

**UNIVERSIDAD SAN FRANCISCO DE QUITO USFQ**

**Colegio de Administración y Economía**

**Causal factors of the banana boom in Ecuador, economic history  
discussion**

**Nicolás Agustín Chuquimarca Arguello**

**Economía**

Trabajo de fin de carrera presentado como requisito  
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**HOJA DE CALIFICACIÓN  
DE TRABAJO DE FIN DE CARRERA**

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Quito, 10 de mayo de 2021

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## RESUMEN

Este artículo identifica, recoge y discute los factores que causaron el boom bananero en Ecuador. Lecturas históricas y teoría económica guían al análisis. Los cuatro factores causales son (1) condiciones climáticas, (2) enfermedad de *Panamá*, (3) infraestructura y (4) herencia de haciendas cacaoteras. Cada factor promovió la producción de bananas a través de incentivos en estabilidad de oferta, precios, transporte y contratación de factores. Los hechos estilizados sugieren que en ausencia de cualquiera de estos factores el boom era poco probable, sino imposible.

*Palabras clave: historia, economía, banana, banano, Ecuador, enfermedad de Panamá, inversión de capital, cacao, haciendas, huasipungo*

## ABSTRACT

This paper identifies, collects, and discusses the Ecuadorian banana boom (1948-1952) causal factors. History reading alongside economic theory guides the analysis. Banana boom is the outcome of four primary variables: (1) climate suitability, (2) *Panamá* disease<sup>1</sup>, (3) infrastructure, and (4) cacao hacienda heritage. The four factors caused supply stability, price, transportation, and input hiring mechanisms. This work concludes that the absence of any of the four factors would have made the banana boom in Ecuador very unlikely, if not impossible.

*Keywords: history, economics, banana, Ecuador, climate, Panamá disease, cacao, haciendas, huasipungo*

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<sup>1</sup>*Panamá* disease (Fusarium wilt) is a fungus that kills banana plants.

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# 1 Introduction

Bananas are the most exported tropical fruit in the world. In 2019, the world market sold 24 760 113 tonnes of bananas. The same year coffee sold 7 879 848 tonnes (three times less) (FAO, 2021). Surprisingly the biggest banana exporting country (Ecuador) is 30 times smaller than the first coffee exporter (Brazil).

The banana industry is important to Ecuador; it represents 14.46% of exports and 3.05% of GDP (BCE, 2021). (Wunder et al., 2001). Due to the banana, an elected Ecuadorian administration accomplished its four-year term (1948-1952) for the first time in seventeen years (Donoso, de Jesús, et al., 2020). Bananas brought agricultural industrialization to Ecuador and trained a specialized labor force. The first agrarian labor association is rooted in 1944 in Tenguel banana plantation (Southgate & Roberts, 2016).

Ecuadorian banana represents 25% of the world export supply (Wunder et al., 2001). The industry historically has influenced local and foreign policies. The biggest company in Ecuador between the 1970s to the 1990s, Bananera Exportadora Noboa, was a banana export firm (Líderes, 2017a; Noboa, 2000). The banana industry also accelerated Guayas, Los Ríos, and El Oro provinces urbanization (Hamerly, 2006). The banana in Ecuador is a broader topic in academics, businesses and society.

This paper uses historical context, stylized facts, descriptive statistics, and economic theory are the primary tools to identify four casual factors of the banana boom. Factor 1 is climate. Ecuador posses optimal conditions for bananas. Additionally, Central American countries (Ecuador competitors) experience stochastic losses due to tropical storms (Ecuador is free). Each time a storm hits Central America, demand for Ecuadorian bananas increases. Robust Ecuadorian supply (a climate outcome) backed up the banana boom. Factor 2 is Panamá disease. The illness removes competition by killing plantations. Therefore bananas become scarce.

At the time when Ecuador began to export, almost all land was malady-free. Conversely, Central American countries underwent severe outbreaks from 1860 to 1950. Panamá disease kept high prices in international markets, priced incentivized an increase in Ecuadorian production.

Factor 3 is infrastructure. Banana export requires roads and ports. Before the banana boom took place, the Ecuadorian government invested in connections. Infrastructure was key to transport fresh bananas efficiently, but more importantly, as public goods, they avoided entry barriers.

Factor 4 is the previous existence of cacao haciendas. These rural estates easily transitioned from cacao to bananas via industrial espionage. Furthermore, after the cacao bust, they allocated land for the banana boom efficiently enough. Cacao haciendas had more flexibility in labor hiring than their highland counterparts and therefore received migrants who transitioned to bananas years after. This work contributes a straightforward entry to the subject and a qualitative foundation for further research.

Structure wise chapter 3 discuss the banana history facts in Ecuador, chapter 4 exposes the economic discussion from stylized facts, finally, chapter 5 exhibits conclusions.

## **2 Literature Review**

The banana industry in Ecuador is an extensive topic, but this work focuses primarily on historical and economic material. Broader literature informs how and why did some agents made the banana a staple fruit outside the tropics (Koeppel, 2008; Chapman, 2014; Striffler, Moberg, Joseph, & Rosenberg, 2003; Marquardt, 2001; Ploetz, 2000). However, precision on the Ecuador banana boom is missing. Works by Coronel (2013); Ibarra (1979) conclude that active government intervention in the economy from 1925 to 1963 resulted from social unrest.

Therefore, if the banana boom coincides with government interest and action in the economy, there is a probability that the government is responsible to a certain extent.

In contrast, Southgate & Roberts (2016) conclude that entrepreneurial conditions far away from politics boosted the rise of a national banana conglomerate. Inversely, Larrea, Espinosa, & Charvet (1987) work states that government intervention was a particular aspect of the banana industry. The government indeed intervened in the economy before the banana boom, but Larrea et al. (1987) acknowledge as crucial while Southgate & Roberts (2016) promotes that intervention was not representative. Caspa (2020) work serves as a middle point because he concludes the highway from Manta to Quevedo (1943-1958) was part of a national road system planned on the last years of the cacao export (1920-1925).

Acosta (2006) promotes the idea that banana production inherited the working force from the cacao haciendas. In the same line Peralta (2016) claims “the need for land by the entrepreneurs and land occupation by cacao peasants forced entrepreneurs to a strategy change. Many cacao landowners decided to intermediate banana and rice exports, and a minority regained control on their properties and copied United Fruit Company to produce bananas in their previous cacao haciendas”. Hamerly (2006) encounters that labor demand for the banana boom encouraged migration from the highlands to the shores. Additionally, Rivadeneira (2020) demonstrates the effects of concertaje labor coercion institution in the highlands as he founds that an increase in 10% of concertaje is associated with a 6% increase in current poverty. His work suggests that migration towards the shores was a viable outside option for highlands indigenous peasants.

Theoretically speaking, works by Acemoglu & Dell (2010); Robinson & Acemoglu (2012) emphasize that incentives, institutions<sup>2</sup>, and public goods may explain why some regions can construct robust economic and social activity in which exports industries thrive. Oppositely, re-

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<sup>2</sup>Institutions in this context refers to rules that determine how social decisions are made (Acemoglu & Dell, 2010).

source allocation theory claims endowments (natural and human) are the more relevant reason for an industry boom (Barbier, 2002).

### **3 Historical background**

#### **3.1 The early stages 1900-1948**

Before significant banana production in Ecuador, the country had a cacao boom which accounted by Acosta (2006) made Ecuador grow at a 2.5% rate in the early 1900s. At the time, 1.3 million people inhabited the country, and they experienced a considerable increase in commercial activities. The best period to export cacao was from 1908 to 1914. In 1908 the first highlands-shores railroad was inaugurated by president Eloy Alfaro. The trail connected the port city of Guayaquil in the Pacific ocean shores with Quito, the country capital, landlocked in the Andes range. This railroad was crucial to Ecuador's economic development since, in past times, only walk-roads linked the cities. Unlike Central American countries, infrastructure projects for connecting cities with the countryside began years before the banana boom. For an example of Central America newcomer strategy in Costa Rica in Costa Rica, check Méndez-Chacón & Van Patten (2019). Between 1920 and 1930, cacao prices decreased worldwide as more competition came to the market and diseases hit plantations in Ecuador.

The economic system under which the cacao boom emerged was the type of sociopolitical alliance between massive landowners, bureaucrats, and catholic authorities. Acosta (2006) reports that the XX<sup>th</sup> century in Ecuador was characterized by a significant migration flow from the highlands (Sierra) towards the shores (Costa). On the shores, the land and working policy offered more room for small to medium private property configurations instead of the Hacienda configuration that prevailed in the highlands. In there, big landowners continually prohibited

labor mobility first under the “Concertaje” as mentioned by Rivadeneira (2020) and which later became the “Huasipungo”<sup>3</sup>. The long migration flow began in 1900 and was mainly from the highlands countryside to the shores fields and towns. Migration flow evidence is found in population records between Guayaquil and Quito. In 1946-1947, both cities ran local census and found a difference of 24 255 people, in which Guayaquil was most populous than Quito (by a 13% contrast). In 1962, the difference between was 156 068 people, a 44% difference, thus confirming a long-lasting migration flow between regions (Hamerly, 2006; Grijalva, 2015).

At the beginning of the 1920s, Ecuador began a disorganized road-building movement. Cuenca, Guayaquil, and Quito concentrated almost all the suitable roads. These roads were built and maintained by local rather than national government (Caspa, 2020). In 1294 Ecuador had 273 road miles available all year, 74 extra miles available in the dry season, and 221 miles under construction (Curran, 1925). In total, local governments had an estimate of 662 road miles as a building target (see figure 1). Surprisingly a piece of Salinas-Guayaquil road was funded by Guayaquil Automobile Club<sup>4</sup> (Caspa, 2020).

