Between a rock and a hard place: A two-economic-model analysis of the chicle commodity chain

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The analysis of commodity chains provides a series of linkages connecting the many sources of production and distribution of a particular commodity. By looking closer at the commodity chain framework it is possible to draw conclusions about the inefficiencies and advantages of chain itself. This analysis is applied to the natural chewing gum, or *chicle*, industry since the beginning of its mass commercialization at the beginning of the 20th century until present-day. Chicle is a very special case because unlike the majority of other commodities, it experienced two production booms and each under different economic models: outward-led growth and import substitution industrialization (ISI). Moreover, unlike other commodities its production and manufacturing sectors were divided by the Mexican and American industries. This article concludes that the cause of the decline of the chicle industry is due to the segregation between the production and manufacturing sectors of chicle existing in the outward led-growth model and the corruption and detrimental fiscal policies the Mexican government implemented against the industry during ISI.

Introduction

After a century of advertisement and mass commercialization, chewing gum has become the "quintessential American invention."[1] The *chicle* commodity chain is not a completely American one – as is often suggested. Chewing gum existed long before Thomas Adams added sugar to chicle, which is the raw material chewing gum comes from. Chewing gum existed long before Walter E. Diemer created a chewing gum capable of producing bubbles. The first accounts of chewing gum were well before the "discovery" of America, when the Mayans first chewed chicle. Yet, the chicle commodity chain is unique because, unlike other commodities in Latin America, it experienced two booms, each of which was fundamentally different. The first chicle boom spanned from the beginning of chewing gum commercialization in the late 19th century until 1929. This paper will refer to this as the "outward-led growth" period. This period was characterized by a combination of domestic and foreign investors, who benefited from concessions from the Mexican government. The second phase is the "inward-led growth" period. This period started with the presidency of Lázaro Cardenas, whose administration desired to regulate quality, production, and the sources of investments during the 1930s and onward. This paper will argue that this scheme continued until the early 2000s with few variations. It will start with the intrinsic aspects of chicle and how its limitations shaped the commodity chain. Then, it

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will outline each type of economic model according to its characteristics and establish its advantages and disadvantages. Through each period's benefits and detriments, the paper will argue that chicle's success is a wonder, considering the corrupt and inefficient economic policies of the producer states and the Mexican government. Against all odds, chicle led to some transformative effects among the southern Mexican states, and generated great amounts of revenue for the Mexican government and American chewing gum companies.

I. The commodity chain as a consequence of chicle's inherent qualities

Chicle's inherent characteristics make its production and manufacture two segregated processes. This division of labor is reflected through the chain's production sector being entirely dependent on *chicleros* in the Yucatan Peninsula and their manufacture solely existent in the United States.[2] This division of labor formed because the tree from which natural chewing gum or *chicle* derives is the *Manilkara Zapota*. The *M. zapota* only grows in the forests of the Yucatan Peninsula and the Gran Petén region of Belize and Guatemala.[3] Thus chicle production is specifically limited to this region and consequently Mexico's geography provides it with a comparative advantage over this resource.

Its geographic limitation, however, was not the only factor that would shape its future commodity chains. The quantity of resin that can be derived from a single tree varies widely from approximately 3 kilograms to as much as 15 kilograms.[4] Moreover, the tree can only be tapped during rainy seasons spanning four months when high daily temperatures complement heavy rains.[5] Moreover, trees can only be tapped once every five years.[6] Consequently, the fact that the chicle trees are in remote areas, as well as the fact that the amount of production per season is uncertain, makes production stability weak. Thus, for the production of chicle to be economically feasible, a constant flow of capital that can survive during low yield seasons is necessary. This ambiguity made American entrepreneurs with vast amounts of capital more willing to risk it over domestic capitalists less willing to do so. Subsequently, American entrepreneurs became the tycoons of the chewing gum industry and created their own niche in the chicle commodity chain as the manufacturers of chewing gum.

