

International Product Fragmentation and the Insertion of Latin America and the Caribbean in Global Production Networks

Colombian Case Studies

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ABSTRACT

Understanding the drivers of international production fragmentation is an important issue for Latin American and Caribbean countries because participation in global production networks can help mitigate instability due to dependence on natural resources and can provide opportunities for further exports diversification and increased growth. This paper contributes to the literature on global value chains by analyzing two case studies that examine the experience of Colombian firms that have successfully penetrated international markets through participation in global production networks. The stories of these firms are contrasted within the framework of the global value chain literature. A series of policy implications are drafted as a result of this exercise.

JEL: F14, F23

Key Words: Global Supply Chains, International Fragmentation of Production, Suppliers.

1. Introduction

The emergence of global production networks, also called global value chains, opens up a whole new spectrum of possibilities for firms to participate in international markets. In developing their business strategies, firms not only decide where to locate the different stages of the value chain, but also the degree of control they want to have over these processes. The latter is a classic make-or-buy decision, whereby some firms choose, for instance, to keep the production of inputs within firm boundaries engaging in foreign direct investment (FDI) activities and intra-firm trade, or choose to contract the procurement of these inputs with external suppliers.

The scope of global production networks varies across both countries and industries. Theories offer different explanations for this variation, including cross-country and/or cross-industry differences in trading costs, factor prices, and the technological restrictions of separate production.

Understanding the drivers of production fragmentation and its effects on trade patterns is an important issue for Latin American and Caribbean countries in the changing global context, not only because participation in global production networks can help mitigate instability due to dependence on natural resources, but also because it can be an opportunity for further exports diversification and increased growth.

Moreover, whether trade reflects a fragmentation of the production process or the horizontal specialization in the production of final goods has implications for policy, incentives for tariff reductions vary, for instance, depending on the pattern of trade. So identifying the role of the government as facilitator of increased participation of national producers in global production networks is a desirable objective.

Economic literature analyzing global value chains emphasizes case studies as a tool for understanding and anticipating how governance structures change over time. Gereffi and Fernandez-Stark (2011) propose four dimensions relevant for global value chain analysis: the global value chain's input-output structure (identification of its main activities/segments, as well as the dynamics and structure of the firms in each segment); its geographic scope; its governance; and the institutional context in which it appears (how local, national, and international economic conditions and policies shape globalization in each stage of the global value chain).

Drawing on three strands of economic literature—transaction-cost economics, production networks, and technological capability and firm-level learning—Gereffi, Humphrey, and Sturgeon (2005) generated a theoretical framework for understanding the shifting governance structures in sectors producing for global markets. These authors identify three factors determining how global value chains are governed and how they change: (1) the complexity of information and knowledge transfer required for a particular transaction; (2) the extent to which this information and knowledge can be transmitted without the parts involved making transaction-specific investments; and (3) the capabilities of suppliers in relation to the requirements of the transaction. By allowing these factors to take only two values, high or low, there are five possible combinations giving rise to governance types that can actually be found: markets (low complexity, high ease of information transfer, and high supply base capabilities), modular value chains (high complexity, high ease of information transfer, and high supply base capabilities), relational value chains (high complexity, low ease of information transfer, and high supply base capabilities), captive value chains (high complexity, high ease of information transfer, and low supply base capabilities) and hierarchies (high complexity, low ease of information transfers, and low supply base capabilities). These global value chain governance types differ in their degree of explicit coordination and power asymmetry between buyers and suppliers and can be used to illuminate how power operates in global value chains.

It is in the framework of this literature that we approach this investigation. We contribute two case studies exploring the experience of Colombian firms that have been relatively successful in joining global production networks as input providers.

Section 2 presents a brief summary of the process that led to selecting the two industries, and Sections 3 and 4 develop our case studies. Each case study has three components: an analysis of the global industry describing the products, process, main actors, trade volumes, technology trends, et cetera, at the global industry level; a description of the industry in Colombia and of how Colombia has participated in global value chains related to this industry; and a detailed story of the firm around which the case study is constructed. Section 5 reviews the themes that are common to both case studies and the fundamental differences between them in light of the global value chain theory,

and discusses implications for policy.

2. Summary of Industry Selection

While a number of Colombian firms have grown based on their participation in foreign markets as exporters and/or direct investors, participation in global production networks as input providers bound by long-term contracts has not been as common. The exception to this are *maquila* arrangements in the apparel industry, by which local firms, entering as labor contractors, assemble products for foreign-owned brands to be sold in international markets.

To identify cases suited for the purpose of this project, we interviewed a number of candidate entrepreneurs and consulted government agencies, industry associations, and academics.¹ We found that while there have been some experiences of participation in global value chains shaped as we were looking for, these types of contracts have generally been short-lived. The reasons given by the interviewees for their failure are mostly associated with their inability to compete with providers from other countries, particularly from China. Both production costs and transport costs in Colombia are high, and prices offered by foreign firms are usually too low, requiring cost reductions by Colombian firms that are unviable. This problem has been magnified since 2008 by the peso/dollar exchange rate appreciation. Colombian firms are simply unable to compete for these types of contracts. Some of the entrepreneurs interviewed also view these types of contracts as too risky. They say long-term contracts for input provision are often signed under conditions that allow foreign firms to interrupt the business relationship at any moment, regardless of the investments or long-term commitments acquired by the local firm to serve them. Also, some firms consider their brand name an important component of their business strategy, and the idea that goods will not carry their name is a drawback of these types of contracts.

We identified two firms in the security business that have successfully entered into

¹ We explored the experiences of firms in the plastics industry with the aid of industry association Acoplásticos and the cases of sugar confectionery and paper and paperboard products with the aid of industry association ANDI. Conversations with the Ministry of Industry, Trade, and Tourism led us to firms in the security business. Finally, informal conversations with friends and colleagues led us to the firms we selected for case study.

these types of vertical arrangements with foreign firms, but they were unwilling to make their stories public. To the extent that these firms operate in the midst of a civil conflict where demand for security is high, they probably have a comparative advantage firms in other sectors lack, enabling them to be competitive.

Our search concluded in a way we hope will be interesting for the purpose of this research, with the finding of two firms in the food and food products sector for which participation and growth in global markets has been driven by what we think is exactly the type of vertical arrangement this project wants to explore.

The first case is of a Colombian firm who is the main provider of chili pepper paste for the Tabasco brand. This firm is part of the hot sauce industry. Since the mid-1970s it has sold processed chili pepper to Tabasco, bound by a long-term agreement based on contracts that are renewed every two years. The firm organizes farmers located in the Colombian southwest to grow the chili pepper required by Tabasco, which it then processes, packages, and sends abroad. While Tabasco was originally the firm's only client, the firm has succeeded in expanding its participation in global markets, exploiting similar arrangements with other hot sauce producers.

The second is the case of a fruit pulp producer that has had, among others, a long-term contract with the marketer serving restaurant chain Subway's demand for fruit pulp for juices in Puerto Rico. This firm, founded in 1981, is part of the fruit pulp for juices industry and has a history of participation in vertical global value chains through contracts with a number of foreign firms in different countries

3. Hugo Restrepo y Cía, Producer of Chili Paste for Tabasco

3.1. The Global Hot Sauce Industry

- Main Final and Intermediate Goods Composing the Industry

- 1) Chili Pepper Fruit (*Capsicum spp*)

There are more than twenty-five species of chili pepper. The main types are tabasco, cayenne, habanero, and jalapeño. Chili pepper grows best in deep soils at temperatures between 14 and 24 degrees centigrade and relatively low humidity. Seeds can be of two types: open pollination, which may be produced by the farmer on his land, or the

hybrid type, which are produced under exceptional conditions by seed-producing companies using hybridization processes. Fertilizers and other chemical products are used to prevent and fight plagues and to increase productivity. Use of these products varies across regions and crop types because plagues depend on climate and latitude. The choice of fertilizers and the handling of climate conditions are also associated with the irrigation system chosen. The more sophisticated drip irrigation systems allow for drop-by-drop application of fertilizers and pesticides.

The chili pepper fruit can be used fresh (“chili pepper green”) for direct consumption or processed in different forms and presentations: as a pulp or paste; in brine; dry or powdered; or as an oleoresin. While its main use is as a food product, it also enters as an input in the pharmaceuticals industry (in medications to ease pain from lumbago, arthritis, or torticollis); in the cosmetics industry (where its active substance, capsaicin, is used in hair and body products); and in ecological agriculture (for plague control).

2) Chili Pepper Paste

Chili pepper paste results from processing the chili pepper fruit whole, or broken to use only part of it. It can be made fresh or fermented in brine or vinegar. Fermentation conserves natural chili pepper paste. The fermentation process takes around two weeks, and the resulting paste can be aged for six months or more.

3) Chili Pepper Sauce (Hot Sauce)

There are various recipes for hot sauce that depend not only on the type of chili pepper used but also on additional ingredients such as vinegars and oils. Hot sauces can be produced directly from fresh chili pepper or from fresh or fermented chili pepper paste.

▪ Main Activities in the Industry

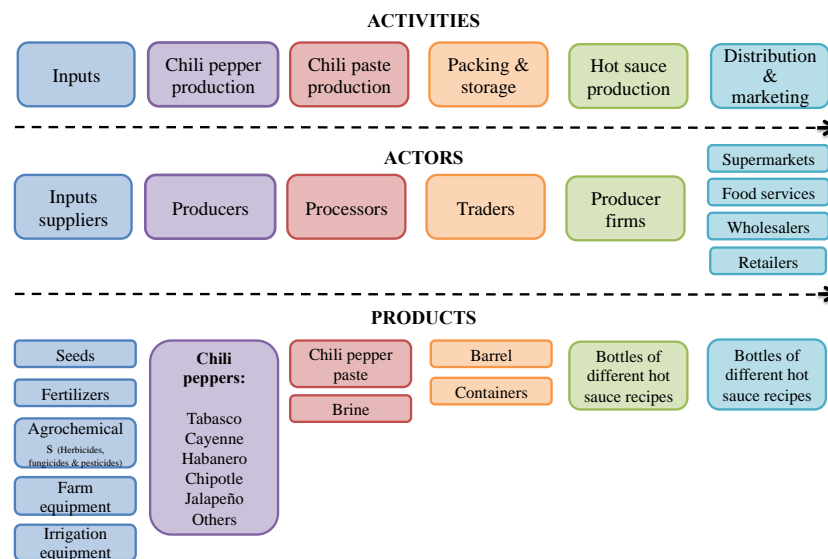
The main activities associated with the intermediate and final goods of the hot sauce industry are: cultivation and harvest of the chili pepper fruit; preparation of chili pepper paste (fresh or fermented); storage and packaging of chili pepper paste; preparation of hot

sauce; and distribution and marketing of the final product. Each stage involves transport and marketing activities. If the chili pepper harvest has to travel to reach the plant where the fruit is processed into a paste, crops will have to be packaged and transported. And if the hot sauce producer is far away or abroad, chili pepper paste has to be stored, packaged, and transported to its final destination. Logistics become critical to ensure a stable supply of chili pepper paste throughout the year, not subject to weather risks or other dangers that may affect harvest volumes. Figure 1 shows the different activities, actors, and products that compose the industry's value chain.

- Key Technology Trends

Technology impacts the industry through the development of (1) seeds to produce more productive and plague-resistant plants; (2) fertilizers to reduce the incidence of plagues and diseases affecting chili pepper crops; (3) irrigation equipment to make both irrigation and application of fertilizers and pesticides more efficient; (4) packaging materials to store and transport very large volumes of chili pepper paste in containers across very long distances; and (5) machinery to automatize the process of bottling chili pepper sauce.

Figure 1: Hot Sauce Production Value Chain



- Actor Mapping

The leading worldwide hot sauce brand is Tabasco, from McIlhenny Company, a firm founded in 1868 on Avery Island, Louisiana, in the United States. While the tabasco chili pepper sauce is its original recipe, the firm currently produces and markets seven different hot sauces made of tabasco chili pepper in addition to a range of other food products. Tabasco has no global competitor. It does, however, face competition at the regional level and at the country level. Table 1 lists its main competitors by market.²

Hot sauce consumers are concentrated in the United States, Mexico, and countries in the Caribbean, where spicy food is a tradition. In the Middle East, where consumption of spicy foods is also common, the use of dry powdered chili pepper and other dry spices coming from India and China is more prevalent. The taste for chili pepper sauce in the region is more recent, dating to the Gulf War (1990). The presence of military troops in the area has apparently played a central role in opening this market. As an anecdote, emergency food boxes dropped from the air for soldiers in Afghanistan during the war contained small packages of Tabasco sauce and other hot sauces, resulting in an effective marketing strategy. Figure A1 and Figure A2 in the annex show the evolution of exports of hot sauces since 1995, by origin and destination. The industry's international trade more than tripled over the last fifteen years. The United States, Germany, Netherlands, and China are the largest hot sauce exporters, and the main destinations of hot sauce exports are the United Kingdom, the United States, France, and Germany.

Large-scale hot sauce producers frequently outsource the production of chili pepper paste under arrangements in which they maintain a certain degree of control—for example, through seed provision, transfer of crop management knowledge, and permanent monitoring of crops—to guarantee the quality of the chili pepper fruit that goes into the production process. This outsourcing often takes place across borders, because crop locations with ideal climate and soil conditions are not necessarily found in proximity to hot sauce producers. Figure A3 and Figure A4 in the annex show the evolution of exports of chili pepper paste and dry chili pepper since 1995 by origin and destination. China and India are huge players in this market. They, however, are large exporters of dry chili

² Table 1 contains information pertaining to the main markets in which the Tabasco brand is present and the main competing actors in each of them. Tabasco identifies Frank's Red Hot (from Reckitt-Benckiser) and Cholula (from José Cuervo S.A.) as the brands from which it faces the strongest competition.

pepper and not of chili pepper paste, which is the main ingredient for hot sauces.³ The United States is the largest market for these products.