In the prosperous ages of cacao boom the cantons home to the biggest operation were Babahoyo, Baba, Machala, Palenque, Vinces, and Yaguachi (Cuetos, 1987). Since labor structure in the shores was non-coercive, the employee status was common<sup>5</sup> even if 16 families<sup>6</sup> controlled significant land share. However, fungus<sup>7</sup> attack on cacao and African countries competition caused a cacao bust. In an exports contraction scenario, country income declined; many business made wage cuts or extended shifts. Former cacao exporters had the faculty to change working conditions without the interference of government (Henderson, 1997).

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<sup>3</sup>Huasipungo, formerly concertaje is a type of property where the indigenous people own a small piece of land inside of a big Hacienda, in exchange the indigenous household supplies all his working hours to the hacienda owner.

<sup>4</sup>Created in 1922 by the wealthiest families of the port city, the club promoted car purchases (Caspa, 2020).

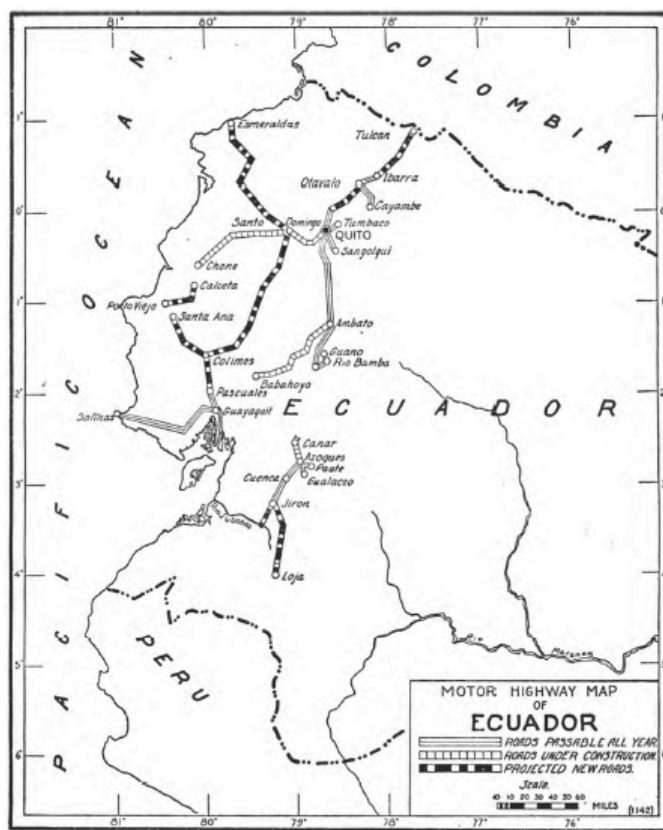
<sup>5</sup>Huasipungero was a common labor status in the highlands.

<sup>6</sup>See Table 9 for details.

<sup>7</sup>The two fungus, Witches’ Broom, and Frosty Pod Rot, were responsible for many plantation closures (Southgate & Roberts, 2016).



Figure 1: Ecuador roads in 1924 (Curran, 1925)



At the time of decline in cacao prices, social conditions deteriorated, and riots emerged in the 1920s. Guayaquil witnessed a worker's massacre in 1922 due to protests against wage cuts. Government officials at the time had little connection with most of the population. In 1925 the July revolution took place and consolidated a coup d'état against president Gonzalo Córdova, establishing two temporary government boards before Isidro Ayora was elected and served as president in the 1926-1931 period. Ayora's actions involved creating the Central Bank of Ecuador (BCE), the social security office, Superintendence of Banks, and the introduction of income taxes (Paz y Miño Cepeda, 2002). The wealthiest families lost power concentration, even though they retained economic influence. When Isidro Ayora left office, country instability produced eight different presidents in ten years. In 1940, all the rail lines ran with financial losses. Therefore public policy shifted towards highway building; no more railroads were constructed nor planned (Caspa, 2020).

The first company to export bananas from Ecuador was Chilean own South America

Fruit Company (SAFCo), which established an office in Guayaquil in 1908 for exports towards Chile (Southgate & Roberts, 2016). United Fruit Company (UFCo) entry in Tenguel hacienda<sup>8</sup> in 1934 serves as the initial point of a relevant banana market in the country as reported by (Striffler, 2001; Larrea et al., 1987; Wunder et al., 2001). Before, the company could not enter the Ecuador market. UFCo lent its reefers to the U.S. Navy in WWI. President Luis Tamayo made Ecuador's first contact with UFCo, yet negotiations did not prevail at that time (Southgate & Roberts, 2016). Tamayo was searching for direct foreign investment, but uninterested executives ran UFCo. The situation reverted when Sam Zemurray ("the banana man") gained management of the company in 1932 (Koepfel, 2008).

UFCo Ecuadorian operation was different from Central America. Instead of building from scratch all the infrastructure needed for production and shipping, the company used the available port of Guayaquil. The lack of *Panamá* disease was Ecuador main attraction for UFCo (Mallesard, 1968). Additionally, labor unions did not exist, and "the pressure absence from the local workforce to build hospitals and schools"(Chapman, 2014). Table 1 shows the first disease reports per country. As production increased, the consolidation of the first labor union of the banana industry occurred in Tenguel a few years after the company was established (Roberts & Sanbrailo, 2009).

Panamá Disease first reports by country (1860-1930)			
Country/Region	Year	Country/Region	Year
Southeast Asia	1860	Jamaica	1911
Australia	1876	India	1911
Panamá	1890	Honduras	1916
Suriname	1906	Indonesia (Java island)	1916
Cuba	1908	Guatemala	1919
Trinidad	1909	Philippines	1920
Puerto Rico	1910	Ecuador	1929

Source: Soluri (2002); Sotomayor Herrera (2012); Mallesard (1968)

Table 1: *Panamá disease expansion*

The banana boom started in 1948 when global prices skyrocketed. From 1946 to 1947

<sup>8</sup>UFCo bought 30,000 hectares as well in Tuara-Vainillo, in Naranjal Canton, Guayas province, although it never had a fully working operation there

the price increased 30.15%. (U.S. Bureau of Labor Statistics, 2020). The growth of prices was a consequence of steady demand and a shortened supply. Central America was in the middle of a severe *Panamá* disease outbreak (Koeppel, 2008). The disease was a long-lasting problem in the region. One scientist in UFCo reported the closures of at least six big banana operations in Panamá, Costa Rica, Honduras, Nicaragua, and Guatemala (Wardlaw et al., 1935). Table 2 shows the operations closed de to *Panamá* disease.

*Panamá* disease-destroyed banana operations  
owned by UFCo

Year	Operation/location	Country
1926	Almirante	Panamá
1939	Truxilio Division	Honduras
1940	Limón	Costa Rica
1942	All producing locations	Nicaragua
1955	Bananera Division	Guatemala
1956	Quepos	Costa Rica

Source: Marquardt (2001)

Table 2: Panamá Disease spread

UFCo and Standard Fruit tried to reach demand quantities by purchasing production both in Ecuador and Colombia. In 1945 Standard Fruit bought the first 100 bunches from a the-unknown businessman, Luis Adolfo Noboa Naranjo, which would become the wealthiest entrepreneur in Ecuador (Noboa, 2000; Líderes, 2017a; Southgate & Roberts, 2016). Previous to the export of bananas, Noboa had successfully made rice exports. Luis Noboa Naranjo was born and raised in poverty, working actively in merchandise resale before getting in touch with Juan F. Marcos, founder of Sociedad General Bank. Sociedad General was an agricultural bank specialized in loans to cacao plantations. Under Marcos's guidance, Luis Noboa learned and developed export business skills (Larrea et al., 1987; Southgate & Roberts, 2016).

Two international factors promoted Ecuador to start banana production (1) major outbreak of *Panama* disease in other producing countries, and; (2) cyclones and hurricanes absence (Striffler, 2001; Wunder et al., 2001). UFCo was present in Ecuador in 1948. However, Standard Fruit signed a contract for buying bananas with Luis Noboa in 1945.

Nevertheless, the national characteristics of Ecuador banana exports are: (1) high number of small and medium plantations; (2) active government policies (specially in infrastructure); (3) multinational companies non-consolidation and; (4) rise of a big national company, Exportadora Bananera Noboa (Larrea et al., 1987; Cueva, 1964).

### **3.1.1 A productive yet isolated region: Santo Domingo**

In the early stages of the banana boom, Santo Domingo de los Tsáchilas<sup>9</sup> and Esmeraldas produced relevant *Gros Michel* quantities. At the time, Quito was the only reachable market for Santo Domingo bananas (Burt, Hitchcock, James, Jones, & Minkel, 1960). Esmeraldas, on the other side, possessed inadequate port facilities and mailed production to Guayaquil before shipping to the U.S. or Europe. Before 1949 a dirt road between Santo Domingo and Esmeraldas did not exist (Burt et al., 1960).

River trips from plantations to Esmeraldas city made bananas to navigate Quinindé and Blanco rivers. *Fruit Trading company*<sup>10</sup> invested in Esmeraldas in the 1940s but went bankrupt in 1950. Ibarra (1979); El Universo (1968) suggest poor infrastructure and disputes with labor unions collapsed the company.