As mentioned previously, chicle is extracted from the *chicozapote* and thus its production levels are severely unstable. Therefore, investors decided to minimize the amount of capital invested in the production sector. This observation is supported by the fact that the technology used for the extraction of chicle in 1880 is the same used today.[7] Chicleros still only rely on their sharp machetes, resin containers, and knowledge about the best moment to tap a tree. New technology was not applied to chicle extraction because large amounts of it would be required, which also hindered the economic feasibility of chicle extraction.[8] However, having a large workforce and cheap technology made chicle extraction economically feasible. Thus, the investment of capital was not destined to increase productivity per capita, but rather to acquire and maintain a large workforce.[9] The necessity of a large workforce was exacerbat-

ed by the fact that *chicozapotes* were not able to grow in plantations or haciendas like henequen did. Thus, to maintain a large working population the infamous system of *enganche* had to be used: a system in which workers from all over the country were brought to the working field by loaning them money that would later result in extreme debt. In a sense, chicle's intrinsic qualities prompted the use of coerced labor as seen with tobacco in the United States, rubber in Brazil, and sugar in Cuba.

The success of chewing gum depended on how much "added value" was given to chicle. One needed not only to add flavor, but also to package it in a convenient form and sell it.[10] The first step in the chain was to collect the chicle and dehydrate it by boiling it in large copper containers to remove the excess water. During the cooling, the resin was then transferred to brick-shaped molds weighing between 8 to 12 kilograms, which was then exported to the manufacturing companies.[11] The manufacture of chewing gum was capital-intensive because of the extensive use of complex and expensive machines. There were six steps in the manufacture of chewing gum: the grinding and melting of chicle, the mixing of the ingredients into the meddled mass, the rolling of the mass into thin sheets that were cut up into strips of gum, the wrapping of gum, the packaging and boxing of the wrapped sticks, and finally the carrying of the chewing gum to the stock rooms where it was going to be shipped.[12] Each step needed different machinery, and equipment that could only be afforded through great amounts of capital stemming from American entrepreneurs such as Thomas Adams Jr. and William Wrigley Jr. Thus, the nature of chicle caused a huge disparity in wealth and segregation between its production and manufacturing, which had a profound impact on the future commodity chains of chicle in Mexico and abroad.

II. The "outward-led growth" model of the chicle commodity chain (1870-1929)

The "outward-led growth" model of chicle started with Thomas Adam Jr.'s "discovery" of chicle's potential. A legend says that former President of Mexico Antonio Lopez de Santa Anna was captured by Texans in 1836, and sent to Washington where Colonel Adams took him as a prisoner. He was amazed by Santa Anna's habit to chew gum and convinced Santa Anna to sell him some. Adams was not convinced of its flavor and decided to add some sweeteners and established the Adams Chewing Gum Company with an initial inversion of 50 dollars.[13] After a few years, he established a web of producers in Tampico, Mexico.

The initial demand for chicle in the US was very low. It only started to increase after 1860. Imports grew by 929,959 pounds from 1885-1886. The next decade the imports of chicle quadrupled and prices rose from $0.08 to $0.36 per pound.[14] This initial increase in demand for chicle was developed due to the expansion of urban areas in the United States at the end of the 19th century and early 20th century.[15]

By the end of the 19th century the logistics of the industry were established, including access to exploitable forestlands, a workforce, transportation, industries and

marketing. It was during this time that the most important American chewing gum companies, such as Beechnut, Wrigley and Adams Companies were established and became the suppliers to the international chicle market with a manufactured product. To achieve this hegemony over the market they created a mechanism with other companies such as the Wrigley Import Company, The Chicle Development Company and subsidized companies including the Mexican Exploitation Company. All of these developed a physical presence in Mexico and provided capital, credit and equipment in exchange for a steady source of chicle. These enterprises obtained concessions from the federal Mexican government for chicle's export but depended on other companies – domestic or foreign – for the production of chicle. The commodity chain is depicted in Figure 1.