There are no commodity exchanges. Large hot sauce producers compete among each other and set prices and standards to input providers, who in turn compete fiercely to enter into long-term arrangements with them.⁴ Business relationships between chili pepper paste producers and hot sauce producers are on a one-to-one basis and require personal interaction, especially at the beginning.

Aside from the role played by the American military forces in facilitating the industry's entry into Middle Eastern markets, mentioned above, there are no institutional actors that may have influenced the structure, location, and growth of the global industry.

Table 1: Main Competitors of Tabasco, by Market

Market		Firm	Hot sauce brand
North America	United States	McIlhenny Company Frank's Redhot Bruce Foods Baumer Foods TW Garner Food Company B&G Foods Heinz Santa Fe Seasons Albuquerque Tortilla Company Bueno Foods	Tabasco Frank's Redhot Louisiana Hot Sauce Crystal Redhot Texas Pete Trappey's Hotsauce Heinz Santa Fe Seasons Albuquerque Tortilla Company Bueno Foods
	Mexico	Salsa Tamazula	Valentina Búfalo
Latin America and the Caribbean	Dominica	Parry W. Bellot Limited	Bello Hot Pepper Sauce
	St. Lucia	Baron Foods Limited	Baron Hot Sauce
	Jamaica	Encona and Dunn's River Goldson's	Pickapeppa sauce Grace's Hot Pepper Sauce Goldson's MoreFire! Hot Sauce
	Belize	Hot Mama's Belize Marie Sharp's	Hot Mama's Marie Sharp's
	Panama	D'Elidas Alisina	Picante Chombo D'Elidas Sistá Natural Pepper Sauce
Asia	China	Huy Fong Foods	Sriracha hot chili sauce
	Japan	Earthy Delights	Red Yuzu Kosho
	Korea	Haechandle	Gochujang Hot Pepper Paste
Europe	England		
	Netherlands		
Middle East	Saudi Arabia		
	New Zealand	Huffman's Kaitaia Fire	Huffman's Hot Sauce Kaitaia Fire

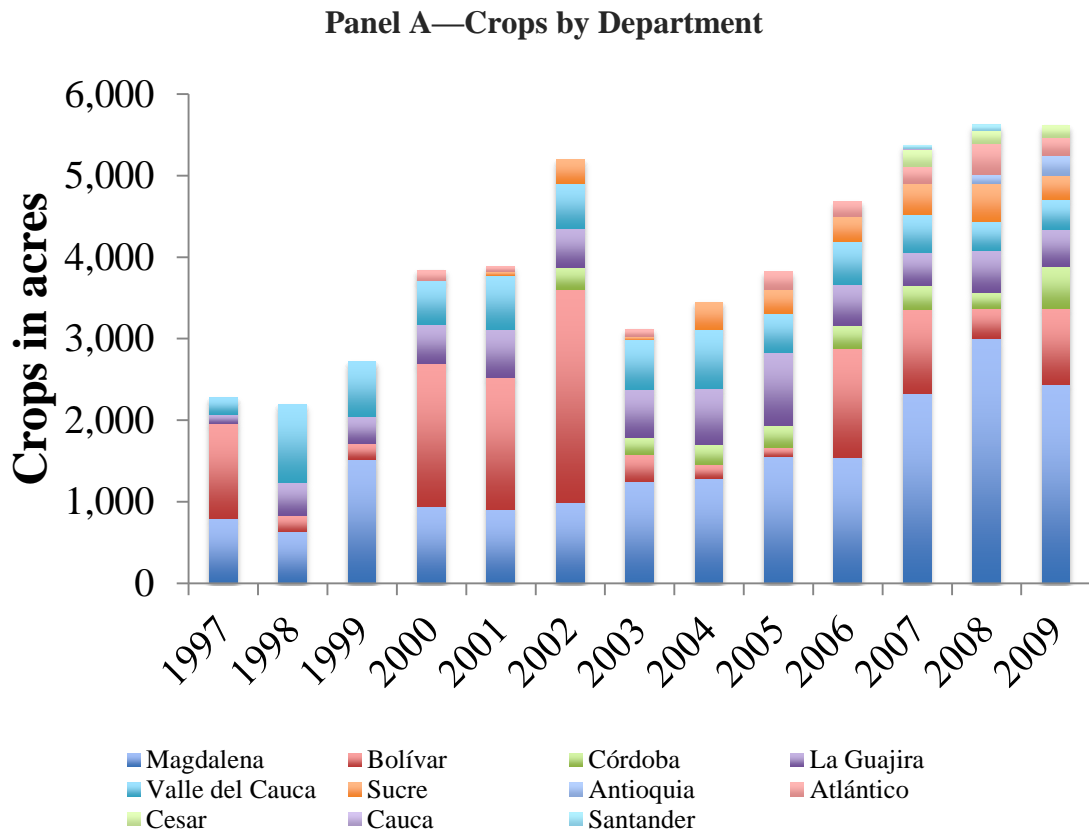
³ Colombia has been a small chili pepper paste exporter in the global context, never representing more than 1% of total exports during the period we observe. As we will see, however, Peru's growing participation as an exporter over the decade coincides with Hugo Restrepo y Cía's activity in that country.

⁴ Long-term arrangements are desirable from the viewpoint of agricultural input producers because they bring stability to the business, reducing cash flow volatility. From the perspective of hot sauce producers, long-term relationships with input providers also make sense to the extent that control over input quality is associated with relationship-specific investments on their part.

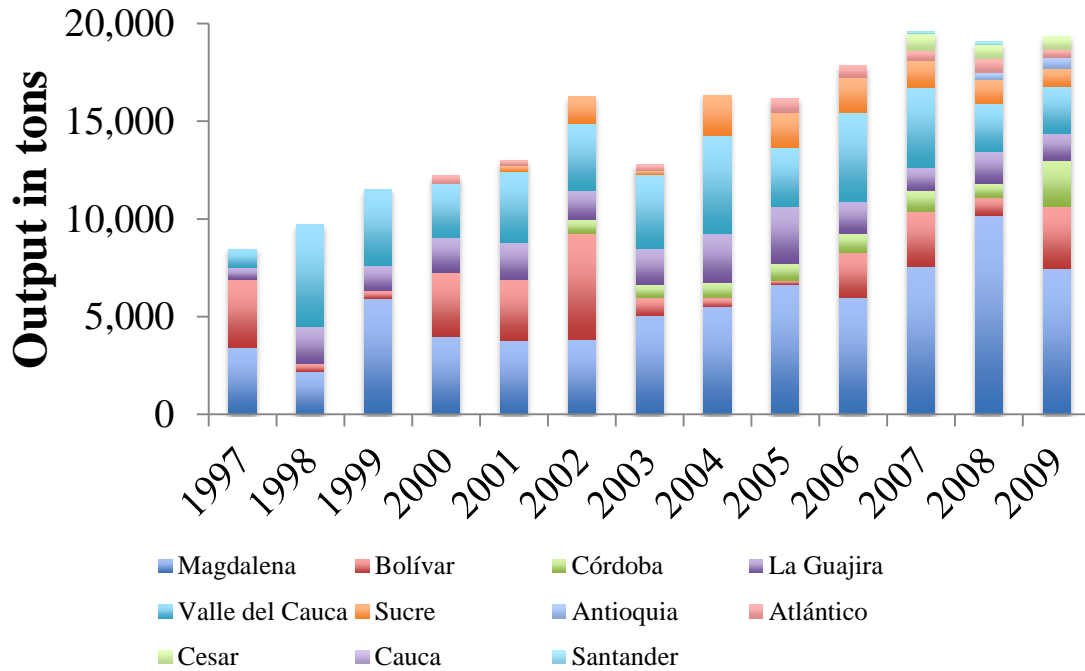
3.2. The Local Industry

Colombia produces chili pepper paste. **Figure 2** shows the evolution of chili pepper croplands (Panel A) and production (Panel B) between 1997 and 2009, the most recent year for which there is information available. Notice that four departments account for 78% of chili pepper production in Colombia: Magdalena, Bolívar, Valle del Cauca and Córdoba. Croplands planted with chili pepper recovered after a decline in 2003 and reached a peak of 2,272 acres in 2009.

Figure 2: Chili Pepper Fruit, 1997–2009



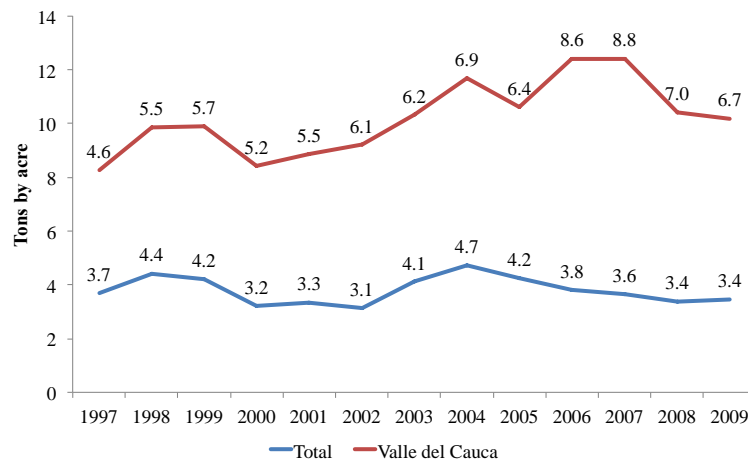
Panel B—Output by Department



Source: Ministry of Agriculture and authors' calculations.

Increasing activity in the last five years was, however, accompanied by a decline in productivity (see the evolution of yield per acre in Figure 3). Crops in Valle del Cauca, where Hugo Restrepo y Cía is located, systematically perform above average in terms of productivity and display an increasing trend between 2005 and 2007.

Figure 3: Yield by Acre, 1997–2009



Source: Ministry of Agriculture and authors' calculations.

Factors affecting productivity are related to crop management and the capacity to control plagues and diseases. According to the Ministry of Agriculture, the productivity of chili pepper crops in Colombia is limited by high production costs associated with phytosanitary problems (MINAGRO, 2010).⁵ Valle del Cauca's above average productivity levels result from a combination of irrigation infrastructure, knowledge, and land quality that is not available in other country regions. In particular, Valle del Cauca has an even distribution of rain throughout the year that allows uninterrupted sowing. This is different than on the coast, where there is summer in the first months of the year and intense rains during the second semester. If either the summer or the rain seasons are extreme, the crops are lost.

We have been unable to establish how competitive Colombian chili pepper crops are by international standards. The Food and Agriculture Organization of the United Nations (FAO) has records of yield per acre for “chili pepper and pepper” together. At this aggregation level, the Netherlands, the United Kingdom, and Belgium come up as the most productive,⁶ but none of them are producers of chili pepper.

Chili pepper paste producers are difficult to track using national statistics because official records are not kept at a sufficient level of disaggregation. In the Annual Manufacturing Survey (AMS), chili pepper paste is included with the production of “other food products” (ISIC 4-digit sector 1549).

Trade records are, however, available at a more detailed level from customs records, and they allow us to identify the local firms participating in international markets as exporters⁷ of “fruits of the genus *Capsicum* or *Pimienta*” and/or “sauces.” Hugo Restrepo y Cía's exports fall mainly in the first of these product categories, where the firm is the largest player. Its competitors in 2010 were Comexa, Naturandina, and Levapan⁸ (see Figure 4).

⁵ Phytosanitary problems in the chili pepper paste industry are associated with poor plague management in chili pepper crops (i.e., use of harmful pesticides). These problems can be avoided by vertical arrangements through which chili pepper paste producers control crop management.

⁶ The Netherlands, the United Kingdom, and Belgium are leaders in growing sweet peppers in heated greenhouses, which is why they appear in the top productivity ranks.

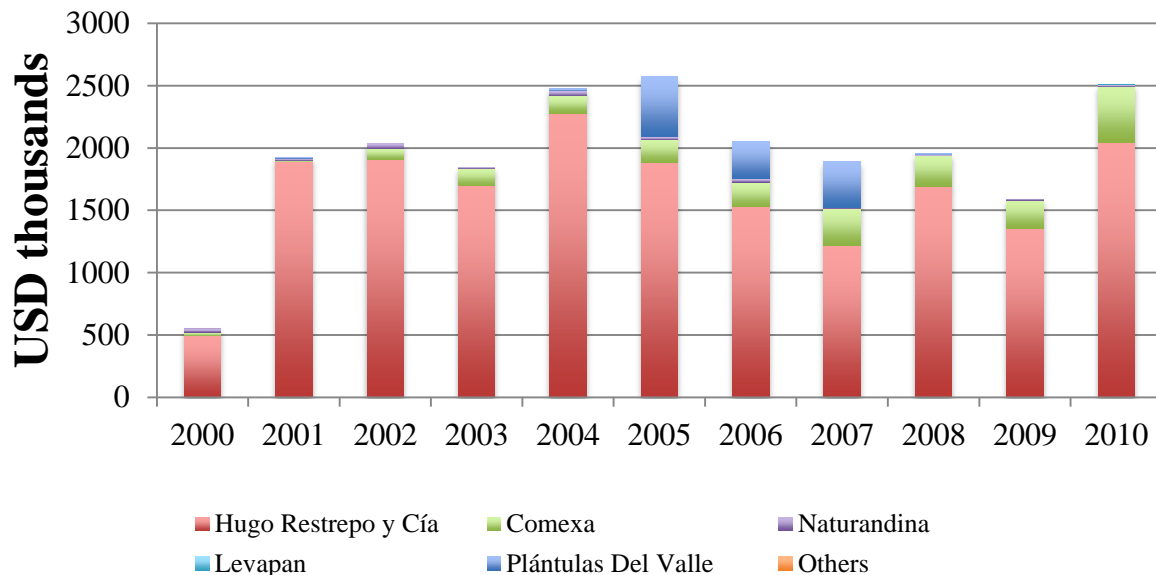
⁷ Because consumption of chili pepper sauce is not very widespread in Colombia, it is probably true that they are also the largest players in the local market.

⁸ Hugo Restrepo y Cía also mentioned Tecnoaji among its local competitors. We only find records under this name in the Customs Registry for years 2000 and 2008, when the firm appears as a very small exporter. We suspect it exports through a marketer, but we have been unable to establish this for certain.