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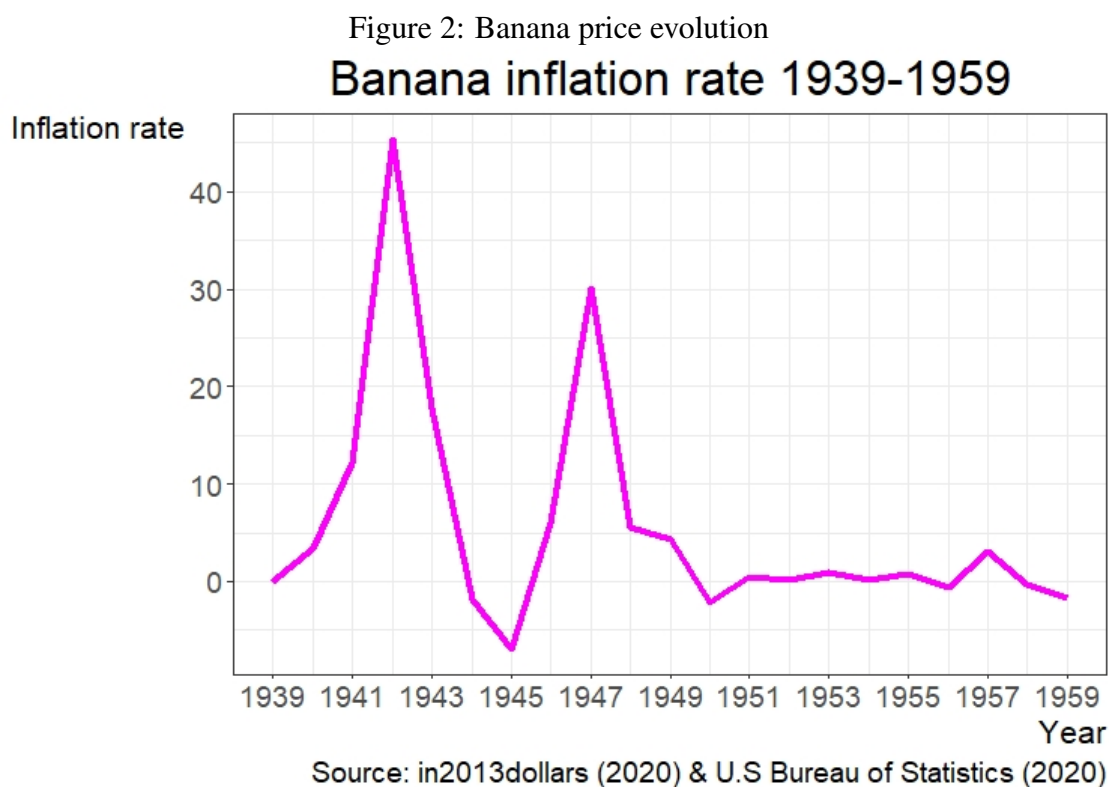
<sup>9</sup>Until 2007, Santo Domingo remained part of Pichincha province.

<sup>10</sup>Also known as Bananera Astral was based in Esmeraldas city

## 3.2 Full Banana Mode 1948-1990

### 3.2.1 *Gross Michel* boom

After 1948, the prices rose, and a steady production concentrated in Guayas province gave birth to the banana boom in Ecuador. Figure 2 shows price inflation rate from 1939 to 1959<sup>11</sup> of bananas for consumers in the US.



As the government assumed the expenses over infrastructure (specially ports), the settlement for foreign companies was less expensive than their original investments in Central America. Nevertheless, from 1955 onwards *Panamá* disease expanded without control throughout Ecuador. Standard Fruit introduced the *Panamá* disease-resistant *Cavendish* banana in 1955<sup>12</sup> primarily on Central America (Koeppel, 2008). As a consequence, UFCo abandoned Tenguel in the 60s decade and re-established Central American plantations.

<sup>11</sup>Base year is 1982-1983, a complete 1939-2020 series is available in the appendix (see Figure 11).

<sup>12</sup>Ecuador began the change in 1967 (Larrea et al., 1987)

Galo Plaza Lasso served as president during the banana boom period (1948-1952). Its “development economic public policy” made technical approaches to problems (Donoso et al., 2020). His administration took the U.S. economic and social systems as gold standards (Gómez & de la Torre, 2008). Galo Plaza administration brought international experts to collect data and create policy suggestions. The outcome was the report *El desarrollo económico del Ecuador (Ecuador economic development)* (Gómez & de la Torre, 2008), published in 1948. Unfortunately, actual copies are unavailable. However, during his presidency, he could not extensively address the land concentration problem, especially in the highlands (Donoso et al., 2020). He was unable to disrupt the Huasipungo institution since big haciendas remained almost untouched.

In the short run, Galo Plaza Lasso’s economic policies aimed to initiate more banana plantations by lending at low-interest rates with the Banco Nacional del Fomento (Gómez & de la Torre, 2008). Clemente Yerovi, economy minister, created the first small and medium farmers cooperatives with access to loans and machinery (Donoso et al., 2020). As farmers improved quality and quantity, Luis Noboa finally founded a fruit exporting company in 1956 after not renewing Standard Fruit (Larrea et al., 1987; Southgate & Roberts, 2016; Noboa, 2000).

Noboa’s business model is the following. First, Noboa agreed to buy bananas from medium and small farmers. Then he coordinated the shipment via land or river to Guayaquil port, there a Grace Line ship loaded the fruit just after arrival (Noboa, 2000; Southgate & Roberts, 2016; Larrea et al., 1987). The schedule was consistent, coordinated, and disciplined. Until 1955 Noboa’s relied on multinational firms to reach the final consumer. Alongside his partner, Juan X. Marcos contacted Shillo Adir in New York City. Adir served as the middleman who negotiated directly with supermarkets. Marcos financed the project while Noboa was in charge of operations. From this point, Noboa reached new markets by first partnering with local fruit importers. Then he purchased that local intermediaries business side or learned import procedures in each country. The result of their efforts was the transformation from a local sup-

ply company to a multinational. Exportadora Noboa company sold bananas in North America, Europe, Japan, and the Middle East.

Table 3 compiles banana production both for exports and as total production, in metric tons. Data appears to be unreliable in 1951 when the share of export production fell 20%, but global output increased. The margin of error is high since the information comes from two secondary sources (Donoso et al., 2020; Larrea et al., 1987).

Banana production in Ecuador (1949-1952) in metric tonnes.			
Year	Exports	Total production	Share of exports
1948	99 600	179 084	56%
1949	138 000	221 688	62%
1950	169 600	265 407	64%
1951	246 500	595 500	42%
1952	429 800	676 900	64%

Sources: Donoso et al. (2020); Larrea et al. (1987)

Table 3: Banana production data under Galo Plaza Lasso administration

Noboa exploited business conditions before anyone else. He took advantage of (1) public investment in the construction of roads and ports, (2) promotion of technical agriculture, and (3) low taxes in the banana export industry.

Exportadora Noboa grew in the last decade of the *Gros Michel* variety. He dominated Belgium, Germany, Sweden, and Italy markets (Southgate & Roberts, 2016). After UFCo's departure in 1962, Noboa and Standard Fruit remained the two dominant exporters.

### 3.2.2 Labor Unions

In the 1955-1965 period *Panamá* damaged severely Ecuadorian plantation. Simultaneously Central America began the transition to *Cavendish* variety. The United Fruit Company aban-

done the country in a disorganized way in 1961 and 1962. A peaceful shift of ownership towards the buyers and employees ended in a riot when the labor union leaders incited the members to invade the property in 1962 (Mendoza, 2018)<sup>13</sup>. When the invasion took place, president Otto Arosemena Monroy initiated an expropriation process for the whole plot in may 1962 (Ibarra, 1979).

The Tenguel invasion shows that labor unions' influenced the banana market. Labor unions became prominent at the same time that UFCo and Astral abandoned Ecuador. Rudimentary workers associations began in cacao bust last days, indebted landowners sold their properties in small plots and rent the remaining. In the transition towards banana cropping, a remaining landowners portion became production managers. In search for efficiency, they paid wages to workers (instead of a tenant system) (Ibarra, 1979). Once settled in wages, labor unions emerged as a mechanism to demand welfare practices. Tenguel workers created the first agricultural labor union in 1944. Esmeraldas' workers, later on, established a labor union in Bananera Astral plantations.

Fruit Trading Company (Bananera Astral) disappearance was related to labor unions confrontations. The company cultivated four plantations (Cole, San José, Río Blanco, and Timbre) with an area of 7 thousand hectares. The first of many strikes took place in Río Blanco in 1955, workers demanded wages and work conditions improvements (Martinez, 1976). Table 4 reports all the labor strikes taken under banana-producing haciendas between 1955 and 1962. Additionally, Astral started to run at a loss when prices diminished from 1948 throughout all the 50s.

The final strike in "El Timbre" 1962 collapsed the company. Astral lost El Timbre to the government due to social security debt and went bankrupt. The owner, Folke Anderson, was murdered in his apartment in 1968 (El Universo, 1968). Eventually in 2009, the government

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<sup>13</sup>In the original plan, half Tenguel was going to be sold to potential buyers and the other distributed to employees.



formally distributed 12 000 hectares to farmers<sup>14</sup> (El Comercio, 2009). On the other hand, Exportadora Noboa did not fight with labor unions since producers did not belong to the payroll.

Banana workers strikes in Ecuador 1955-1962				
Year	Name of the hacienda	Company	Canton	Province
1955	Río Blanco	Astral	Quinindé	Esmeraldas
1956	San José	Astral	Quinindé	Esmeraldas
1958	Soledad	Plantaciones Ecuatoriana	Balao	Guayas
1959	San Antonio del Delta		Quevedo	Los Ríos
1960	Tenguel	UFCo	Guayaquil	Guayas
1960	La Clementina	Banamera Noboa	Babahoyo	Los Ríos
1962	Tenguel	UFCo	Guayaquil	Guayas
1962	Timbre	Astral	Esmeraldas	Esmeraldas

Source:Ibarra (1979).