The production sector inside this "outward-led growth" model had transformative effects because of its ability to incorporate marginalized people into the national economy. This was due to the fact that chicle was located in remote areas, which pressured extraction companies to recruit people from different regions in Mexico. People from Tuxpan, Tampico, Guerrero, Michoacán, and Tabasco went to the jungle every year and gave themselves to the chicle business for six months.[16] The chicle economy made the integration of the "Mayan rebels" into the national economy possible.[17] It was the lumber and chicle industries that – instead of fomenting separatists sentiments in southern Mexico like Henequen did – made the government more effective at imposing its political order over these remote areas.[18] In fact, it was during the first decade of the Mexican Revolution that these southern states saw an unusual collaboration between the rebel Maya and new business entrepreneurs from the Yucatan Peninsula. The commerce in gum transformed the urban features of the region and gave rise to new powerful social groups.[19] Railroads, ports and urban areas were built because of the imminent chicle boom that provided vast amount of foreign capital investment in these areas that, without it, would have been marginalized by the Mexican government.

This economic model, unfortunately, enabled exporting and manufacturing companies to exploit the domestic workforce sector. The concessions given to the Wrigley Import Company, the Chicle Development Company, and the Mexican Exploitation Company allowed them to exploit their workers through an *enganche*-like system. Since foreign or domestic extraction companies had capital they could easily lend money to chicleros, which inundated them in debt. During the early 20th century many chicleros had no option but to leave their villages and remain in the forest for months.[20] The travel to the forest and every other tool needed to extract chicle was usually sold by the domestic and foreign contractors and deducted their cost from the debit accumulated by the chicleros. Chicleros had to live five to six months a year on a cash advance paid to them by the contractor who agreed to buy their chicle at negotiated price. The quantity of chicle sold to the contractor by each chiclero was entered into an accounting system at the end of each season, from which the cost of the provisions and the material that had been advanced to him was subtracted. This

system allowed for constant abuse and led to the inevitable debt among chicleros.[21] An observer during the 1930s commented on this vicious cycle stating:

> "*Without any amenities during the great part of the year […] the chiclero would go on a spending orgy the moment he received revenue from his work at the end of the season […] After a few days he spent everything he earned in one year and then he would have to look for another contractor that would give him money during the dry season – when the exploitation of chicle was impossible.*"[22]

Debt was not, however, the only a method used to coerce chicleros. In fact, the commodity chain in the "outward-led growth" model carefully resembled a debt chain due to the fact that lending money to chicleros caused subcontractors to also plunge themselves in debt. Similarly, the contractors fell into debt because they lent the money received from American Companies to subcontractors – the buyers of chicle. Hence, the chiclero became the enemy of the subcontractor owed wished; the subcontractor, by the same motives, became the enemy of the general contractor, who at the same times despised the agent of the American company that extortions him by demanding lower prices of chicle.[23]

The willingness of contractors and foreign companies to reduce the amount of capital invested in the extraction of chicle and the relative lack of supervision from the Mexican government allowed chiclero camps' infrastructure to be very poor. The walls of the camps were constructed with weak wooden structures. Moreover, there was a lack of family life and permanent buildings, conditions that are similar to those seen among the southern colonies in the United States in the late 17th century. There was virtually no medical attention in those remote areas and many chicleros suffered under the *mosca chiclera* that caused small pieces of ear and nose to become completely devoured by the disease, which eventually lead to death.[24]

The success of this commodity chain, surprisingly, was not due to the impressive advertisement to American audiences surrounding chewing gum but rather to the Defense Department's decision to provide chicle to the troops for WWI. Figure 2 shows the amount of exports of chicle from 1882-1983. As Fig. 2 shows, the first chicle boom occurred from 1910-1914. The argument behind the Defense Department's decision was that chicle aided soldiers with digestion and served as a relaxant.[25] The chewing gum manufacturer Wrigley argued that chewing gum "helped to combat thirst, improved concentration and freshened the mouth."[26] Besides the huge demand spike to up to 4 million kilograms of chicle in the height of WWI, the soldiers disseminated the habit of chewing gum in Europe and the United States when the war ended and thus it increased sales domestically as well as abroad.[27]