Hugo Restrepo y Cía accounted for 82% of chili pepper and chili pepper paste exports that year.

Figure 4: Exports of Chili Pepper and Chili Pepper Paste by Firm, 2000–2010

Source: Customs records and authors' calculations.

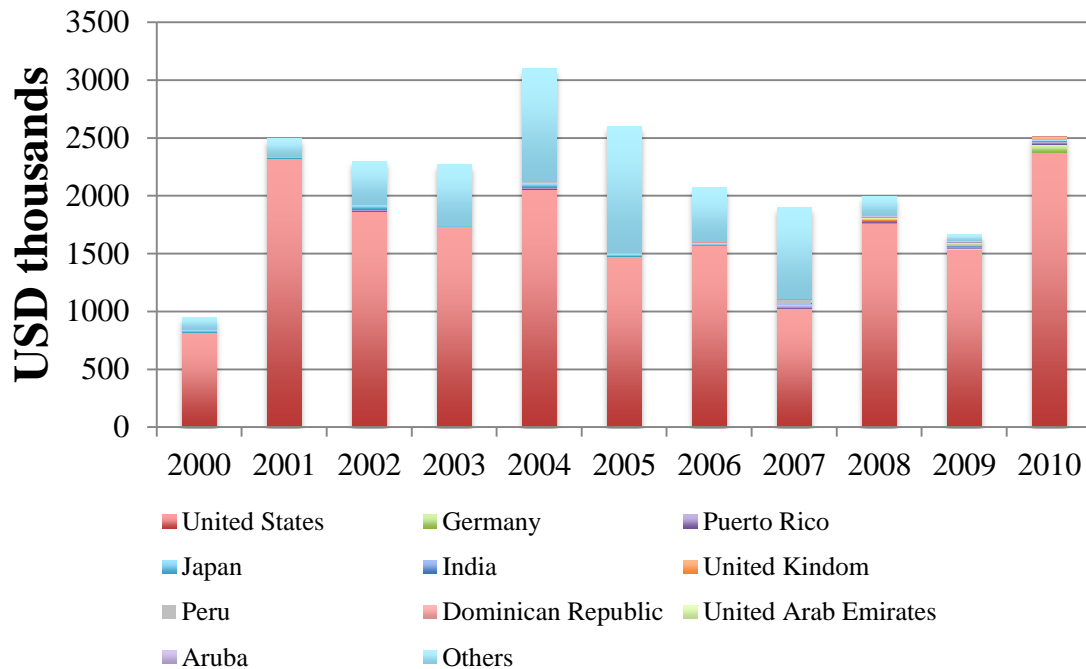


Comexa is the owner of the Amazon brand. It produces chili pepper paste and a variety of bottled hot sauces, participating in all stages of the production chain (chili pepper crops, chili pepper paste, sauce production, marketing, and distribution). It was founded in Cartagena, on the Colombian Caribbean coast, in 1992, and its activity currently reaches the United States (where it has offices), Guatemala, Chile, Canada, England, France, Mexico, Venezuela, El Salvador, Uruguay, Japan, Saudi Arabia, and Spain. Naturandina is a marketer of agricultural and food products created in 1994 to market Latin American gourmet products; it has offices in Peru and Chile. And Levapan is a producer and marketer of inputs for the food industry and of a range of food products for final consumption, among them San Jorge hot sauce. Hugo Restrepo y Cía provides 100% of the chili pepper used by Levapan.

Colombian exports of chili pepper paste go mainly to the United States (exports to this destination represented 94.8% of all chili pepper paste exports in 2010), where their main competitors are Mexico and Central America. In second place was Germany (2.8%),

and in third place was Puerto Rico (1.1%). During the first half of the 2000s, exports were more diversified in terms of their destinations than they currently are (see Figure 5). The decline in exports between 2004 and 2009 was driven, as we will see, by Hugo Restrepo y Cía's strategy to partially relocate its activity to Peru.

Figure 5: Exports of Chili Pepper and Chili Pepper Paste by Destination, 2000–2010



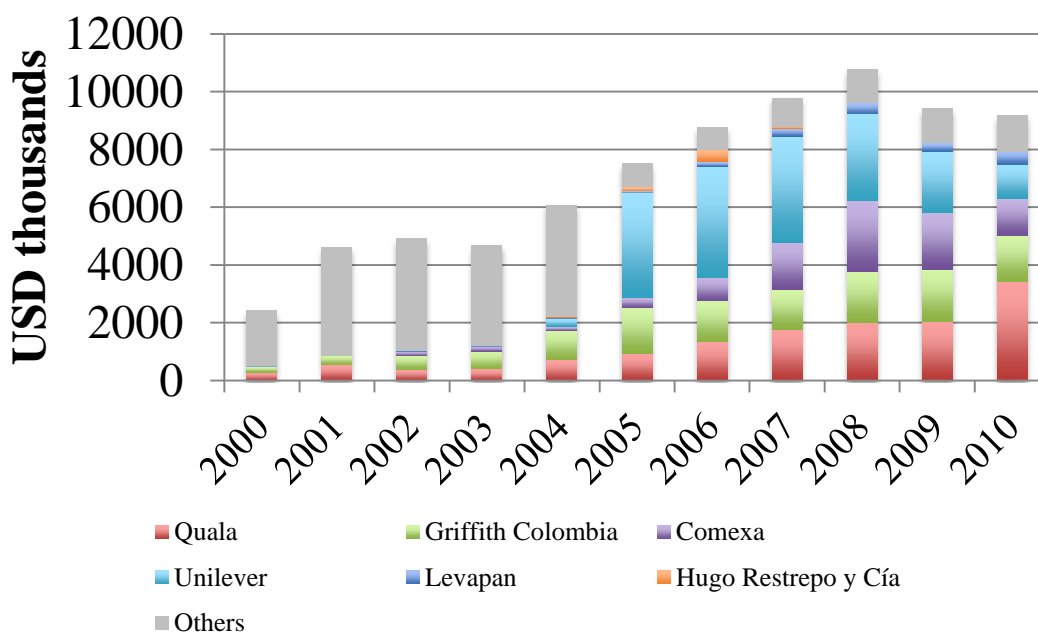
Source: Customs records and authors' calculations.

Sauce exports are more diversified by destination. In 2010, the main destinations of sauces produced in Colombia were Venezuela (37.3% of exports) and Dominican Republic (14.5%). Sauce exports increased between 2003 and 2008 but decreased in recent years.

In the second export category, that of sauce exports, other types of sauces are included with hot sauces. We show their evolution by firm in Figure 6 and by destination in Figure 7 because Hugo Restrepo y Cía exported hot sauces between 2004 and 2007. Comexa and Levapan are also present as exporters in this product category.

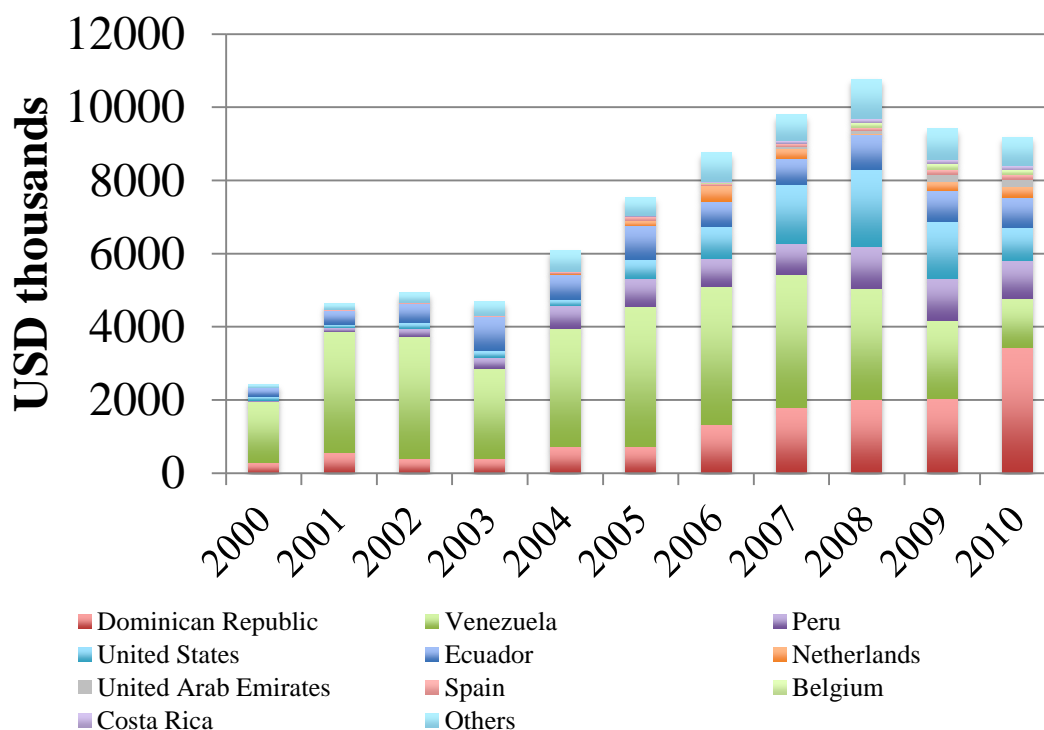
There are no particular government regulations or programs for this industry.

Figure 6: Exports of Sauces by Firm, 2000–2010



Source: Customs records and authors' calculations.

Figure 7: Exports of Sauces by Destination, 2000–2010



Source: Customs records and authors' calculations.

3.3. The Firm and Its Linkages

Hugo Restrepo y Cía participates in global markets as a supplier of chili pepper paste. The firm obtains the chili pepper fruit from farmers and transports it to its production plant, where it is ground and mixed with salt and stored for fermentation. Once fermented, the chili pepper paste is packed and transported to the final client, who uses it to produce hot sauce. The variety of chili pepper paste produced depends on the chili pepper used: tabasco, cayenne, or habanero.

Because the manufacturing process to produce chili pepper paste is so simple, Hugo Restrepo y Cía's value added is more in the stages of storage, packaging, and transportation. The firm adds value in the transformation process, but more importantly, as will become clear, in the overall logistics and organization, without which its business would not be possible. When asked about the allocation of total costs across components of the value chain, the firm reported that 43% of the costs of putting chili pepper paste into international markets corresponds to the agricultural input (in whose production the firm is not directly involved), and that the stages in which the firm is directly involved account for the remaining 57%. This 57% is broken down as follows: 5% corresponds to stock-up and processing costs; 22% corresponds to packaging and storage; and 30% corresponds to costs associated with international logistics.

The Firm's Story

Hugo Restrepo, founder of the firm, entered the chili pepper paste business by chance, to some extent. As a professor in Universidad del Valle he had participated in the launching of the first MBA program in Colombia, and in 1965, when the university decided to offer an Executive MBA program, he was chosen as a member of the team that would work together on its design along with professors from Georgia Tech who traveled to Cali for this purpose. Among them was Roderick O'Connor, who became good friends with Hugo Restrepo. He remained in Cali for six years; after going back to the United States, he would come back every other year to visit. After one of those visits, during a lecture he was giving, a representative of the Tabasco brand approached him and asked him if he knew anyone who would be interested in growing tabasco chili peppers for McIlhenny Company in Valle del Cauca. Apparently, through research they had found that the land

quality and climate conditions in Valle del Cauca were well suited for these crops.⁹ O'Connor gave them Hugo Restrepo's name, and this is how he got started in the chili pepper business. The year was 1978.

McIlhenny Company gave Hugo Restrepo the tabasco chili pepper seeds to plant in Valle del Cauca, together with a written promise to buy his production. In exchange, Restrepo promised them exclusivity during the next fifteen years, during which he could produce for no other client. From the first attempt, however, only a few plants survived. Restrepo was devastated. He wrote a letter informing them of his lack of success, prepared to end the business relationship that had just started. But his counterpart was not ready to give up just yet. They asked him to wait, if he had no better use for the land right away, and visited his crops three months later with technical assistance. From the plants that survived, Restrepo obtained seeds and planted new plants, and little by little techniques were improved, always under advice from Tabasco (as we will call McIlhenny Company from now on). Tabasco waited two years before being able to buy the first load of chili pepper paste from Hugo Restrepo, and over the next fifteen years sent an experienced agronomist twice a year to check on the crops and bring in technological innovations.¹⁰

Annually, Hugo Restrepo y Cía meets between 25% and 30% of Tabasco's demand for tabasco chili pepper paste (in 2010 and 2011 this share has been even higher, at 40%). The firm does not own chili pepper crops or land. It sources its input from small farmers bound by contractual agreements, and provides the farmers with both the seed and permanent technical support, together with the promise to purchase 100% of the farmer's chili pepper fruit production at a price set in advance. Technical assistance is no longer dependent on Tabasco's support. Years of effort and experience have overturned this practice. Hugo Restrepo y Cía's crop development is nowadays equal or better than Tabasco's, and Hugo Restrepo y Cía's agronomists, now often better qualified than Tabasco's, are teaching back.

Since 2000, Hugo Restrepo y Cía has been in an alliance with Fundación Carvajal,

⁹ The firm had had a previous experience growing Tabasco chili pepper in Venezuela that apparently helped identify the desirable climate conditions for these crops. Since 1975 they had been looking for places with similar conditions where they could obtain their chili pepper. They had tried Central America, but had to deal with complicated plagues there.

¹⁰ Tabasco developed a supply of chili pepper from providers in Honduras, Ecuador, and Panama simultaneously. Those providers also remain in business with the firm.

a local non-profit organization supporting small farmers in the region with training in associative processes, entrepreneurial development, and searches for new productive projects, in order to provide peasant farmers (or farmers' associations) with technical support to grow chili crops and access to financing. Under this alliance, originated by Fundación Carvajal after the model of "Productive Alliances" or "Productive Chains" promoted by the Ministry of Agriculture at the time, Hugo Restrepo y Cía provides peasant farmers with specialized agricultural training in exchange for their commitment to sell 100% of their production to the firm at a given price, and Fundación Carvajal grants them financing to develop their productive activities.¹¹ The latter is possible thanks to government funds to promote peasant productive associations, secured by Fundación Carvajal. As a result of this alliance, productivity improves, and Hugo Restrepo y Cía's reliability as a supplier of chili pepper paste to international clients increases (thanks to the higher certainty of a stable chili pepper supply).