Table 4: strikes in banana plantations

Labor unions gained ephemeral benefits since foreign companies abandoned production and transitioned only to port transportation (Ibarra, 1979; Larrea et al., 1987). In consequence, after the banana boom, an export monopsony was created.

### 3.2.3 *Cavendish* new variety, new hopes

*Panamá* disease threatened bananas to disappear. Fruit monoculture nature meant that after one plant was contaminated, the whole plantation end was a matter of weeks (Ploetz, 2000). Under risk, Standard Fruit first introduced the *Cavendish* variety for mass consumption in the latter 50s. In Ecuador, the change was initiated in 1967 (Larrea et al., 1987). Since Standard Fruit had already invested in introduction costs (technology and marketing), Ecuadorian companies could free-ride (Southgate & Roberts, 2016).

Nonetheless, the new variety could not resist another fungus's appearance, which produced the Black Sigatoka Disease (BSD). The sickness is fought with chemical pesticides, fumigation investments, yet they were provided by big producers themselves or by government

<sup>14</sup>In total government owned a 70 000 hectares

Black Sigatoka Disease first report by country			
Country	Year	Country	Year
Fiji	1963	Costa Rica	1979
Malaysia	1965	Panamá	1981
Thailand	1969	Colombia	1981
Honduras	1972	Ecuador	1986
Guatemala	1977	Cuba and the Caribbean	1991
Nicaragua	1979		

Source: Larrea et al. (1987); Lopez & Perez-Vicente (2013)

Table 5: Spread of Black Sigatoka Disease (BSD)

assistance (Striffler, 2000). According to Lopez & Perez-Vicente (2013) “BSD infect the leaves, reducing the plant’s ability to photosynthesize. The fungus produces spores [...] in as little as three hours, the spore begins to spread the disease”. Table 5 reports the exhibits the BSD first reports by country.

*Cavendish* adoption made plantations denser, geographically, and economically concentrated. Plantations that transitioned successfully to *Cavendish* variety clustered around El Oro, Guayas, and Los Ríos. Table 6 presents the most significant cantons for banana production in 1987.

Cantons with more banana plantations 1987	
Canton	Province
Machala	El Oro
Santa Rosa	El Oro
Pasaje	El Oro
El Guabo	El Oro
Balao	Guayas
Naranjal	Guayas
Santa Isabel	Azuay

Source:(Larrea et al., 1987)

Table 6: Cantons with stable banana production

The *Gross Michel* variety was harvest and directly loaded. Once cut, the stems traveled without extensive washing. *Gross Michel* was resistant to transport mishandling and smashes (Wunder et al., 2001). On the other hand, *Cavendish* banana needs complete care.

Chiquita (2012) claims a *Cavendish* bananas need to be exported in a box which travels at 13°C (55.4°F). First, a fruit stem needs to be cut from the tree. Each stem has between 5 to 20 hands. Each hand consist of 5 or 6 fingers. Each finger is a banana. When the stem is out of the tree, a worker carries it to a cable system that transports bananas to a packing station. In the packaging process, the hands are cut off and classified into clusters by their size. The last step in the packaging station is to combine different clusters in a box. Inside the box, both plastic and blotting paper cover the hands. Then, bananas are shipped to a port in cold control containers. Once in the destination country, bananas are ripened in weather-controlled conditions, and they jump out of the box with a yellow color just before they go to sale (Chiquita, 2012).

In 1976, Standard Fruit began a program of associate producers in which producers cropped bananas under contracts using Standard Fruit's technical methods. The associate producers' program allowed farmers to acquire machinery, loans, and technical assistance. Larrea et al. (1987) argues associate program discouraged newcomer producers. *Cavendish* variety transition also changed land demand. Larrea et al. (1987) reported a substantial reduction in the labor force dedicated to banana growth and export. 60 000 jobs in 1960 transformed to 32 000 in 1987.

### **3.2.4 How does the export market was structured?**

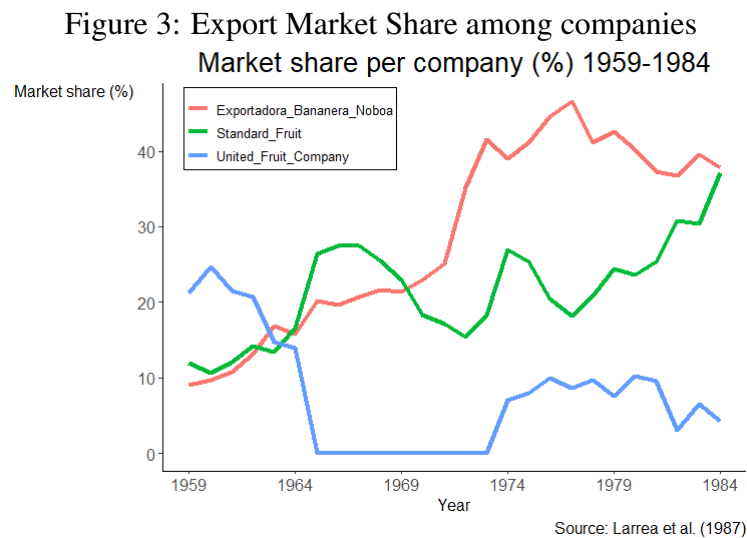
After UFCo left Ecuador (1962-1963), both Noboa and Standard Fruit could dominate exports from Ecuador. Standard Fruit bought UBESA (Unión de Bananeros Ecuatorianos S.A.) in 1978. In 1990 the company was renamed Dole Ecuador<sup>15</sup> (Líderes, 2017b; EMIS, 2020). In 1964, Noboa bought his first banana producing-plantation, Hacienda *Martinica*, located in Pimocha, Los Ríos province. Later on he bought hacienda *La Clementina* in 1980 (Noboa, 2000; Southgate & Roberts, 2016). Since Cavendish travelled in boxes, Luis Noboa created *Industria Cartonera Ecuatoriana (Ecuadorian box Industry)*. Exportadora Noboa secured an essential

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<sup>15</sup>Standard Fruit changed its name to Dole Food Company Inc. in 1964.

element in the supply chain (Larrea et al., 1987).

Del Monte company entered Ecuador in 1977. At the time, Bananera Noboa and Standard Fruit had the biggest share of exports at 46,62% and 18,20% respectively (Larrea et al., 1987). Figure 3 shows the dynamics of competition among Noboa, UFCo and Standard Fruit<sup>16</sup>



A National Merchant Fleet was created in 1952 following a 200 nautical miles sovereign right declaration (Aleman Ruiz, 1987). In 1965, The Ecuadorian Banana Fleet (Flota Bananera Ecuatoriana) was created<sup>17</sup> with four ships in assets. Moreover, Aleman Ruiz (1987) claims the company reported losses from 1967 to 1972 due to wrong pricing policy, although it received fuel subsidies.

Before the Ecuadorian Banana Fleet, Grancolombian Merchant Fleet (GMF) offered shipping supply. In 1968, the Ecuador government decided to stop contracts with GMF and initiated the National Merchant Fleet (NMF) (Toledo Echeverría, 1981). In September 1971, Jose María Velasco Ibarra created another company, TRANSHAVE (Transporte Navieros Ecuatorianos). Instability on companies number and size pushed exporters to constantly hire Grace Line Company and rarely enrolling for space in an NMF ship.

<sup>16</sup>Figure 12 in appendix exhibits market share competition for 6 companies

<sup>17</sup>Since 1953, it was a paper company. Therefore it was an organization that exists for financial, administrative, or political reasons. A paper company does not produce.

Exportadora Noboa opened offices in London and Antwerp in 1974. The company's goal was to become the biggest banana exporter for Europe. In 1964 the company bought a 13 ship fleet. Noboa (2000) mentioned ships with Ecuadorian address needed to pay 16% tax on cargo value. Therefore the company decided to establish itself in the Bahamas.

In 1976, five companies accounted for 88.9% for Ecuadorian bananas export. Simultaneously production was composed by thousands of independent farmers (Larrea et al., 1987). The latter suggests the production side was a monopolistic competition while export companies held monopsony. Since banana price fluctuates<sup>18</sup> year-round, export firm concentration gave them bargain power.

In 1974 Central American countries and Colombia launched the Organization of Banana Exporting Countries (UPEB) to replicate OPEC success in rising commodity prices. In 1975, the cartel announced a standard per-box export tax. Ecuador declined cartel invitation due to lobbying from independent producers. UPEB failed to change the price significantly. The tax made Ecuadorian bananas cheaper. The outcome was a rise in Ecuador exports (Striffler et al., 2003).

### **3.3 Fall in grace, still a giant, 1990-present**

In Ecuador, the banana industry was relegated to second-order exports due to oil exploitation in the east Amazonian forests beginning in 1974 (Acosta, 2006; Gerlach, 2003). On the other hand, Central American countries did not discover oil reserves. Today, their exports still rely on agricultural commodities (e.g., Honduras and Costa Rica).

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<sup>18</sup>Production shrinks globally from December to April due to climate conditions in Africa and Central America (Aggrey-Mensah & Tuckwell, 1969; Southgate & Roberts, 2016).

### 3.3.1 Competition in production, year 2000

Trough January to December 2000, the National Institute of Statistics and Census (INEC) and the SICA<sup>19</sup> project conducted the third national agricultural census. Table 7 compiles the number of hectares sowed for bananas in all the country at the province level.