After the war, the *upper* (manufacturing and distribution) commodity chain also saw significant changes. In 1929 there were 27 plants in the US manufacturing chewing gum. These 27 plants employed over 2,265 workers.[28] It was also during the

Fig.1: The Outward-led growth chicle commodity chain in Mexico (1880-1929)

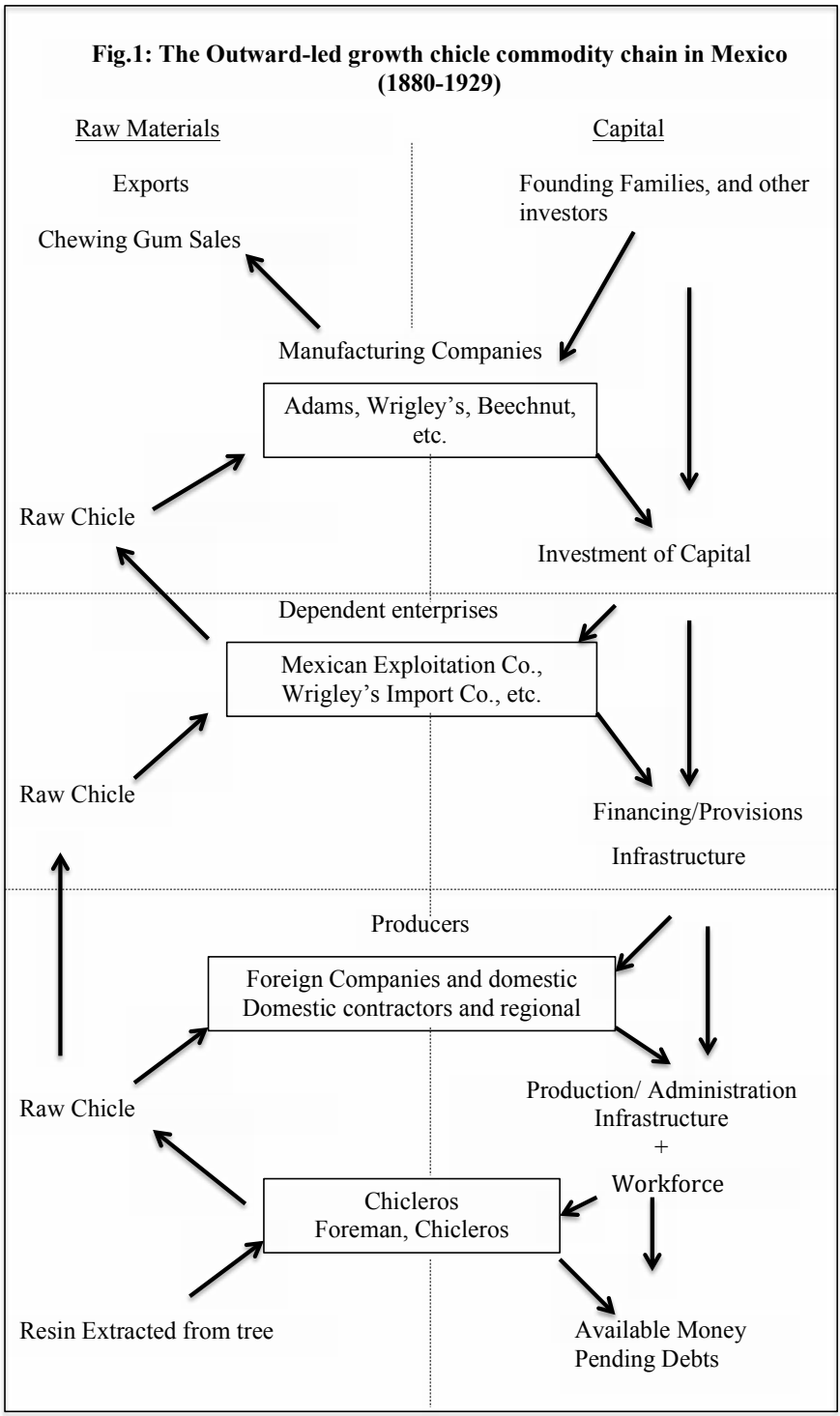
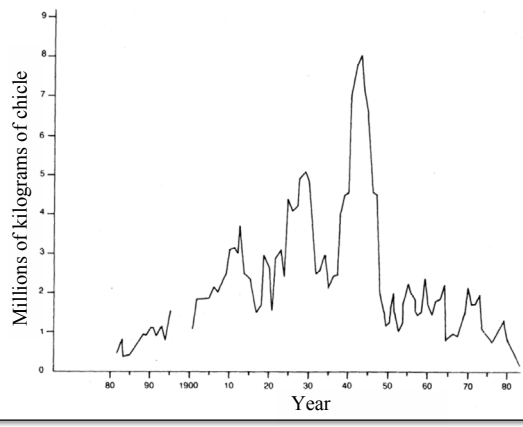