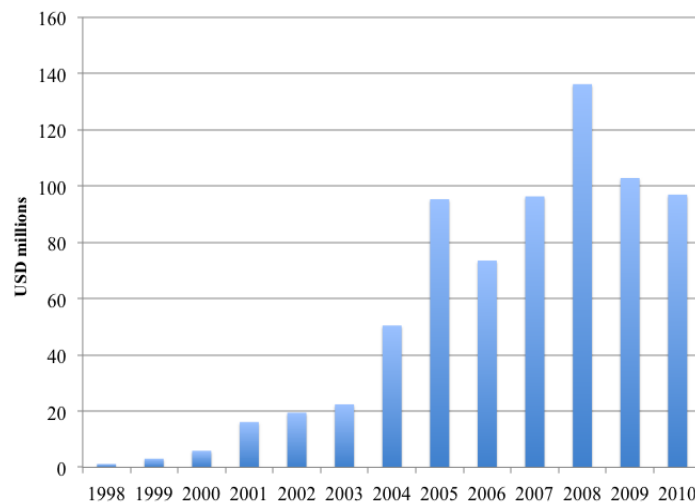
In 2001, Hugo Restrepo y Cía brought its business to Peru using the same model whereby it organizes chili pepper crops without entering directly in the production of the agricultural input, and takes on all manufacturing, packaging, and logistics activities. The origin of this decision is, once more, Tabasco, who worried about concentrating more than 20% of its input supply in only one country, and asked Hugo Restrepo y Cía to expand its business to another place in order to prevent country risk. This request came, as before, together with the promise that Tabasco would purchase 100% of Hugo Restrepo y Cía's production in the second country.

Tabasco is no longer Hugo Restrepo y Cía's only client (although it remains the major client for chili pepper paste). The firm has managed to replicate the vertical arrangement it entered into with Tabasco with other hot sauce manufacturers in order to produce chili pepper paste from varieties of *Capsicum* other than tabasco chili pepper. It now has this sort of long-term arrangement with Bruce Foods Corporation, Baumer Foods, and TW Garner Foods, which market their hot sauces in the United States; with GoTan BV, a Dutch hot sauce producer serving European markets; and with Bafarat Industrial Group from Saudi Arabia, serving the Middle East. The next target is to enter Asian

¹¹ The program reached 160 farmers between 2000 and 2010, and in 2009 covered fifteen small farmers' associations. PNUD (2010) calculated an overall effect on more than 600 people.

markets under similar arrangements with established hot sauce producers. Figure 5 does not show Hugo Restrepo y Cía's increasing diversification of export destinations because the firm is serving these new markets from its plant in Peru. Figure 8 presents the evolution of chili pepper fruit and chili pepper paste exports from Peru between 1998 and 2010. While from the data available we are unable to distinguish Hugo Restrepo y Cía's share of these exports, we know that the firm has only one recognized competitor in that country, Proají SAC. So its activity undoubtedly contributes to explaining the evolution over time.

Figure 8: Peruvian Exports of Chili Pepper and Chili Pepper Paste, 1998–2010



Source: Comtrade and authors' calculations.

The new clients have been found by “knocking at their door for many years, and waiting patiently until a window of opportunity opens” (according to Camilo Restrepo, Hugo Restrepo's son who is now in charge of the business). International trade fairs have been used as an opportunity to gain access to potential future clients, who have been previously identified through research of the hot sauce supply of the local supermarkets in the target markets. Camilo Restrepo will contact the identified potential clients in person to offer the firm's product and services. Because established hot sauce brands usually already have long-term contracts with other input providers, closing a deal may take years. The “window of opportunity” opens when another input provider fails or raises prices. Monitoring markets and competitors in the global industry becomes a permanent need in

order to open markets.¹²

Nowadays, Hugo Restrepo y Cía has 296 acres of chili pepper crops in Colombia and 1,086 acres of chili pepper crops in Peru bound to the firm as input providers by contractual arrangements as described above. Crops in Colombia were reduced from 987 acres to the current 296 in an effort to protect the business from the appreciation of the peso/dollar exchange rate. The firm maintains crops of tabasco chili pepper in Valle del Cauca because the fact that its sale is guaranteed under contract with Tabasco at a price higher than that of other chili varieties, plus the high productivity level of tabasco chili crops in Valle del Cauca, have allowed its production to remain competitive under the current exchange rate conditions. Crops of other chili varieties have been relocated to Peru, where 80% of the crops are cayenne chili pepper, 10% are habanero, and only 10% are tabasco.

The firm operates with very small direct employees (seventeen workers in Colombia and forty-one in Peru). With few exceptions, employees are trained professionals with expertise in the core of the firm's business.

Explaining Success

Hugo Restrepo y Cía has systematically invested in productivity growth and applied the lessons learned from its interaction with Tabasco to shape its business. In this section we review the elements that appear to have been crucial for the firm's success in growing through its participation as an input provider in the industry's global production network.

- **Control (Without Ownership) over Crops**

Hugo Restrepo y Cía modeled its relationship with farmers after its initial experience with Tabasco. Understanding that business success was dependent on the firm's ability to guarantee a stable supply of a high-quality product, it took full control over the agricultural process, assuming not only responsibilities of seed production and personalized technical advice to farmers, but also over technological innovation efforts.

¹² Hugo Restrepo y Cía's competitors in the U.S. market are similar firms from Central America and Ecuador (as well as the local competitors in Colombia and Peru that have been mentioned). In Asia, the Middle East, and Europe, the competition comes from China and Thailand. Asian competitors, however, offer powdered chili pepper and not chili pepper paste, so Hugo Restrepo and Cía's product is not a perfect substitute.

An example in this category is the introduction of a drip irrigation system brought by Hugo Restrepo y Cía from Peru to crops in Valle del Cauca to optimize the application of fertilizers and pesticides.

Farmers contractually related to Hugo Restrepo y Cía are small in the sense that their crops do not cover great expanses of land, but they are not unsophisticated. Organizing production in scattered relatively small expanses of land was a deliberate strategy to mitigate plague and climate risks.

- Packaging and Transport Logistics

Hugo Restrepo y Cía's product is sold in different presentations. The smaller is a 200-kilo barrel for industrial use, and the larger is a flexible 3-centimeter-thick plastic bag that fits precisely into a 24-ton container that is filled using a force pump. The bag is imported from China and the filling process takes two to three hours, but the wonder of it is that it allows them to dispatch very large amounts of chili pepper paste to clients overseas in the most efficient manner.

Hugo Restrepo y Cía has entered strongly into the provision of logistics services where, as shown above, most of the value is added in this global value chain. The firm is probably better characterized as a services provider than as a manufacturing firm. Note that the manufacturing stage represents a small portion of total costs (only 5%).

- Long-term Arrangements, Short-Term Contracts

Although once started a relationship with a client is generally meant to be long-lived, and this is in the best interest of both sides entering the deal, signed contracts are typically fixed-term. In the Tabasco case, contracts are renegotiated every two years, and the renewal period with all other clients is one year. This is optimal for Hugo Restrepo y Cía to the extent that it grants the firm a certain degree of control over prices: one-year contracts are, in fact, signed with the sole purpose of agreeing on a fixed price.

- Global Participation Model

For Hugo Restrepo y Cía, participation in the upstream levels of a global value chain has been the most effective way of entering into and taking advantage of international

markets. The idea that the objective of business would be to reach consumers across borders with final goods appears nonsensical in face of the added distribution and marketing difficulties it entails, particularly, but not exclusively, when it comes to the food and food products sectors. Business opportunities in great numbers are lost when efforts are focused in that direction, forgetting that others, whose success frequently depends upon having a reliable inputs supply, may have already done the work of understanding consumer preferences, breaking entry barriers, and establishing their brands in unknown markets. These were, more or less, the ideas expressed by Camilo Restrepo when interviewed for this project.

Below is a transcription of the way he understands the business:

“When I move on to the hot sauce bottle I am generating added value. But I cannot compete because I have no market big enough for the volume I would need to produce in order to be efficient. Tabasco produces four hundred bottles per minute in a production line with five workers. I installed a bottling line to bottle chili pepper sauce and assigned five workers to operate it. We delivered thirty bottles per minute. But I was unable to sell the whole production lot and had to close down. That was from 2006 to 2009. I entered into that project to export to Holland. Half of my production was already sold, but I would have had to sell twice as much to be efficient. The issue is not cheap labor: even if labor costs are low, if you don’t have the capacity to market large volumes and operate at an efficient scale you are done; you can’t compete. But you can add value in many other ways, not only in the production cost component. Service quality is value added. Selling cheap labor costs is not enduring. Value added through service quality is.”

4. Alimentos SAS, Player in the International Fruit Pulp Markets

4.1. The Global Industry

- Main Final and Intermediate Goods Composing the Industry

- 1) Fresh Fruit

A fruit is the fleshy or dry ripened ovary of a plant enclosing the seed or seeds. In a strict botanical sense, by this definition, bean pods, corn kernels, tomatoes, cucumbers,

acorns, and almonds are all technically fruits; popularly, however, the term is restricted to the ripened ovaries that are sweet and either succulent or pulpy, whose cultivation and processing are major industries worldwide.¹³ From the consumer's or food processor's point of view, fruits are characterized as the edible product of a plant or tree that includes the seed and its envelope and can typically be described as juicy, sweet, and pulpy.

Because ripening leads to tissue breakdown, fruits are highly perishable.¹⁴ The postharvest life of fruits can be extended by refrigeration with or without a modified oxygen-carbon dioxide atmosphere. Temperatures under which harvested fruit is stored must be managed: while the rate of chemical change in fruit (including extreme color formation, development of strong off-flavors with intense aroma, softening of the flesh, and signs of disease) generally doubles for every increase of 20° F, fruit can also be injured by overcooling. Most temperate-zone fruits can be held safely at 32° to 41° F, but many subtropical and tropical fruits, including lemon, banana, and mango, show signs of injury from being chilled in prolonged cold storage, failing to ripen properly.

Fruit may also be damaged by the action of microorganisms (bacteria and fungi) during storage. Efforts to control infection begin in the orchard, usually with the application of fungicides.

2) Fruit Pulp (or Fruit Juice Concentrate)

Pulped or cut fruit is the product of washing, peeling, and separating the seeds to keep only the edible part of the fruit (its pulp or substance). Fruit pulp is extracted in an industrial process that includes the use of specialized machinery (e.g., automated washing lines, industrial grinders, industrial pulper-sieving machines, evaporators, et cetera).

3) Frozen or Long-Life Fruit Pulp

¹³ Definition from the *Encyclopædia Britannica*.

¹⁴ Different fruits have varying degrees of postharvest longevity. Strawberries last only a week to ten days, for instance, while apples or lemons can be successfully stored for months.

In order to preserve it, pulp must be frozen, treated by pasteurization, or both. Frozen to a temperature of -4° F, fruit pulp lasts up to a year, allowing producers to overcome seasonal problems. Frozen pulps have no preserving agent, and maintain the strictly natural flavor and nutritional characteristics of the fruit from which they were extracted. Pasteurized fruit pulp or juice concentrates have an unrefrigerated shelf life of six to eight months at room temperature, and they may or may not include chemical preservatives.

Packaged (frozen or long-life) fruit pulp is distributed to customers who use fruit pulps at home in the preparation of natural juices or, if they are business customers, in many other applications in the industrial preparation of juices for retail sales, restaurants, ice cream, refreshments, candy, and preserves.

- Main Activities in the Industry

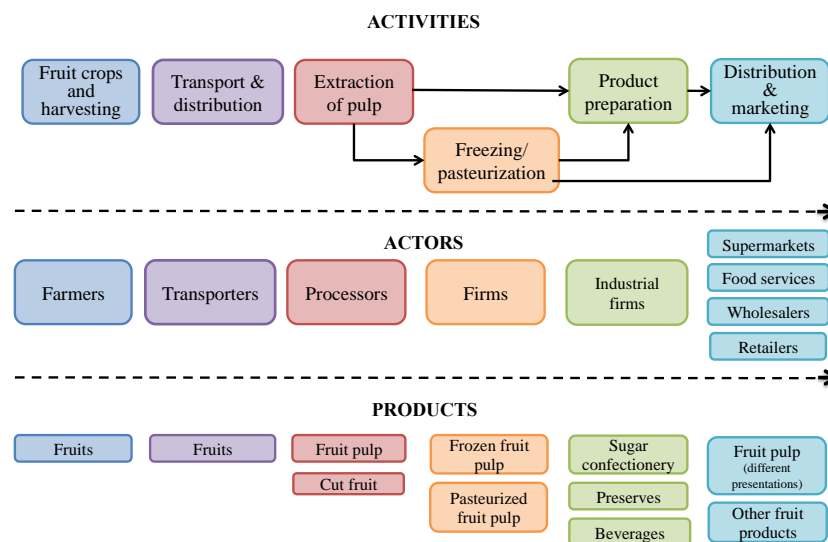
The fruit pulp production chain includes the following activities (see Figure 9):

1. Fresh fruit crops and harvesting. Done both by small and industrial farmers around the world.
2. Transport and distribution of fruit to fruit pulp producers. May be done by the farmers themselves, by marketing firms, or by the buyer (the fruit pulp producer), who goes to the farm to select and pick up the product.
3. Pulp extraction. Done in the producers' processing plants using machinery of varying degrees of sophistication. In the case of cut-fruit production, the process may include more hand labor.
4. Treatment for conservation. This stage of the production process includes packaging for storage.¹⁵ Frozen pulp (and/or cut fruit) is packed in its final presentations and stored in cold rooms where it is frozen and kept at a controlled temperature until delivery to the customer.