Hectares of sowed bananas in Ecuador, 2000		
Province	Hectares	Share %
Azuay	2417,87	0,92
Bolívar	13546,01	5,15
Cañar	5920,23	2,25
Carchi	118,22	0,04
Chimborazo	1230,31	0,47
Cotopaxi	6160,14	2,34
El Oro	45581,18	17,34
Esmeraldas	26865,19	10,22
Galapagos	227,76	0,09
Guayas	45965,50	17,49
Imbabura	110,04	0,04
Loja	25001,01	9,51
Los Ríos	52910,89	20,13
Manabí	23936,27	9,11
Morona Santiago	4082,05	1,55
Napo	328,11	0,12
Orellana	542,72	0,21
Pastaza	523,01	0,20
Pichincha	4365,26	1,66
Sucumbios	1186,69	0,45
Tungurahua	0,02	0,00
Zamora Chinchipe	1850,55	0,70
Total	262869,03	100,00

Table 7: Banana plantations per province

Table 7 demonstrates the shores achieved banana production specialization. Esmeraldas, El Oro, Guayas, Loja, Los Ríos, and Manabí accumulate 83,79% of the land dedicated to banana production. Only Los Ríos and Loja are landlocked provinces. However, they are very near an

<sup>19</sup>*Sistema de Integración de Centro América SICA* is an ongoing project of the World Bank in which it provides technical assistance for information related to agriculture and development strategies.

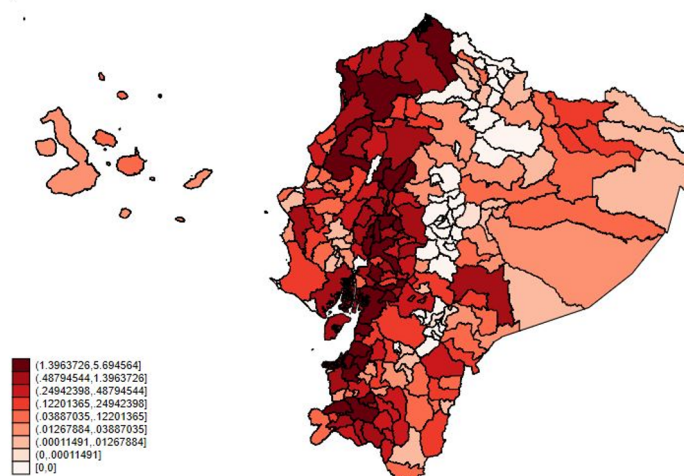
export port<sup>20</sup>.

Table 3.3.1 tests validity of Table 6 proposed by (Larrea et al., 1987). The outcome is that the six cantons accounted 23,67% of national hectares dedicated permanently to banana cropping. Balao canton is the home of Tenguel Hacienda, formerly UFCo property. Figure 4 shows instead that the banana industry clustered in the south shores side<sup>21</sup> (Guayas and El Oro).

Hectares of sowed bananas in Ecuador, selected cantons year 2000				
Province	Canton	Hectares	Province Share	National Share
El Oro	Machala	10653,21	23,37	4,05
El Oro	Santa Rosa	6320,86	13,87	2,40
El Oro	Pasaje	8875,45	19,47	3,38
El Oro	El Guabo	15154,64	33,25	5,77
Guayas	Balao	7915,40	17,22	3,01
Guayas	Naranjal	13291,05	28,92	5,06
Total		62210,62		23,67

Table 8: Banana plantation per canton, selected

Figure 4: Hectares dedicated to banana production per canton



<sup>20</sup>Babahoyo in Los Ríos is 72,7 kilometers away from Guayaquil (Google, n.d.-a), and Puyango (the main banana producer canton in Loja) is located 133,6 km away from Puerto Bolívar (Google, n.d.-b).

<sup>21</sup>Province level map is available in the appendix to see Figure 13.

### 3.3.2 Unfeasible Labor Unions

In the year 2000, the standard practice for banana export companies was that they bought bunches by agreements with producers. Plantation managers on their side hired workers temporarily at a given wage without social association (Striffler, 2000). E.g., haciendas hired packaging personnel in groups outside the payroll. They do not belong to any plantation as workers. They worked per day.

Labor unions became unfeasible because employers fired all members after a group conformation. Riots towards plantation owners were not realistic as owners justified their actions on multinational procedures. Since the export companies' operated in cities<sup>22</sup>, complaints with exporters were not the solution either. Even Exportadora Noboa changed its headquarters from Guayaquil to New York in 1993 (Noboa, 2000).

The practice of non-hiring permanent personnel production came to an end in 2013 when the Rafael Correa administration approved a ministerial agreement for labor formalization. Workers in all industries must be included in the payroll inside and in the social security program (El Telégrafo, 2013). Policy enforcement remained adverse as many producers declared themselves unable to pay for all the labor benefits. In the industry, smaller, less capital-intensive plantations constantly hired children (Pier & Zamvil, 2002).

## 4 Main analysis

This chapter settles historical background ideas into an economic framework. Recall from chapter 3 that Ecuador became a banana export country due to climate, transport infrastructure, a banana malady, and transition from cacao. This chapter queries whether the banana boom was

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<sup>22</sup>Standard Fruit had a small office in Machala with almost no personnel (Striffler et al., 2003).



still possible in the absence of any of these elements.

#### 4.1 Factor 1: Climate

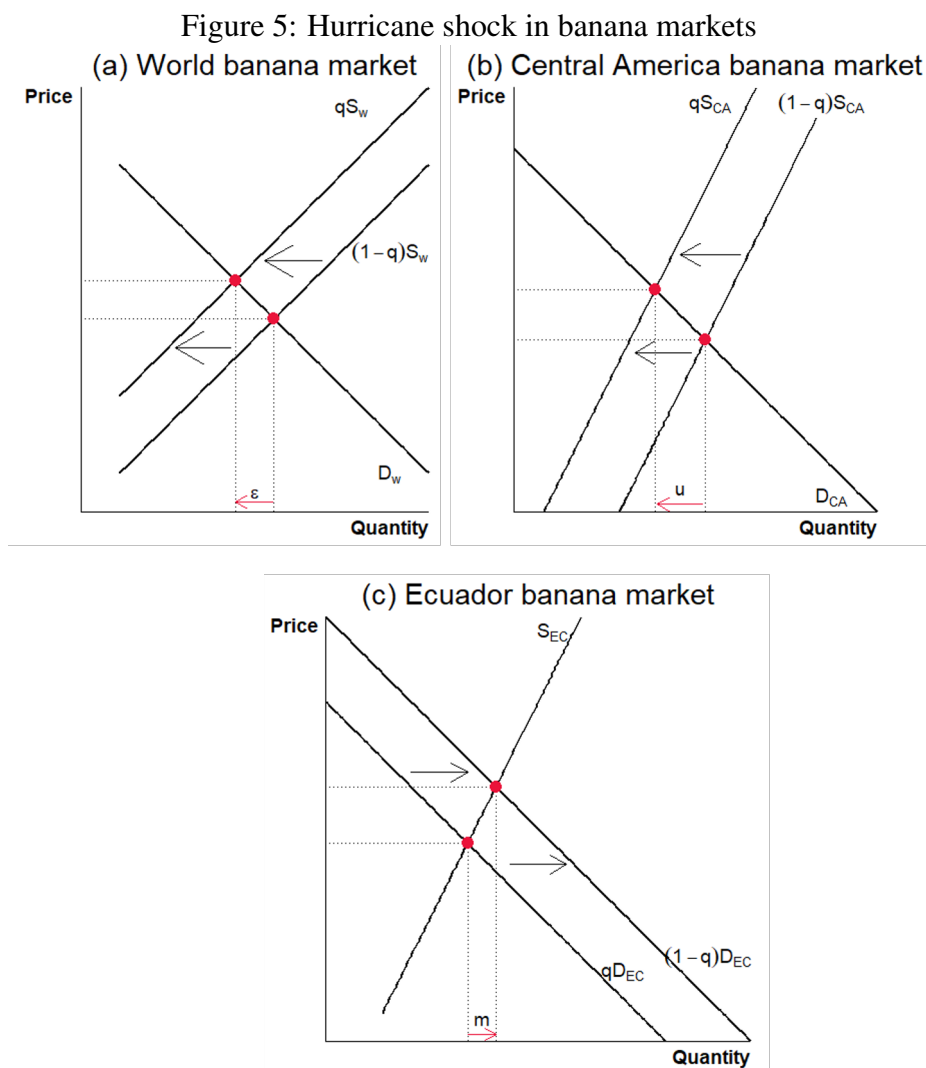
Multinational companies such as UFCo actively searched for plots in Latin America to begin new plantations before the banana boom in Ecuador. Ecuador soil was fertile and rains ideal all year (Southgate & Roberts, 2016). The ground needs to handle good drainage, a pH around 6-7.5, and long-lasting moisture (Turner & Lahav, 1985). From north to south, Ecuador's shores possess these climate characteristics. Furthermore, Ecuador is hurricane-free, which helps the country to differentiate from competitors.

In the first place, in Caribbean countries, hurricanes are an annual danger. Storms can hit from June 1 to November 30 at any point in the Caribbean basin<sup>23</sup>. The *Gros Michel* variety is especially susceptible to hurricanes. The plant is thin and tall (1.82-3.7 meters). Therefore, a combination of strong winds and torrential rain has the potential to ruin entire plantations (Koeppel, 2008). As *Cavendish* variety is smaller (1.70-3 meters) it is less susceptible. According to National Oceanic Atmospheric Administration NOAA (2019) an average hurricane season produces 12 tropical storms, 6 become hurricanes, on which three may evolve into a major storm. Hurricanes are a stochastic shock in the world supply of bananas. Remember from chapter 3 that banana supply relied heavily on monoculture and that each plantation resembles more a fruit fabric than a family farm (Ploetz, 2000; Koeppel, 2008). Therefore, scheduled production and consistency are at the business core.