Fig. 2: Mexican Exports of chicle, 1882-1983



Source: Capitalismo Y Trabajo En Los Bosques De Las Tierras Bajas Tropicales Mexicanas, Konrad, 471.

1920s that despite the highest demand seen yet, chewing gum manufacturing plants declined in number: in 1914 there were 74 plants compared to 1929's 37 plants.[29] This is because small factories fared badly during this period of expansion within the industry. The cost of machinery and the difficulty of obtaining a steady supply of chicle prompted only large chewing gum companies to prosper.

Mexico also started to open up local manufacturing companies. At the end of the decade, they employed over 300 people with a median salary of $5.00 a day.[30] In 1923 the first manufacturing factories were established in Mexico. Two years later more than 1 million kilograms of chewing gum were exported officially. By 1929, it reached its peak for the decade: 2,400,000 kilograms.[31] Thus, great amounts of revenue were generated in every step of the chain: American manufacturers, the Mexican government via export tariffs, and Mexican manufacturing companies. But this system was slated to change as socialist-statist Lázaro Cardenas became President of Mexico and developed the "inward-led growth" economic model of chicle.

III. The "inward-led growth" model of the chicle commodity chain (1930-2000s)

This new economic model had significant consequences in the chicle commodity chain. First, it ended the top-down flow of investment from foreign companies to Mexico. Now, all funding for the development of the chicle industry came from the National Bank of Mexico: foreign control over production was abolished. Companies interested in buying chicle depended exclusively on Mexican contractors, which were also dependent on the federal government for the supply of infrastructure.[32] Additionally, all concessions given to foreign companies were ended and Carde-

nas established cooperatives, or *ejidos,* owned by all the chicleros of a particular area. The jurisdiction of chicle extraction was then given to the Federation of Cooperatives that would take the chicle extracted and sell it to other manufacturing companies. The export revenues would then go back to the National Bank of Mexico and a cycle of capital was made. Exports tariffs were based on weight of chicle exported. Most of the time the tariff was $0.15 to $0.20 per kilogram of chicle exported, but this tax was highly subsidized by the government.[33] In reality, the tax was $1.00 per kilogram with a subsidy of $0.80, thus reducing the tax to $0.20.[34] Figure 3 shows a diagram of this "inward-led growth" commodity chain.