¹⁵ Different types of packaging are associated with different customer types. For business customers (such as hotels, bars, and restaurants), fruit pulp is packed in plastic drums. For smaller-scale consumers, it is packed in plastic bags of varying sizes. Cut fruit is usually packed in polyethylene bags.

5. Transport and distribution of fruit pulp to retail stores (for final home consumption) or to business customers. Includes marketing activities. Notice that transporting frozen products requires special product handling.
6. Production of more elaborate fruit products (juices, ice cream, preserves). May be done by pulp producers or by others.
7. Distribution and marketing of more elaborate products using pulped or cut fruit as an input.

Figure 9: Fruit Pulp Value Chain



▪ Key Technology Trends

There are at least three dimensions in which technological innovation affects the industry's dynamics: (1) development of new technologies for product preservation without freezing, facilitating transport, and distribution logistics; (2) development of transport means and infrastructure adequate to product handling; and (3) development of packaging materials facilitating product conservation (Tetra Pak packaging solutions, for instance).

▪ Actor Mapping

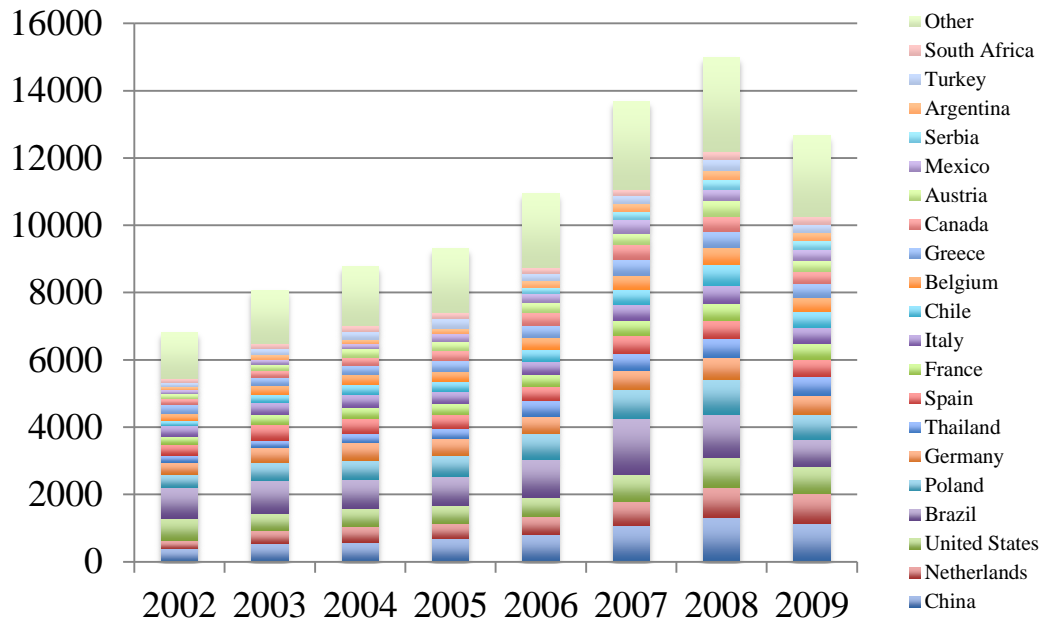
According to statistics for 2009, the latest available from the FAO, the world's most important fresh fruit producers are China, the United States, India, and Brazil. Argentina,

Mexico, and Chile are also among the twenty largest, and Colombia is the fifth-largest Latin American producer, in twenty-ninth place (see Figure A5 in the Appendix). These rankings correspond to production of fruits that can be pulped or juiced and that are frequently consumed in that form. According to their output share, the most important fruits in this group are apples, oranges, grapes, mangoes, pears, tangerines, and peaches (see Figure A6 in the Appendix).

Fresh fruit producers serve their local demand and often also serve the global demand for fruit pulp and fruit juices. Brazil, for instance, is the world's largest orange producer (it was responsible for 26% of the world's orange production in 2009). Citrusuco, the largest of three firms under which orange production is concentrated in Brazil, produces frozen concentrate orange juice; orange juice not from concentrate; and orange pulp pellets and other orange by-products; and is a very large player in international markets. It supplies Tropicana, the world's biggest brand of "fresh" orange juice, with pasteurized orange juice.

Brazil stays in the lead as a fruit pulp exporter together with China and the United States, which hold the first and second places respectively, and the Netherlands also appears as a large player in this market (see Figure 10).

Figure 10: Fruit Juice Concentrate and Fruit Pulp Exports, by Country
(in USD Millions)



Source: FAOSTAT and authors' calculations.

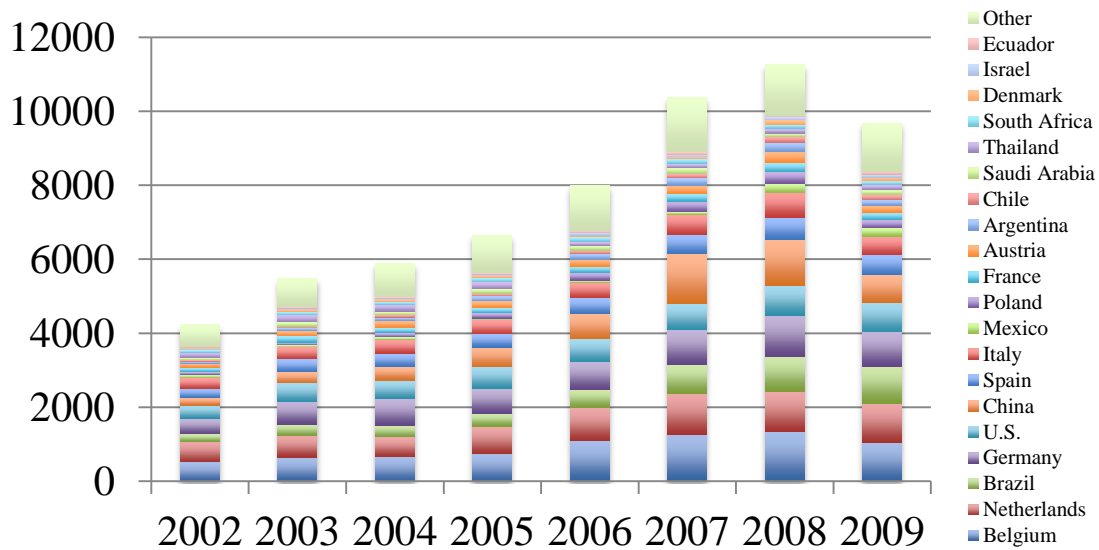
Chile is the second-largest Latin American player, in eleventh place by its fruit pulp exports. Agrozzi Fruit Concentrates from Chile is the largest processor of Mediterranean fruit in the world. This firm supplies the main industrial costumers of nectars and baby food, such as Gerber (Novartis), Nestlé, Heinz, Parmalat, Kagome, and Numico, on a permanent basis. Colombia falls behind, in forty-fourth position among fruit pulp suppliers participating in the global value network.

Trade records show the relative importance of exports of orange juice and apple juice concentrates. They represent about two-thirds of the market's activity when export records of "Fruit prepared, not elsewhere specified (NES)" are not considered (when the latter are taken into account, this participation falls to near 15%). We are keeping the records of "Fruit prepared, NES" separate, because while some pulped or cut fruit may fall in this category, it also includes a number of fruit products that are not the object of our study (see Figure A7 in the Appendix).¹⁶

¹⁶ The fruit pulp exporters' ranking changes slightly if we exclude exports of Fruits prepared, NES. Since there is an error one way or the other due to the level of aggregation at which the data are available, we decided to keep them in our calculations.

Fruit pulp and fruit juice concentrates exports meet the demand of foreign industrial costumers, who, in turn, serve local juice markets where they are based and/or international juice markets. Notice that most of the larger players participating in the global value chain as intermediate goods suppliers are also large fruit juice exporters (see Figure 11).

Figure 11: Fruit Juice Exports, by Country
(in USD Millions)



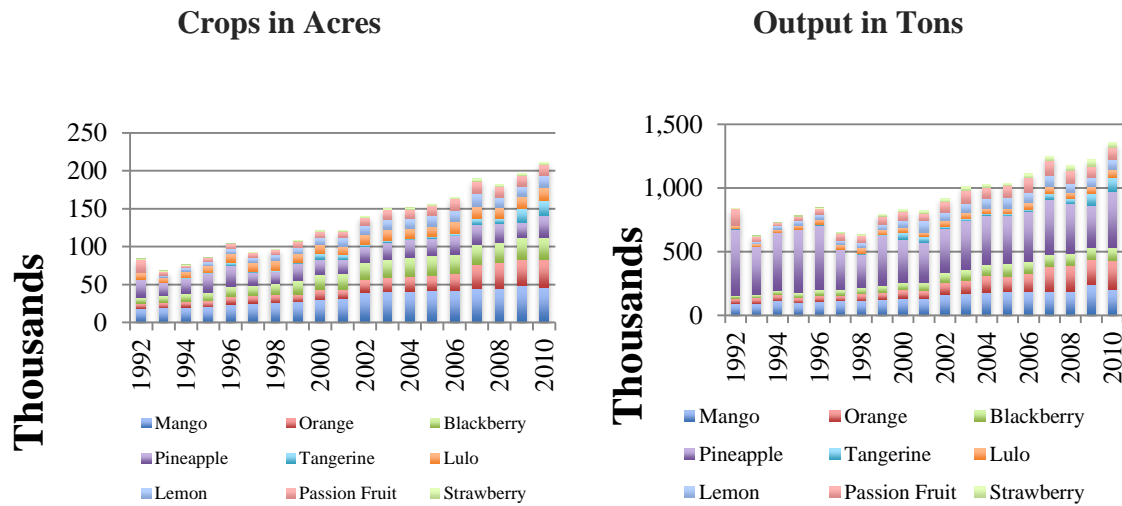
Source: FAOSTAT and authors' calculations.

This does not necessarily mean that the pattern of vertical production fragmentation across borders that we intend to explore through this case study does not exist. On the contrary, it turns out that long-term contracts with established foreign producers have played a key role for industry growth.

4.2. The Local Industry

Colombia is a tropical fruits producer. Fruit crops have grown over time with few interruptions since the early 1990s, and so has fruit production (see Figure 12). Their numbers grew at annual average rates of 6% and 5% between 2000 and 2010, respectively.

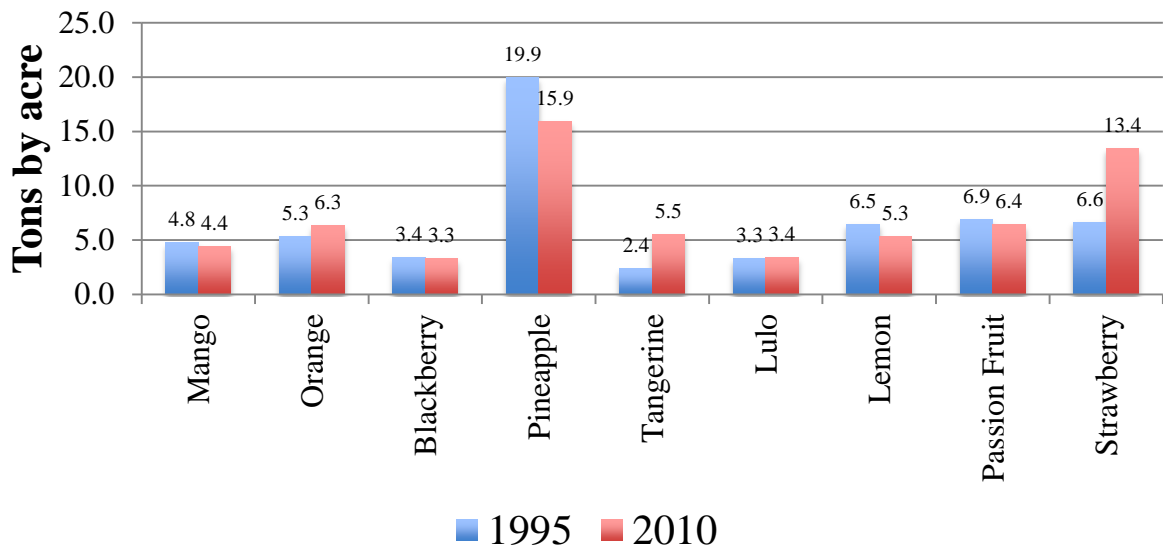
Figure 12: Fresh Fruit Production in Colombia



Source: AGRONET and authors' calculations.

Productivity growth has, however, not been impressive; only oranges, tangerines, and strawberries display a positive productivity trend over time measured by yield per acre (see **Figure 13**).

Figure 13: Yield Per Acre

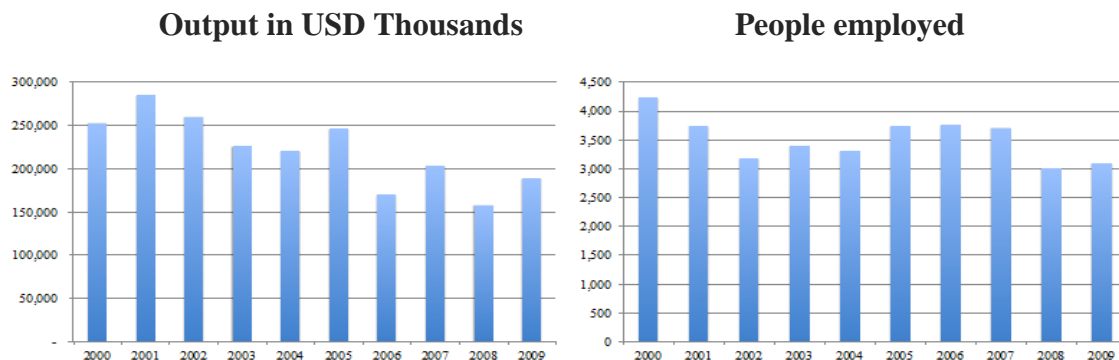


Source: AGRONET and authors' calculations.