Assume that only Ecuador and Central America countries produce bananas. Each one provides  $\frac{1}{2}$  of the total supply. Consider  $q$  as the probability of a major hurricane hits Central America and  $1 - q$  as the probability none major hurricane arrives. When  $q = 1$  Central America is under a heavy storm, their supply receives a negative shock  $((1 - q)S_{CA} \rightarrow qS_{CA}$  in Figure 5

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<sup>23</sup>That includes Honduras, Costa Rica, Nicaragua Guatemala among other nations



(b)). The amount of bananas exported is reduced in a negative magnitude  $u < 0$ . Since Central America is one of two producers in the market, the global supply curve receives a negative shock (world supply shifts from  $(1-q)S_w$  to  $qS_w$  in Figure 5, (a)). Yet the negative quantity shock  $\epsilon < 0$  is less severe than Central America local market ( $u < \epsilon$ ). Ecuador responds to the shortfall by producing more bananas. This mechanism allows the world market to tackle the supply shock. In the Ecuador market, the supply curve remains unchanged. Instead, the demand for Ecuadorian bananas relocates to a greater level, shift from  $qD_E$  to  $(1-q)D_E$ , Figure 5 (c). The change in quantity supplied is  $m > 0$ . This change in local equilibrium allows the banana world market to reduce the effects of a hurricane in Central America ( $m + u = \epsilon$ ,  $|u| > |m|$ ).

Climate is an endowment factor that enabled the banana boom in Ecuador. Soil, tempera-

ture, rain, and moisture are crucial elements to the suitability of crops. Hurricanes, on the other side, are probabilistic events that alter worldwide supply. Since Ecuadorian supply was robust to the hurricane shock in the first years of the banana boom, Ecuadorian banana plantations gained a reliable reputation. The latter made Ecuadorian bananas a staple commodity in world trade.

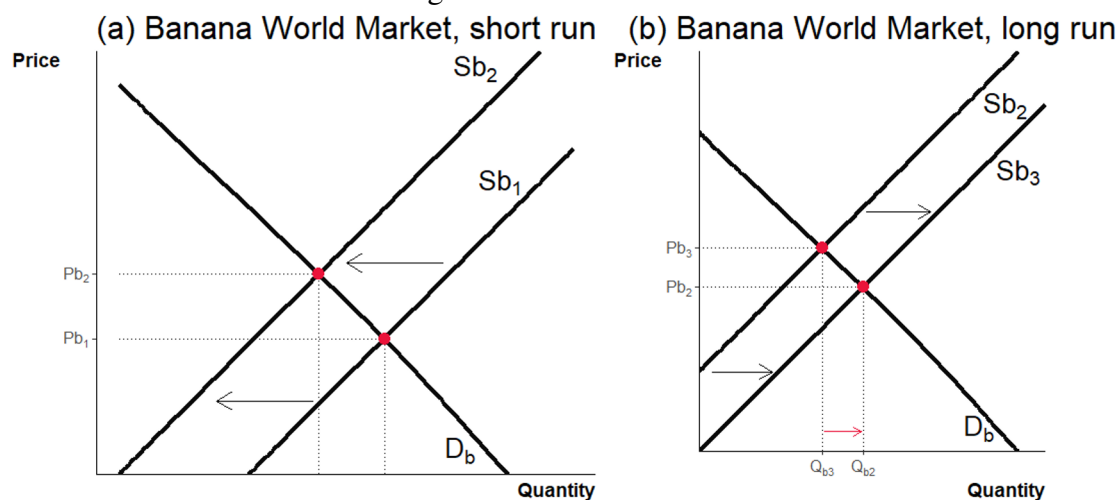
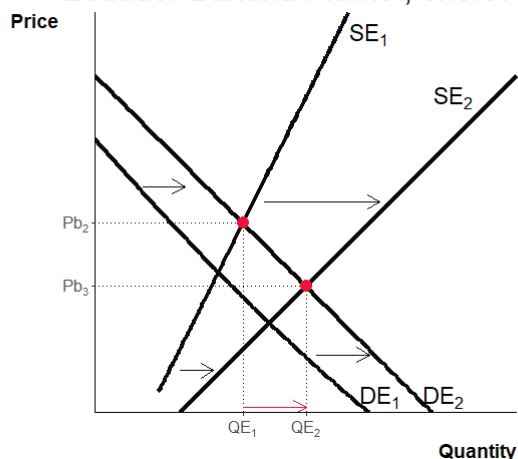
## 4.2 Factor 2: Panamá Disease

*Panamá* disease hurts the plant of bananas and makes it unable to produce. The sickness spreads in relatively short periods and is highly transmissible. Ultimately is the monoculture agriculture consequence (Ploetz, 2000).

Marquardt (2001); Striffler (2000) argue that instead of a short-run shock, *Panamá* disease was a structural problem for the banana industry. Land destroyed by the fungus was no longer useful, capital, and labor displaced. In response, large firms (Standard Fruit and UFCo) set up plantations in virgin soil, soon *Panamá* disease hit again, and the process was repeated (Koeppel, 2008; Chapman, 2014). Constant set up and abandonment of plantations made the world supply to shift left,  $sb_1 \rightarrow sb_2$  (see Figure 6, panel (a)), *ceteris Paribus*, the price per bunch went up. There are two relevant periods of banana price rise, from 1940 to 1943 and again from 1946 to 1949 (see figure 2). Prices encouraged the entry of new producers such as Ecuador.

Consider the period from 1934 to 1952 as the short run and the long run from 1952 onwards. In the short run, suppliers had the incentives to produce greater banana quantities. Consequently, I estimate Ecuador was able to set up a reliable supply starting at 1935-1936. As the prices kept growing, high revenue surpassed investment costs in short periods, so more farmers transitioned to banana exports. *Panamá* disease as an structural factor rearranged Ecuadorian demand rightwards ( $DE_1 \rightarrow DE_2$ , see figure 7). The result was a hike in the price per bunch.

Figure 6: Banana Market

Figure 7: Ecuador  
Ecuador Banana market, short run

Producers received  $Pb_2$ . Since independent producers copied UFCo and were attracted to the market because of the massive increase in world prices  $pb_1 \rightarrow pb_2$  (see figure 7), the Ecuadorian supply curve shifted from  $SE_1$  to  $SE_2$ . Still, I suggest that the supply curve suffered a change in slope since newcomer producers hired inputs at lower prices than multinationals. Curves  $SE_2$  and  $DE_2$  show the convergence towards a new market equilibrium in the long run ( $Pb_3, qE_2$ ).

World markets achieved long-run stability in the point  $Pb_3, qb_3$  (figure 6 panel (b)). The banana price remained stable from 1951 to 1960. See Figure 2. Supply was stable, and demand remained predictable. It grew according to the economic development of rich countries. Burrell & Henningsen (2001) reports price elasticity of demand (PED) for bananas is in the interval

from 0.29 to 0.55, which means that demand quantity diminishes 4% as a cause of a 10% price increase. Elasticity values reflect bananas are a primary necessity among import countries.

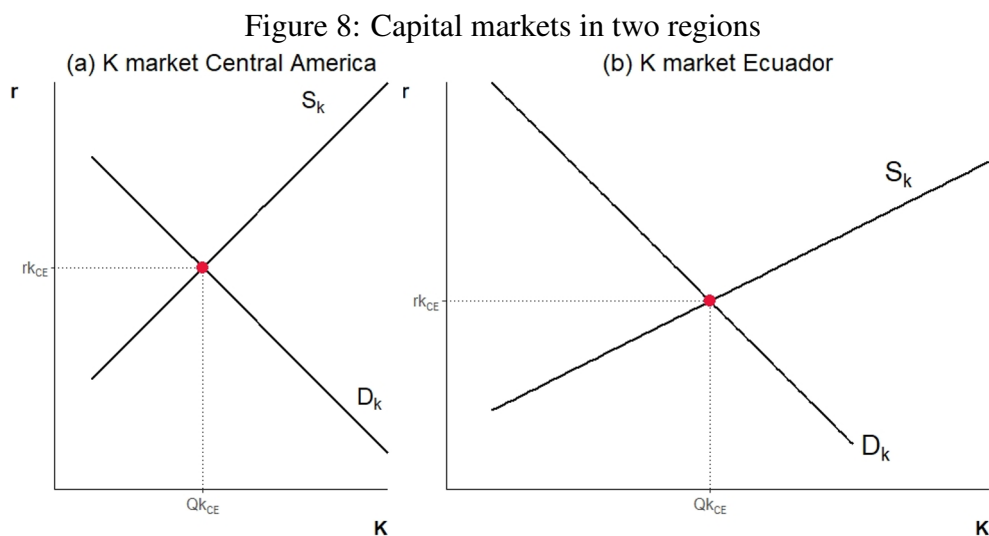
*Panamá* disease is a causal element for the boom through the price mechanism. If *Panamá* disease never emerged, probably Ecuador's banana boom would not have taken place. Simultaneously *Panamá* disease pushed multinationals to produce outside Central America.