The 1930s was a very difficult decade for the chicle industry. The Great Depression caused a decrease in prices as well as a decrease in imports due to the lack of demand. However, very high levels of chicle were still being exported as shown in Fig. 2. This was because the chicle production had already expanded to such a level at the end of 19th century that the amount being produced had exceeded the amount being exported. This led to excess chicle that could be exported during the difficult times of the Great Depression. Also, during the 1930s, chicle imports coming from Mexico surpassed 14,000,000 pounds, which represented 77 percent of world chicle production.[35] But American companies also had a monopoly over the manufacturing industry. The Wrigley Company led with 60 percent of total manufacturing, followed by the Beechnut Packing Company and the American Chicle Company with 20 and 15 percent, respectively.[36]

It was during this time, as previously mentioned, that cooperatives were formed as part of Cardenas' land reform–a promise derived from the ideals of the Mexican Revolution. Cooperatives were made with the purpose of breaking the cycle of abuse present in the "outward-led growth" model. Chicleros now could sell directly to an American agent without the necessity of intermediaries. Chicle resin would be owned collectively and marketed through the government of the Territory of Quintana Roo or Yucatan. The total revenues generated would be divided among the chicleros according with the amount of chicle extracted.[37]

Although this new model had the distinct advantage of preventing abuse against chicleros, it worsened their bargaining position vis-à-vis American manufacturing companies. This is because allowing the state to organize the cooperatives led to corruption that severely hindered the chicleros' condition.[38] The corrupt leaders perverted the goals of the Revolution as seen through the first Federation of Chicle Cooperatives established in 1937. Rafael Melgar, the governor of Quintana Roo, appointed himself the president of the co-operative Federation.[39] In other words, the chicleros were delivered into the hands of the new organs of state management of the Partido Revolucionario Institucional (PRI), the dominant political party in Mexico for more than 70 years.[40] Then, it became a custom for state governors to appoint themselves as presidents of the cooperatives. Gabriel Guevara, another state governor, passed a vote of censure on the cooperative moment and systematically made efforts to weaken popular support for the program.[41] Guevara also started to use the

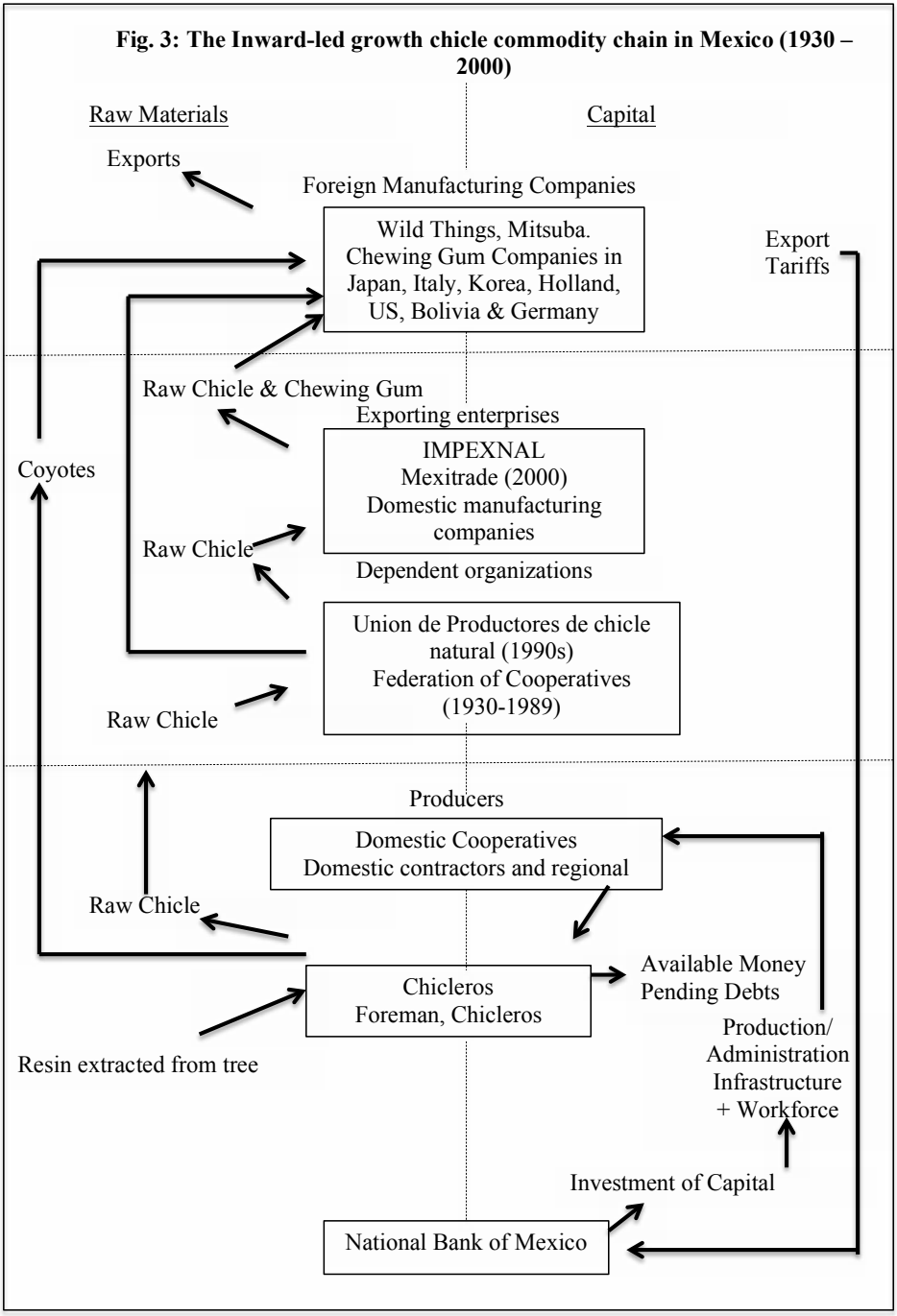
Federation's funds for personal enrichment. This internal corruption only worsened from 1944-1958 when Margarito Gomez took office and transferred huge amounts of money from the Federation's funds to his administration and personal accounts. He would also receive money for making concessions for chicle exploitation and by selling some properties of the cooperatives at very low costs, in order to receive very large kickbacks.[42]