Based on local fresh fruit production, Colombia has developed an incipient industry of fruit products (mostly fruit pulp, and cut fruit on occasion) to serve both the

local and international markets. Because of the level of aggregation at which the Annual Manufacturing Survey data are available, we can only observe fruit pulp together with fruit juice production and other fruit and vegetable products.¹⁷ These data tell a story of an industry still far from maturity, undergoing substantial output and employment fluctuations between 2000 and 2009 (see Figure 14).¹⁸

Figure 14: ISIC 4-Digit Sector 1513, 2000–2009

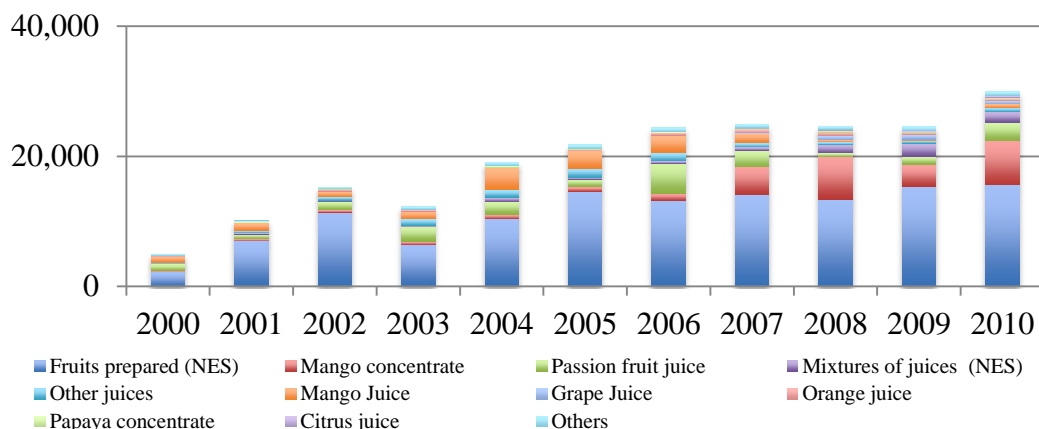


Source: Annual Manufacturing Survey (AMS) and authors' calculations.

Note: In million pesos of 2010, converted to dollars at the December 2010 peso/dollar exchange rate.

The evolution of exports is more promising (see Figure 15). Like fresh fruit output, exports of fruit products appear to have grown steadily since 2003, with only a small deceleration during the crisis in 2008 and 2009. Moreover, the industry has seen substantial entry and growth of new exporters (see Figure 16).

Figure 15: Fruit Products Exports in USD Thousands, 2000–2010

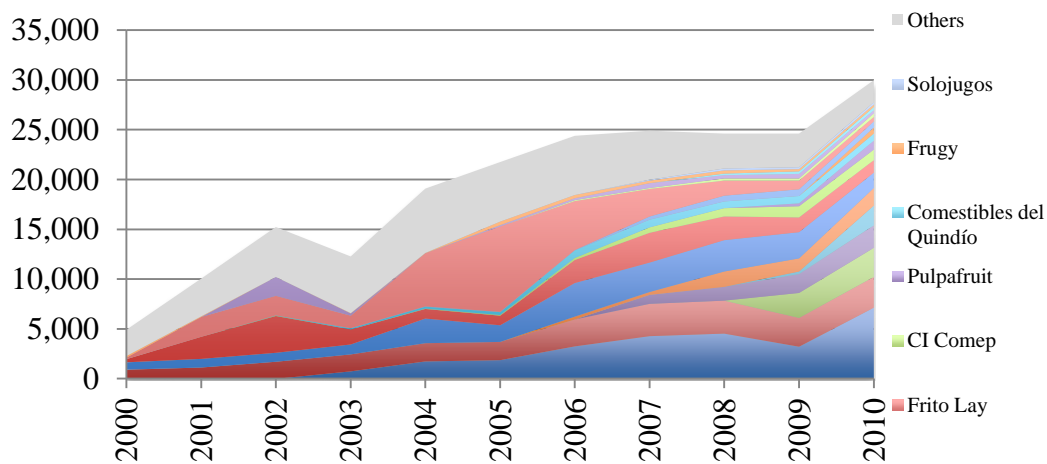


Source: Customs records and authors' calculations.

¹⁷ We only observe ISIC 4-digit (Rev. 3) sector 1513 “Processing and preserving of fruit and vegetables.”

¹⁸ We still need to confirm that the AMS data are correctly capturing the industry dynamics.

Figure 16: Fruit Products Exports by Firm in USD Thousands, 2000–2010



Source: Customs records and authors' calculations.

Note: Fruit products include fruit concentrates, fruit pulps, and fruit juices.

When asked about their ability to compete, exporters say deficient transport infrastructure seriously challenges their activity. In particular, the fact that containers are opened during antinarcotics inspections and the product exposed to temperature changes compromises the longevity of frozen fruit and fruit products. Ports lack cold rooms for adequate handling of perishables. Also, inspections often result in damaged products from the practice of puncturing packages in search of narcotics.

Handling of frozen products is also challenging in destination markets, especially in Europe, where customers' preferences are for natural products with no added preservatives, but refrigeration systems are often inadequate.

Government has not played a particularly important role in facilitating industry development. Trade fairs attended at Proexport's invitation have proved useful as a means to meet potential customers and make business relations, but these invitations frequently target firms who are already participating in international markets, not first-time exporters.¹⁹

Plan Vallejo, a duty drawback program available to exporters using imported inputs, is seen as the policy that has mostly contributed to exports' development. This policy,

¹⁹ Proexport is the government agency in charge of export promotion.

however, would not be necessary if there were no tariffs distorting relative prices in the first place.

4.3. The Firm and Its Linkages

Alimentos SAS is a firm located in Bogotá, Colombia, that has been active in the food products sector since 1981. It produces food products including fruit pulps, whole and cut frozen fruit, and fruit juices. In 1995 the firm was bought by a partnership of four members, three of whom had previous experience in high-level positions in the Colombian food products sector. Between 1997 and 2007 the firm's ownership was reorganized. One of these four partners left the company in 1997; a new one entered in 2000; and two of the original partners sold their shares in 2005. The firm's current owners are Daniel Gaviria and Luis Fernando Trujillo. Gaviria and Trujillo had both previously worked at La Alquería, a large player in the food products sector, and learned about the fruit juice market through that firm's fruit beverage brand, Tampico, that was until recently a leading brand in that market. Gaviria and Trujillo's bet on product and service quality has allowed SAS to position itself among the most important players in the local market, and to enter "timidly but successfully" (in their words) into international markets. Its annual sales in 2010 were USD 4.8 million and its exports that year account for 26% of this value.²⁰

The firm's customer base is essentially composed of food chain stores and business or institutional clients (fast-food chain restaurants, hotels, restaurants, educational institutions, and hospitals). It currently has more than 350 local active customers and is also increasingly participating in the global market as an exporter of naturally concentrated tropical fruit pulps and frozen cut fruit. Its production plant, currently undergoing an expansion process, has capacity to process about two hundred tons of fruit per month.

Fruit pulp producers are excellent market regulators; they buy during peak fresh fruit production seasons when there is excess supply (and sell processed fruit during low times when production is low), making farmers' activity sustainable throughout the year. SAS has business relations with about five hundred farmers from different country regions

²⁰ Sales data are from Supersociedades, and export data are from official customs records.

who provide inputs to the firm. So while there are only eighty direct manual laborers occupied in the firm's business, indirectly, SAS's activity impacts a much larger number of people.

SAS competes both in the local and international markets with a number of firms (see Figure 16). SAS's strongest competition is from:²¹

- Agrofruit, a fruit pulp producer located in Medellín. Its annual sales in 2010 were USD 12.9 million and its exports that year account for 28% of this value.
- Pulpafruit, a fruit pulp producer located in Bogotá that sells only to business and institutional clients. Its annual sales in 2010 were USD 7.2 million and its exports that year account for 6% of this value. This firm is one of Danone's and Quala's input suppliers.
- Meals de Colombia, a juice producer located in Armenia, also selling only to business and institutional clients. Its annual sales in 2010 were USD 135.7 million.
- Productora de Jugos, a fruit products producer located in Tuluá. Its annual sales in 2010 were USD 14 million and its exports that year account for 51% of this value. It is Postobón's main input provider.²² Aside from Postobón, its products are sold mostly in export markets.
- Alpina, a food products manufacturer producing fruit juices in Armenia. Its annual sales in 2010 were USD 596.8 million (this value including sales from other product lines). It is a very small player in fruit products export markets (its fruit products exports represented 0.1% of sales in 2010).

There is also competition from a large number of smaller local producers, with annual sales grossly estimated by SAS to be about USD 5 million, mostly serving the institutional market.

SAS directly controls distribution countrywide, delivering its products to final consumers from its plant in Bogotá or from storage facilities in other cities. Transport is outsourced to independent transporters.

Fruit unavailable in Colombia is obtained through occasional imports from Chile, Argentina, and Mexico.

²¹ Sales data below are from Supersociedades, and export data are from official customs records.

²² Postobón is one of the largest beverage producers in Colombia.

The Firm's Story

SAS's search for international customers nowadays includes participation in international trade fairs alongside the National Exports Promotion Agency. In the beginning, however, the firm was on its own, and entry into international markets was more a result of networking and contacts with potential clients made through friends living abroad.

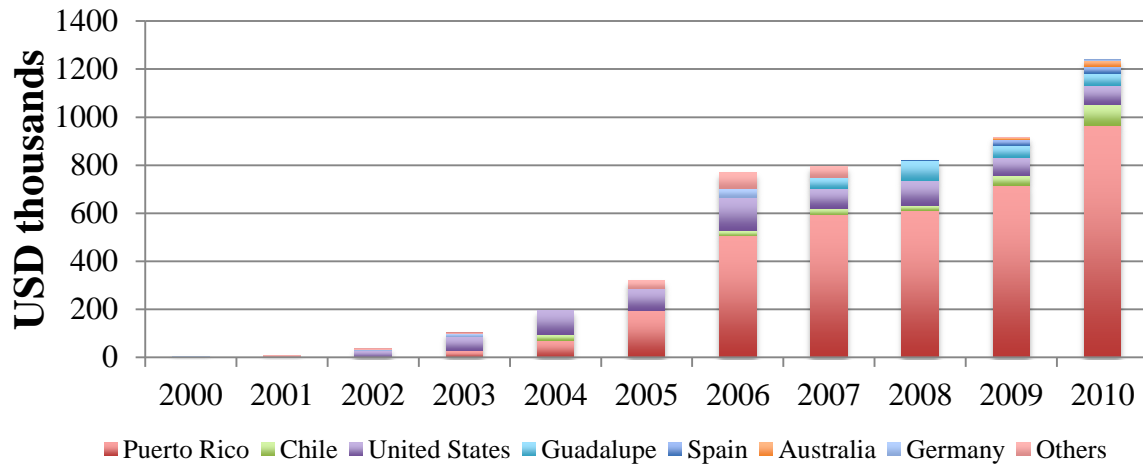
The breakthrough business deal that opened the way to SAS as an exporter was a long-term arrangement with Matosantos Corporation—a large Puerto Rican manufacturing, distributing, and marketing firm that serves Walmart stores worldwide, among others—to provide fruit pulp for Subway fast-food restaurants in Puerto Rico, and frozen cut fruit for sale in food courts in the same country. SAS designed a product with special characteristics that was submitted for Subway's approval; it included a plastic package specially shaped to fit directly into Subway's juice makers, where pulp is automatically mixed with water and dispensed as juice. Matosantos went as far as financing the purchase of the machinery SAS required to enter the deal in 2002. SAS would enter into a long-term business relationship with Matosantos, and pay back the loan by accepting lower prices.

SAS had a second contract with Matosantos, active until recently, to sell packages of frozen cut fruit to food chain stores in Puerto Rico. Tailor-made packaging was designed and packaging materials imported from China for this purpose. This deal was interrupted by Matosantos, who replaced SAS with a Costa Rican supplier allegedly able to offer the product at a better price. Daniel Gaviria does not rule out the possibility that Matosantos will reconsider this decision in the near future and come back to SAS, because the Costa Rican competitor is known to have already failed to meet delivery deadlines.

SAS's experience with Matosantos paved the way for the firm's growing activity in global markets. While export growth over the years has resulted from a combination of both sales in spot markets and long-term arrangements like those described above, and not exclusively from the latter, SAS regards its business relationship with Matosantos as crucial for the firm's development as an exporter, and is alert for opportunities to enter into vertical arrangements under which it will be bound to established foreign firms as an input provider. Puerto Rico's relative importance among SAS's export destinations evidences how fundamental this business relationship with Matosantos has been for the

firm (see Figure 17).

Figure 17: SAS exports by destination, 2000–2010



Source: Customs records and authors' calculations.

A more recent experience in the same spirit is a business relationship with a German firm to produce tropical fruit juices to be sold under the brand Juna in Europe. The target for this product is the market of consumers buying from health food stores. To enter into this deal, SAS is investing in developing a long-lasting product with no added chemicals for preservation that is being tried in cooperation with the German client. Juna juices are to be sold in individual bottles specially designed for the brand in a process in which the client has also participated. So far, the need to keep the product frozen until delivery to retail stores in Europe has been a challenge, so SAS is in the process of experimenting with new technologies to meet this need.

Obstacles to Growth

The greatest challenge is associated with product conservation. Although frozen fruit products conserve well, problems with transport logistics, resulting in poor temperature management while the product is in transit, limit the possibility of export-based growth. The private-sector solution to this problem is investing in technological innovations to develop long-life products that do not require refrigeration or added preservatives, which is exactly what SAS is currently trying to accomplish.

Appreciation of the Colombian peso against the U.S. dollar has also posed a

challenge for survival in export markets in recent years. This has been partially solved by moving toward a larger share of imported inputs (i.e., transitioning as much as possible to costs set in dollars), a strategy used in combination with the purchase of exchange rate coverage from the financial sector.

A third obstacle is fresh fruit producers' use of pesticides unauthorized in destination markets (but authorized for use in Colombia), which results in the need to carefully screen providers and incur costs to test inputs for unwanted chemicals that could represent huge losses.