### 4.3 Factor 3: Infrastructure

Ecuadorian history and Galo Plaza Lasso himself claimed the banana boom was resulted from government economic policy (Gómez & de la Torre, 2008). However, the boom was already taking place when Plaza Lasso arrived to office. Caspa (2020) documents that governments, both local and national, invested money for improving connections from the shores fields to the ports.

To understand how the capital investment in Ecuador was a causal factor for the banana boom, think of infrastructure as a factor endowment. Roads are country assets. They serve as input in any production process. Therefore infrastructure development is dependent on regional economic activities. Cacao was a prominent industry before banana. Thus it created the incentives to develop road networks alongside the cacao plantations and ports. More importantly, before 1927, the local governments received direct tax contributions from export duties (Wiles, 1971).

Figure 8 illustrates the difference in capital markets from Ecuador and Central American countries. The main difference is that the supply curve is at a higher level for Ecuador's market ( $Sk(a) \neq Sk(b)$ ). Since government revenue was a function of export and import goods, the more the trade-in Guayaquil docks, the more taxes government could raise. Infrastructure build was incentive-compatible with tax increases.



Capital stock construction lasts several years. Then inelastic capital supply is a plausible assumption. Instead,  $Sk(b)$  slope in Figure 8 theoretically displays capital supply in Central America. This curve is more inelastic and at a lower level because when banana plantations emerged in Central America, few people lived in the area. Companies build infrastructure on their own without any access to local taxes. In exchange, those companies assured for themselves significant land portions (Koeppel, 2008). Within a private capital frame, the owner company charges tolls that increase marginal costs to its customers, potentially creating barriers of entry. In a public capital scenario, infrastructure is public and tax-financed. The creation, expansion, and maintenance of public infrastructure promoted the banana boom.

Economic theory in this chapter suggests more quantity of infrastructure in equilibrium was supplied in Ecuador in contrast to Central America  $Sk$  in (a) and  $Sk$  in (b). Barriers to entry absence in Ecuador is public capital investment main contribution to the banana boom. Better connection increased income for exporters, producers, and the government (by taxes). The rapid entrance of many independent producers was a consequence.

## 4.4 Factor 4: Cacao Haciendas

Banana production started in cacao export foundations. Export expertise, land and labor markets received influence from the cacao haciendas (Guerrero, 1975; Henderson, 1997; Roberts, 1980; Peralta, 2016).

### 4.4.1 Cacao haciendas Industrial Espionage

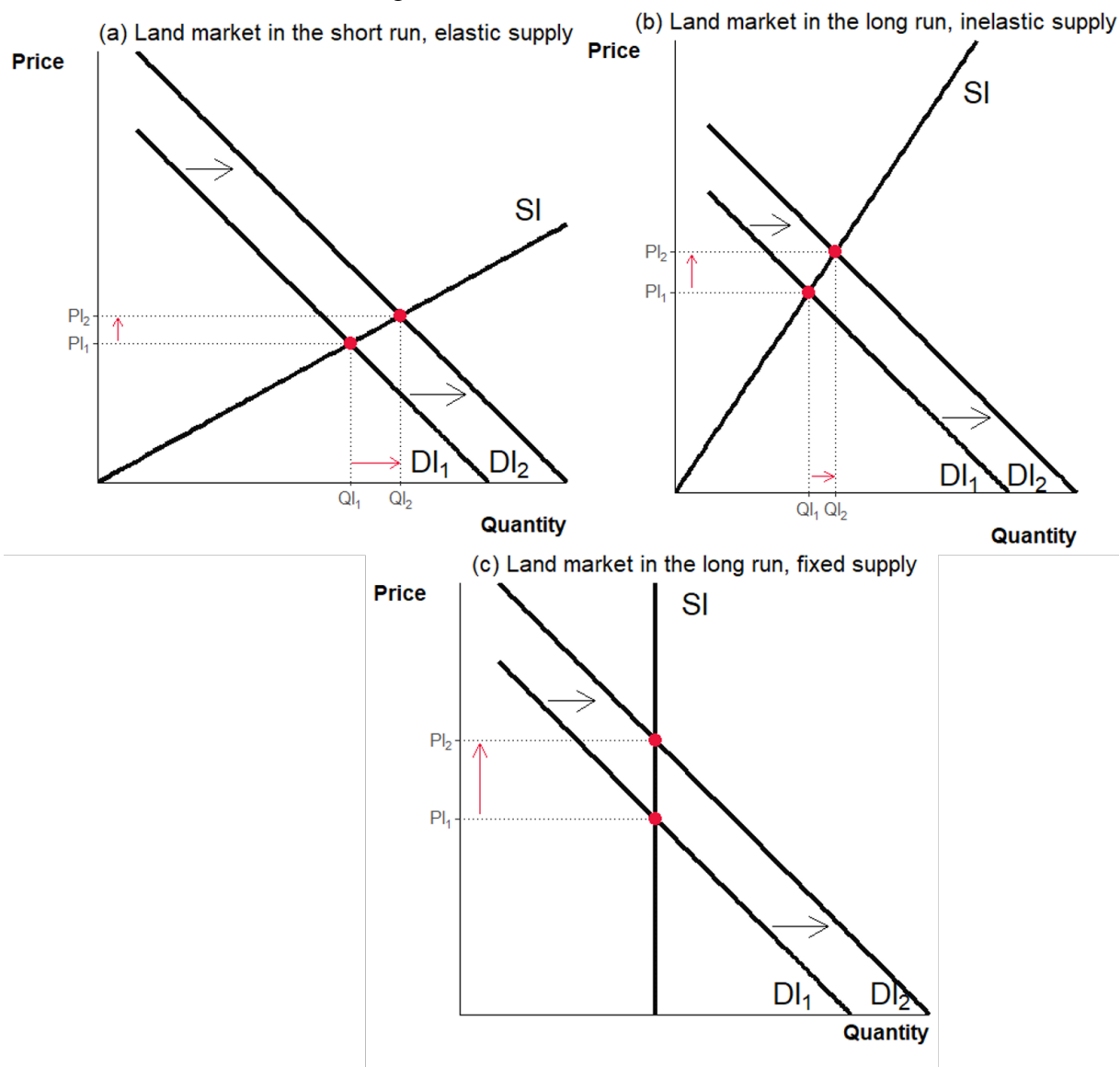
As Peralta (2016) mentions, some of the first local banana producers copied UFCo methods by sending their more trustee workers to Tenguel plantation. The local farmers had been cacao exporters. Industrial espionage leaked valuable information from a more prominent firm to several medium and small companies. The result is the increase in production competition. Additionally, the learning curve to crop was reduced significantly to locals. Once locals gained proficiency, independent producers achieved economies of scale, efficiency, costs reductions, and profits increases. The knowledge acquisition allowed Ecuador to create a banana boom rapidly.

### 4.4.2 Cacao haciendas influence on the land market

Beyond industrial espionage, cacao haciendas influenced the land market. In the short run, the land market had an elastic supply because suitable plots transitioned from cacao to bananas. Landowners fought to recover control from unproductive land, which cropped cacao in the past. They sold or initiated banana production (Peralta, 2016).

Figure 9 panel (a) demonstrates that an elastic supply ensured plot prices increases and the augment in the plot quantity for sale ( $Pl_1 \rightarrow Pl_2$  and  $Ql_1 \rightarrow Ql_2$ ). This short-run equilib-

Figure 9: Land Market scenarios



rium captures only plots that had the capacity of immediate incorporation from cacao to banana cropping. Considering that cacao haciendas affected the infrastructure. The first banana plantations in Ecuador had not been randomly allocated. Parallel to an elastic land supply from former cacao landowners, the government promoted land reclamation in non-populated areas<sup>24</sup>, promising to connect them by roads (Burt et al., 1960; Gómez & de la Torre, 2008; Roberts & Sanbrailo, 2009). Nevertheless, considering that the banana boom was initiated in 1948, public land colonization is an outcome instead of a causal factor.

<sup>24</sup>Gómez & de la Torre (2008) mentions in July 1949, 9493 hectares were sold at a meager price: 3653 ha in Esmeraldas, 2457 ha in Los Ríos, 1709 ha in Manabí, 1354 ha in Guayas, and 320 ha in Cañar. However, the plots government sold were not the most productive nor road connected.



In the long run, the land supply became inelastic or even fixed. In the inelastic supply scenario the market equilibrium  $Sl = Dl_2$  in Figure 9 panel (b) exhibits an increase in prices ( $pl_1 \rightarrow pl_2$ ) greater to the increase in plots sold ( $Ql_1 \rightarrow Ql_2$ ). Proper connections in the shores for banana plantations outside the cacao haciendas were absent. Hence plots could be supplied after the completion of public or private infrastructure alongside them. The final assumption states that land supply, in the long run, was fixed. Within this frame, a rise in demand has the unique effect of price raises ( $Pl_2 \rightarrow Pl_2$  see panel (c) Figure9) I conjecture being that posterior governments made insignificant public investments in infrastructure until the oil boom in 1974.