Increased governmental intervention in the industry also made the production of chicle less efficient due to increased bureaucracy and higher taxes. This increased intervention can be seen in a 1943 Presidential Agreement stating that the federal government would create five committees in charge of the development and supervision of production, exploitation, and exportation of chicle in the states of Yucatan, Campeche, Tabasco, Chiapas, and the Quintana Roo territory.[43] Several taxes were established in every step of the chain. The transportation of chicle from the jungle to the Campeche harbor saw $0.50 per kilogram tax. On average every kilogram was taxed $0.38 just for transportation. The forest taxes were $240 per ton of chicle exploited. Local and state taxes mounted to up to $160 per ton of chicle exploited.[44] Thus, the government became a rentier state in regards with chicle, which severely hindered the cooperatives' ability to generate more revenue.

Bureaucratic measures could have killed the commodity chain. Fortunately a second and final boom produced the greatest amounts of chicle exports that would ever be seen. World War II, by the same reasons in World War I, caused a spike in demand for chewing gum as once again the Defense Department declared chewing gum as one of its "strategic military items". It was during this time that annual exports reached their highest point with 25 million pounds.[45] By the end of WWII, chicle extraction was the most important industry in the Yucatan Peninsula, employing over 40,000 people.[46] Yet, after this boom, synthetic materials such as styrene-butadiene and polyisobutylene were introduced in the market because of improved elasticity. According to the Exterior Commerce Bank (Bancomext) it was since the 1950s that a tendency to substitute chicle with other synthetic materials increased.[47] After the 1950s, the chewing gum industry saw a decrease in demand in chicle, due to demilitarization after WWII, which led to the eventual bust of the industry.