5. Lessons from Case Studies and Policy Implications

Participation of firms in global value chains is not yet widespread in Colombia. Examination of particular experiences, however, suggests it has a strong potential to boost exports and economic growth.

In this article, we have developed case studies around the experience of two Colombian firms that have successfully penetrated international markets through participation in global value chains. The stories of these firms have points in common and elements that set them apart that we will unveil in this section in order to extract lessons for public policy.

The first case reviewed is that of Hugo Restrepo y Cía, a Colombian firm that is the main provider of chili pepper paste for the Tabasco hot sauce brand. Since the mid-1970s this firm has sold processed chili pepper to Tabasco, bound by a long-term agreement based on contracts that are renewed every two years. The firm organizes farmers located in the Colombian southwest to grow the chili pepper required by Tabasco, which it then processes, packages, and sends abroad. While Tabasco was originally the firm's only client, the firm has succeeded in expanding its participation in global markets by entering into similar governance arrangements with other hot sauce producers. The particularities of this case can be summarized as follows:

- The originator of the business arrangement was Tabasco, an American multinational firm. Tabasco was willing to invest in developing Hugo Restrepo y Cía's business. Relationship-specific investments included time (in waiting for adequate crop

development) and knowledge transfer (seeds and continued technical advice), and made sense from Tabasco's standpoint to the extent they returned (1) control over input quality, and (2) a stable input supply at what, by necessity, must be a competitive price.

- Hugo Restrepo y Cía understood soon enough that the industry's value added was more in the stages of packaging, storage, and international logistics than in the production of the agricultural input, or in the manufacturing process by which the chili fruit is transformed into chili pepper paste, which is indeed quite simple, and successfully moved on to replicate the vertical arrangement proposed by Tabasco with local farmers. Under this arrangement Hugo Restrepo y Cía controls input quality and ensures a stable input supply; is in control of the transformation process; and handles the overall business logistics locally and abroad, becoming a market coordinator.
- While Tabasco remains Hugo Restrepo y Cía's most important client, the firm is no longer bound to Tabasco by exclusivity obligations, and has moved on to expand its reach across international markets by entering into similar vertical arrangements with other hot sauce producers.
- The government has played no role whatsoever in facilitating Hugo Restrepo y Cía's growth as an exporter.

In the context of the theory of value chain governance, the arrangement between Tabasco and Hugo Restrepo y Cía can be characterized as having evolved from a *captive value chain* to a *relational value chain* over time. In the beginning, knowledge of a certain degree of complexity—including actual seeds—was transferred in a relatively easy way to an input supplier that knew very little about the business and had to learn from scratch. To that extent, the supplier can be characterized as having low capabilities at the outset. As the lead firm, Tabasco intervened frequently and maintained a substantial degree of control over the input production, and Hugo Restrepo y Cía was a locked-in supplier bound by a contractual agreement preventing the firm from supplying Tabasco's competitors in the hot sauce industry. As time went by, however, the knowledge transfer was completed and Hugo Restrepo y Cía transformed itself from a knowledge receiver into a knowledge producer, able to support Tabasco in a different role. Hugo Restrepo y Cía, moreover, became an expert in packaging, storage, and transport logistics, which is a

type of high-complexity knowledge that is more difficult to transfer. Under these changing conditions, the supply base could no longer be characterized as low capability, or rather, the low-capability supply base was no longer in direct contact with the lead firm, but was instead articulated by a highly capable intermediary who modeled its vertical relationship with the lead firm by replicating in-house the form of governance of the global value chain that Tabasco had originally proposed. This transformation was accompanied by the end of exclusivity clauses in the contracts between Hugo Restrepo y Cía and Tabasco.

The second case reviewed is that of Alimentos SAS, a fruit pulp producer that has had, among others, a long-term contract with Matosantos, the marketer serving Subway's demand for fruit pulp for juices in Puerto Rico. This firm, founded in 1981, is part of the fruit pulp for juices industry and has a history of participation in vertical global value chains through contracts with a number of foreign firms in different countries. The particularities of this case can be summarized as follows:

- The originator of the first vertical business arrangement into which Alimentos SAS entered was Matosantos, a Puerto Rican multinational marketer firm. Like Tabasco in the previous case, the lead firm was willing to invest in transforming Alimentos SAS into its input supplier. The shape this investment took, however, was different: it appeared in the form of a loan to be repaid through supply at lower prices. In this case, Alimentos SAS assumed all relationship-specific investments (for example, development of a special mold to fit the final client's juice dispensers). Also, business risks associated with phytosanitary problems from poor crop management were fully assumed by Alimentos SAS.
- Matosantos interrupted business with Alimentos SAS when a new deal with a Costa Rican provider appeared more profitable.
- Alimentos SAS saw participation in the global value chain as an input provider bound by long-term contracts as the best way to go about entering and growing in international markets. In this spirit, Alimentos SAS made a habit of participating in trade fairs to offer its products to juice producers and marketers already present in foreign markets, and has been able to secure through this channel other business deals under similar arrangements. Its contract with Matosantos did not include exclusivity clauses.

- In its day-to-day business Alimentos SAS faces a number of difficulties. First, the fact that crop management in Colombia is not properly regulated and monitored implies costs from screening fruit for unwanted pesticides before it enters as an input into its production process to ensure the firm's products are not rejected in foreign markets. Second, poor temperature management locally and abroad while products are in transit limits the possibility of export growth. To this, the firm's response has been to invest in technological innovation to develop long-life products that do not require refrigeration or added preservatives. Third, narcotics screening of exports by drug interdiction forces often damages goods, imposing additional costs to be borne by the firm.
- The government has played no role whatsoever in facilitating Alimentos SAS's growth as an exporter.

It is not straightforward to characterize the case of Alimentos SAS in the framework of the theory of value chain governance. Knowledge to produce frozen fruit pulp and to handle the product was not handed down by a lead firm. In fact, the only instructions transferred were the shape and dimensions of the mold in which the product had to be packed in order to reach the final customer. Producing the mold required a small investment on the part of Alimentos SAS to enter the business, something that was easily done. Matosantos facilitated financing, but nothing suggests that Alimentos SAS could not have obtained the required financing from an alternative source. And Alimentos SAS can hardly be characterized as a low-capability supplier. Moreover, Alimentos SAS has assumed on its own all of the business risks associated with exporting. The long-term contract with Matosantos did not even prevent the business relationship from being unilaterally interrupted. If it were not because in this case the buyer is a price-setter, this vertical relationship would fully fall in the *market* governance category. But the lead firm in this case was vital as market coordinator. In its absence, Alimentos SAS would not have entered so successfully into the Puerto Rican market, where Matosantos was already an established supplier. So Alimentos SAS had to accommodate Matosantos's conditions. To that extent, the power asymmetry in this relationship was high. But the vertical arrangement between the firms cannot be fully characterized as a *captive* value chain either, for the reasons stated. Moreover, in the newer business experience with a German

firm, Alimentos SAS has entered more as a business associate than as a captive supplier. These reflections suggest that in this case, the theory of standard transactions costs probably better explains the way in which business across borders has been organized, with long-term contracts between vertically related firms as a means to avoid both renegotiation costs and opportunistic behaviors associated with relationship-specific investments.

Some themes are common across the cases:

- In both cases, the foreign lead firm was key in transforming the local firms into exporters. Not only did local firms export for the first time by their hand, but these first experiences also paved the way for the local firms to fly solo in search of similar business deals with other partners.
- In both cases, the goods sold are agricultural food products that undergo a simple transformation process. Both enter vertical chains as intermediate products and are willingly sold without a brand name. Local firms understand the advantage of entering new consumer markets without struggling to position a brand or a final product.
- Both local firms are small- and medium-sized enterprises (SMEs) led by capable, highly educated businessmen. Both strongly invest in innovation.
- In both cases there was no role played by the government. Firms have faced and solved restrictions on their own.

Some things are, however, different:

- Hugo Restrepo y Cía has become a market coordinator and transformed itself to become a services firm more than a manufacturing firm. In this process it has assumed directly the business logistics both locally and abroad. Alimentos SAS, however, remains a manufacturing firm and depends on others for the majority of its logistics.
- Alimentos SAS does not control its input quality and, as a result, has to incur high costs in screening the fruit that enters its production process. Hugo Restrepo y Cía, in contrast, strongly intervenes in the agricultural process and controls its input quality. As a result, phytosanitary problems are more binding in the former case than in the latter.

- While Hugo Restrepo y Cía's experience lends itself to be examined under the framework of the theory of global value chain governance, this is not as clear about Alimentos SAS's experience.

From examination of these two case studies, some policy recommendations emerge, the most noteworthy probably being that export promotion policy in Colombia should be refocused, understanding the huge potential of building a supply of processed agricultural products to be sold as inputs of more sophisticated production processes in international markets. Export growth leveraged on participation in global value chains where lead firms have already opened markets seems promising. And there seems to be a lot to gain if production of agricultural inputs undergoing basic transformation processes locally is combined with the development of a strong packaging, storage, and transport logistics services sector. Policy emphasis should steer away from promoting the sale of final manufactured products in international markets, particularly in the food sector.

Also, a key policy implication from the cases examined has to do with the need to devise alternative ways for screening exports for narcotics that will not destroy legal goods and impose immeasurable costs on producers who are trying to reach foreign markets.

Finally, phytosanitary regulation must be updated to ensure pesticides banned in foreign countries are also blacklisted in Colombia and their use forbidden (and the regulation enforced). The costs of screening for unwanted pesticides must not be borne by the private sector.

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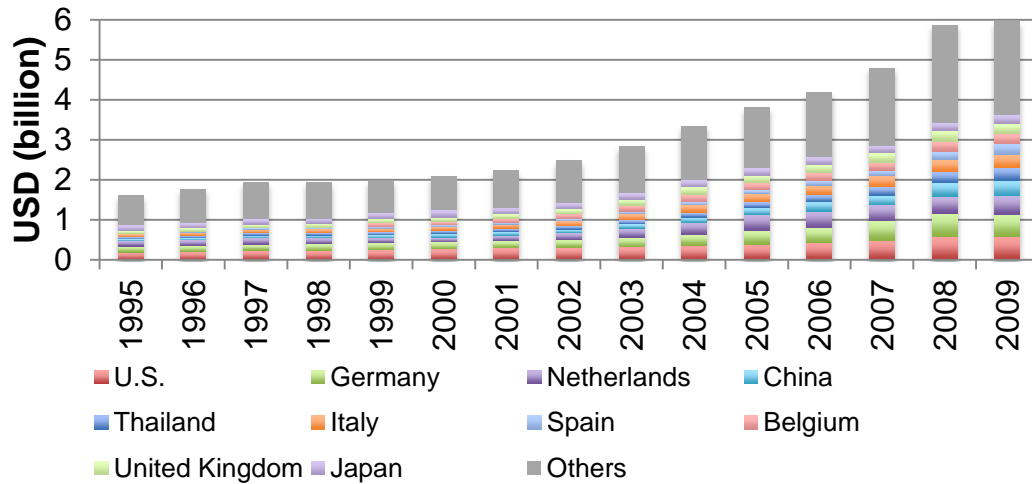
Interviews

Camilo Restrepo at Hugo Restrepo y Cía

Daniel Gaviria at Alimentos SAS

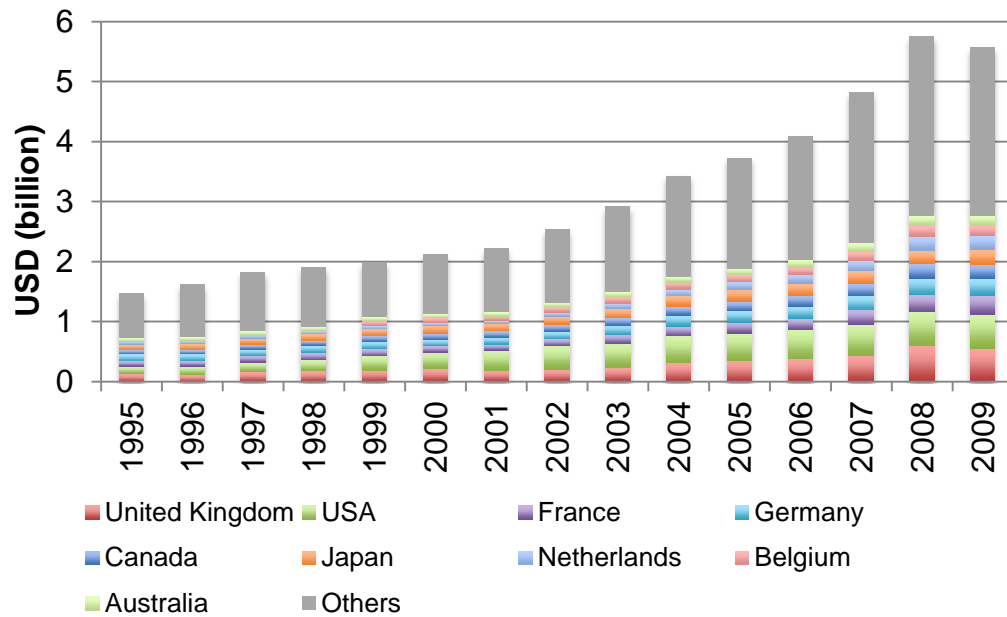
Appendix

Figure A1: Hot Sauce Exports by Origin, 1995–2009



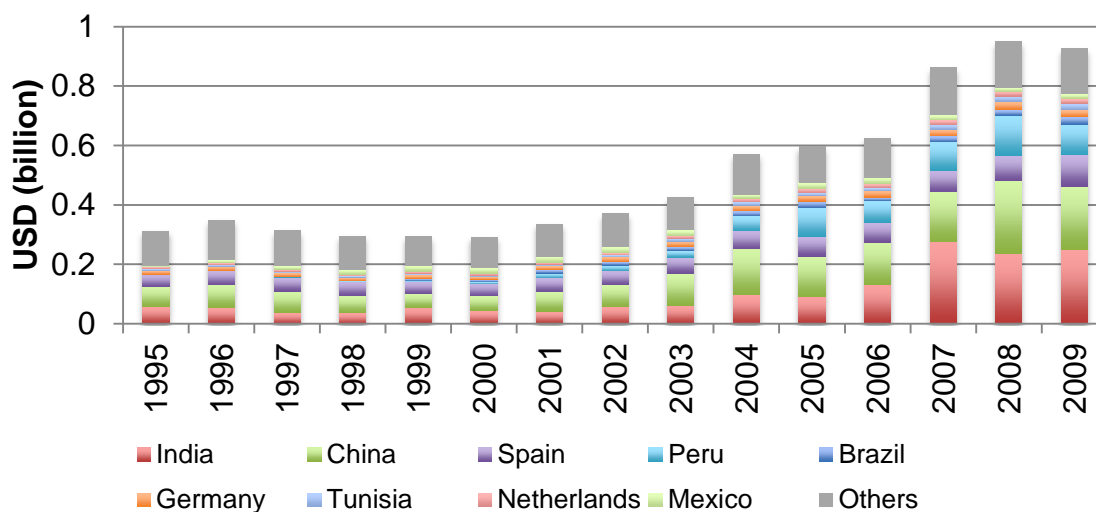
Source: COMTRADE and authors' calculations.