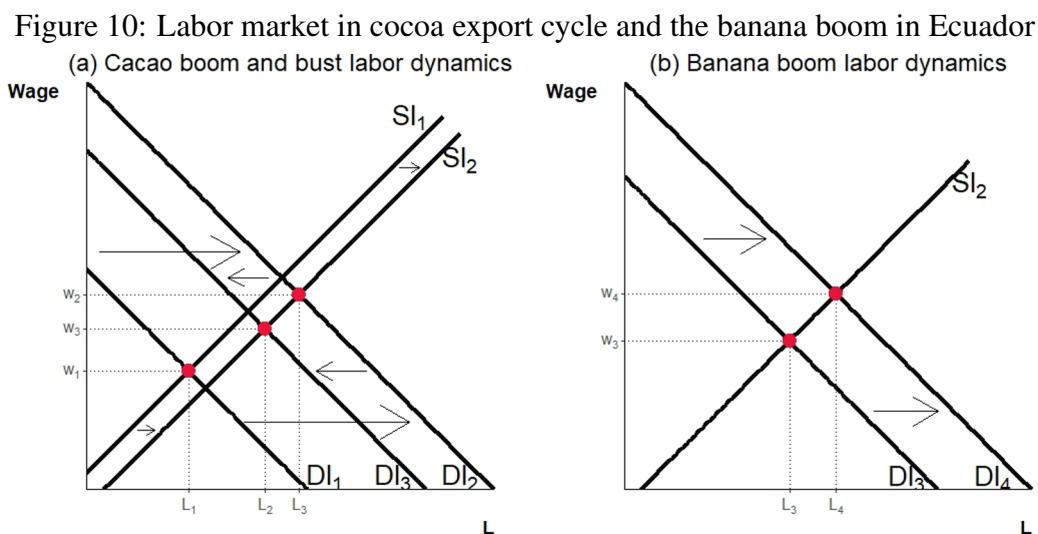
Because of the necessary connections for the banana cropping, the most probable dynamic is an elastic land supply in the short run and an inelastic curve in the long run. Supply assumptions are based on (1) particular shores properties were offered at a low price as a mechanism to dispose non-used land from haciendas (Larrea et al., 1987; Southgate & Roberts, 2016), (2) in the short run, other landowners drew back attention to their plots either to sell or to crop bananas (Acosta, 2006; Peralta, 2016), and (3) government offered new reclamation plots for incoming producers.

Banana production was an external shock to the land market in Ecuador. The theory suggests that land market equilibrium allowed efficient allocation since cocoa bust distributed land efficiently enough to reach a banana boom without land monopolization.

#### 4.4.3 Cacao haciendas influence on the labor market

Before the banana, cacao was the relevant hiring industry. Cacao plantations demanded large labor quantities from 1870 to 1900 and again from 1905 to 1915 (Southgate & Roberts, 2020). Labor demand expanded from  $DL_1$  to  $DL_2$ , at the same time, migration flows from the highlands generated increases in labor supply ( $SL_1 \rightarrow SL_2$ , see figure 10 panel (a)). Inter-regional migra-

tion is an outcome of labor coercion in the highlands as the Concertaje institution<sup>25</sup> suppressed labor mobility (Rivadeneira, 2020). With active migration from highlands to cacao haciendas workers had the faculty to choose an employer. Conversely, employers could hire according to expected worker productivity. Next, cocoa bust (1916-1922) made the demand contract from  $DL_2$  to  $DL_3$  (figure 10, panel (b)). Labor Supply out weighted demand; wages, if not lowered, stayed stagnated.



When big-scale banana production came to Ecuador as an exogenous shock, labor demand shifted right. Figure 10 panel (b)  $DL_3$  starting point shifted to  $DL_4$ , wages and labor increased in equilibrium. Again some highland workers decided to migrate. The latter supports why lower salaries than United Fruit Company, South American Fruit Company, or Astral, independent farmers could attract labor. Banana plantations were the exit option of Huasipungo, just as cacao with Concertaje.

The cacao hacienda granted employers and employees match according to productivity. Additionally, cacao hacienda was non-coercive in labor, making cacao and later banana desirable industries to work.

<sup>25</sup>In place from 1530 to 1918, after president Alfredo Baquerizo abolished, it transformed to Huasipungo institution and actively coerced indigenous peasants until the agrarian reform in 1964 (Rivadeneira, 2020)

## 5 Conclusions

This paper studies the economic historical facts that created the banana boom (1948-1952) in Ecuador. First, a coherent narrative is constructed by using different historical sources from Ecuador and foreign countries. Later an economic discussion elaborates the role of four factors in the causality of the boom.

The result suggests climate contributed to stability by the absence of hurricanes. *Panamá* disease external shock to the banana economy ensured incentives to newcomer producers by the mechanism of a high price. The early capital investment from the government granted infrastructure for the fruit export. Finally, the legacy in the land and labor market of the cacao hacienda set up conditions for a dynamic market of these two inputs.

This paper's contribution is the economic approach to history. A further quantitative approach is a natural extension. Regression Discontinuity design is proposed. By this, causal effects can be accounted by threshold assignation.

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## 7 Appendix

Relevant landowners in the Cacao boom (1895-1925)		
Family	Farming properties	BCA* shares of 5000 sucres
Aspiazú	59	26
Durán Ballen	6	19
Morla	27	71
Seminario	40	20
Puga	17	0
Sanchez Bruno	4	33
Reyre	0	24
Parodi	6	4
Avilés	16	9
Diaz Erazo	1	28
Icaza Illingworth	9	10
Ribon	0	12
Sáenz de Tejada	2	11
Osa	0	20

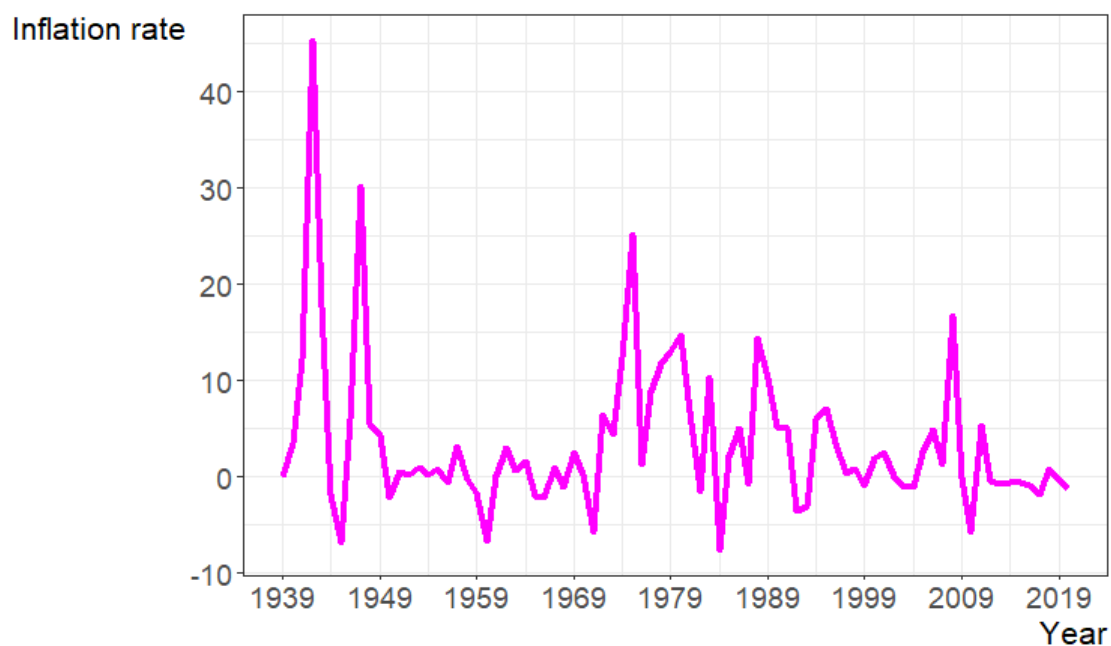
BCA\*: Banco Comercial y Agrícola

Source: (Henderson, 1997; Guerrero, 1975)

Table 9: Prominent families in the cacao boom

Figure 11: Banana price evolution

### Banana inflation rate 1939-2020



Source: in2013dollars (2020) & U.S Bureau of Statistics (2020)

Figure 12: Export Market Share among companies

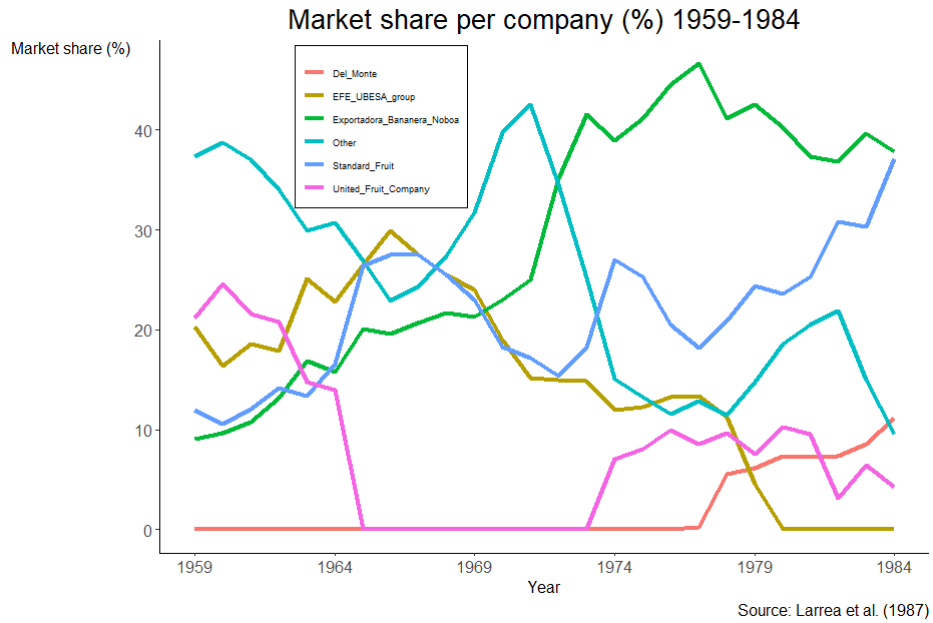


Figure 13: Hectares dedicated to banana production per province