Chicle continued to be exported, nevertheless, because of an increased demand in Asia and Europe, especially in Japan and Italy. However, the commodity chain remained virtually unchanged other than the increased bureaucracy. As previously mentioned, it was the demand from Japan and Italy that prevented the total demise of the chicle industry. Chicle exports doubled between 1964 and 1973 due to their demand as shown in Fig. 2.[48] In 1971, the Banco Nacional de Comercio Exterior and the chicle cooperatives were able to negotiate a better price for its resin from the Wrigley Company.[49] It was not until 1978 that the President of the Federation of Cooperatives was allowed to be democratically elected. However, this did not bring an end to state intervention. Now, the entire production of chicle had to be sold through one export company, the Impulsadora y Exportadora Nacional (IMPEXNAL), a

Fig. 3: The Inward-led growth chicle commodity chain in Mexico (1930 – 2000)



branch of the Bancomext. This monopoly was created through a government tax law, which allowed IMPEXNAL to be exempt from paying export taxes.[50] Thus, new bureaucracy diminished again the bargaining power of chicleros since IMPEXNAL determined the price at which chicle would be bought.

IMPEXNAL was still not the only factor that decimated the chicle industry. In the 1980s, Mexican chicle stopped being important to American companies because their products now only used synthetic materials. From 1983-1984, Mexican chicleros produced only 200,000 kilos of chicle and its production stopped being economically feasible.[51] The management of the Federation and a lack of financial accountability led to the establishment of the 1994 Plan Piloto Chiclero (PPC). The PPC led to the founding of the Union de Productores de Chicle Natural (UPCHN), an organization that could now deal directly with the marketing of chicle. Unfortunately, the former managers of IMPEXNAL introduced to foreign buyers a new exporting company: Mexitrade, and told investors not to buy from the UPCHN.[52] Thus, the UPCHN had no choice but to sell to Mexitrade and accept its prices.[53]

State economic policy again severely hindered what was left of the chicle market and subsequently diminished the potential development of the chicle industry. First, the UPCHN received a great bureaucratic burden via forest exploitation and shipment authorizations. All these bureaucratic procedures diminished the capacity of the UPCHN to enter into export contracts. Given the great amount of regulations and administrative requirements, the UPCHN managers calculated they could not take orders for more than 900,000 kilograms of chicle a year even when their production capacity was well over twice that amount. Second, *coyotaje*, or human smuggling, was a severe problem to the Union. *Coyotes* were individuals who approached chicleros and offered them better prices than the cooperatives. *Coyotes* did this because they did not pay any of the costs that cooperatives had already incurred such as licensing costs, environment taxes and exploitation taxes.[54] Thus, selling chicle to *coyotes* caused a decrease in production in the eyes of the Union and thus less revenue collection.

In the last decade, it appears that the Union has acquired more independence and there was a chance for the chicle industry's autonomy. In 1998, the UPCHN started to erode the control Mexitrade had over chicle sales by negotiating directly with Wild Things, a US organic chewing gum manufacturer. This caused a small rise in the price of chicle during the 1999-2000 season.[55] Wild Things offered $5.25 per kilogram; Mitsuba (a Japanese manufacturer) bought chicle at $4.70 per kilogram whereas Mexitrade only offered $3.50 per kilogram.[56] The rise in demand comes from the rising population in Asia and the recent wave of organic food consumption, which has caused the chicle industry to show some revitalization in the last few years.[57]

IV. Chicle Today & Conclusions

Chicle today is irrelevant in the chewing gum market. In 2004, chicle represented only 3.5 percent of the total chewing gum market – dominated by the use of synthetic chewing gum made from hydrocarbons.[58] However, chicle is now creating

its own niche market for natural gum. The demand today comes mainly from Asia because of the Japanese's preference for chicle's texture, elasticity and capacity to absorb flavors.[59]

There is no doubt that the chicle commodity chain is unique. It experienced two booms in two different economic models. Both offered different outcomes to the labor sector in Mexico, and led to the development of cities, infrastructure and manufacturing companies in the Southern states of Mexico as well as job growth in American manufacturing cities. However, as this paper has argued, the chicle industry was constantly, severely hindered by Mexico's state policies and bureaucracy, which damaged the ability for chicleros to obtain more revenue from their work. For the chicle industry to grow it is necessary to free the marketing of chicle, lower taxes, decrease the bureaucracy, and open up to new markets in Asia and Europe.

Notes

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