Figure A2: Hot Sauce Exports by Destination, 1995–2009



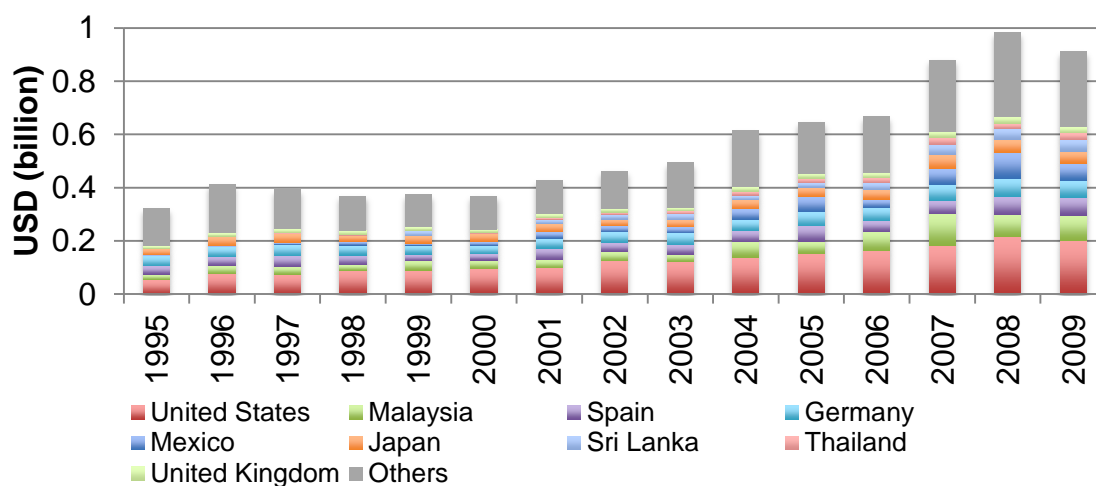
Source: COMTRADE and authors' calculations.

Figure A3: Chili Pepper Paste and Dry Chili Pepper Exports by Origin, 1995–2009



Source: COMTRADE and authors' calculations.

Figure A4: Chili Pepper Paste and Dry Chili Pepper Exports by Destination, 1995–2009



Source: COMTRADE and authors' calculations.

Figure A5: Fresh Fruit (for Juicing) Production, by Country

Source: FAOSTAT and authors' calculations.

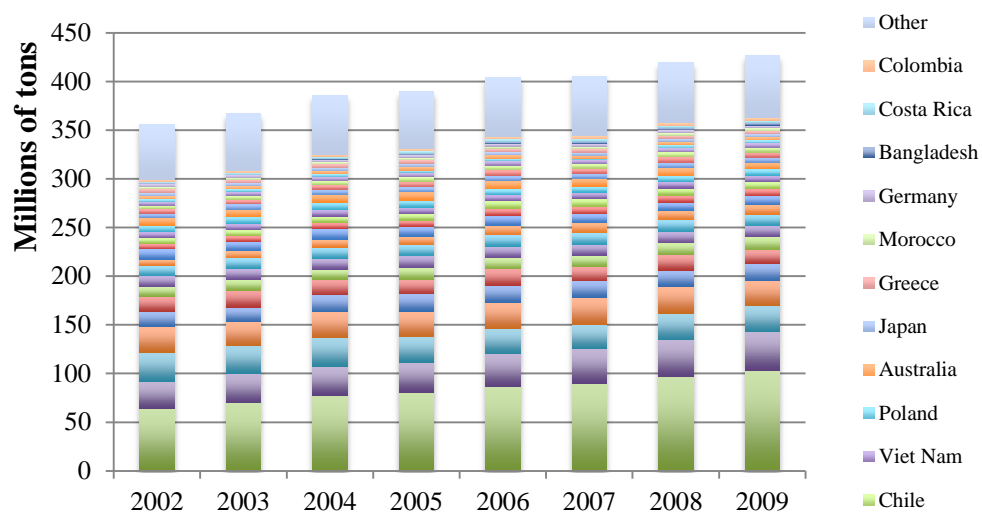


Figure A6: Fresh Fruit (for Juicing) Production, by Fruit

Source: FAOSTAT and authors' calculations.

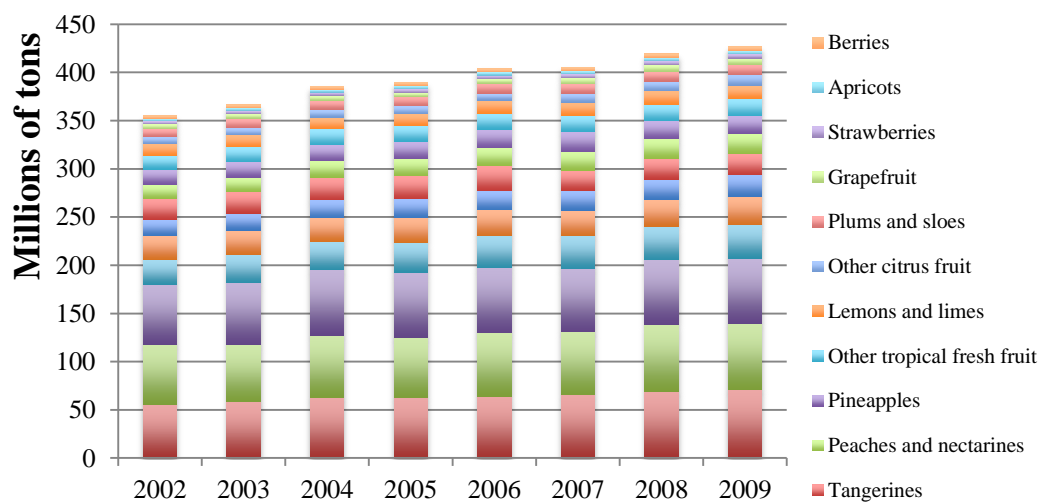
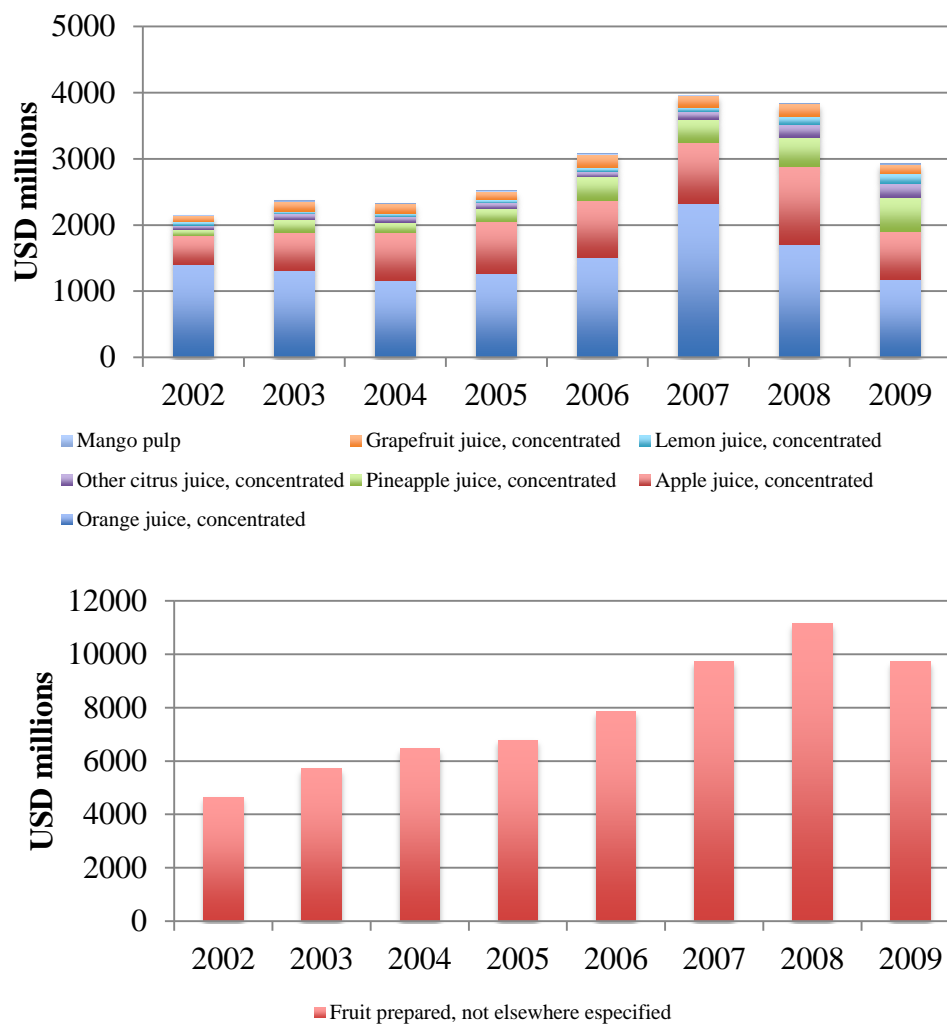


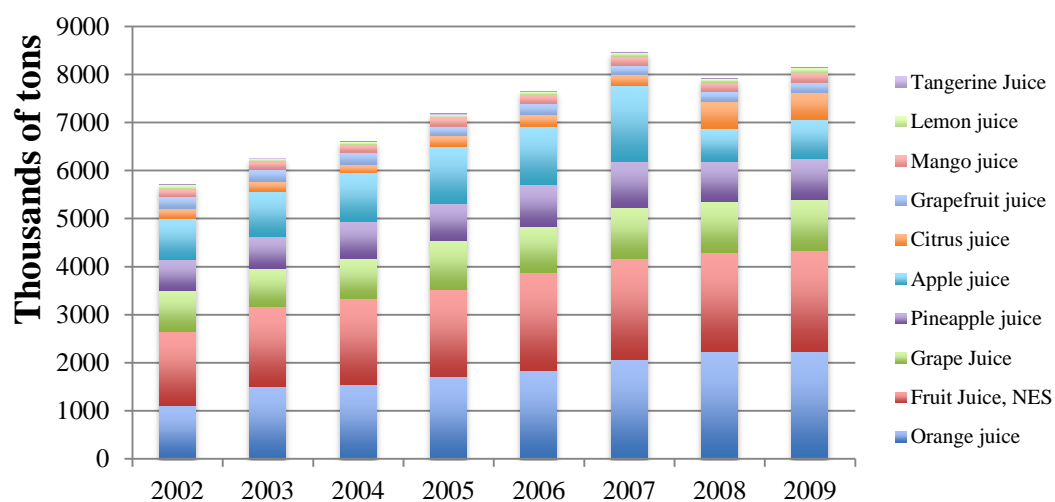
Figure A7: Fruit Juice Concentrate and Fruit Pulp Exports



Source: FAOSTAT and authors' calculations.

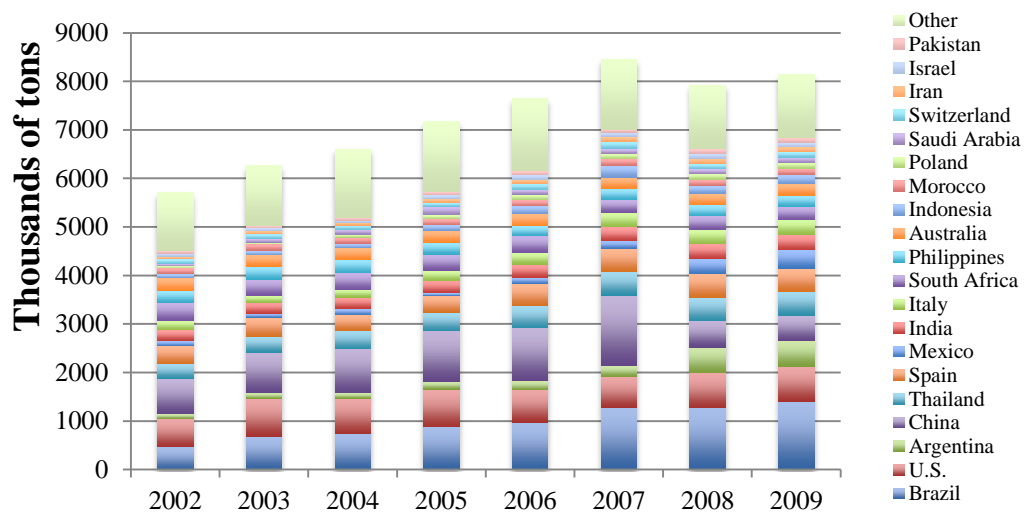
Note: "Fruit prepared, not elsewhere specified" refers to "Fruit, nuts, and peel, *including frozen, prepared, or preserved*, jam, paste, marmalade, puree, and cooked fruits, other than those listed separately."

Figure A8: Fruit Juice Production by Fruit



Source: FAOSTAT and authors' calculations.

Figure A9: Fruit Juice Production by Country



Source: FAOSTAT and authors' calculations.