



Master in Competition and Market Regulation 2021

**“Chilean fresh milk market: Ex-post evaluation of
Competition Authority's Decisions”**

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ABSTRACT IN ENGLISH (100 words):

This report presents a conceptual and empirical analysis of the Chilean Antitrust Authority's decision in the upstream dairy market. In 2004, the Antitrust Court decided that the biggest milk processors should not discriminate and publish their buying prices in order to improve the competitive conditions in the market. The empirical analysis focuses on the effect of the decision in the prices of fresh milk, using aggregated and plant level data. Estimation results show that the decision caused an increase in price of fresh milk. Considering the development of the market in the last years, it is unlikely that the decision is achieving the original objectives, so it is likely that it is causing inefficiencies to the market and higher prices for final consumers of dairy products.

ABSTRACT IN CATALAN/ SPANISH (100 words)

Este reporte presenta un análisis conceptual y empírico de las obligaciones impuestas por el Tribunal de Defensa de Libre Competencia de Chile en el mercado de provisión de leche fresca. En el año 2004, el Tribunal decidió que los principales procesadores de leche no podrían discriminar en la compra de leche fresca y que debían publicar los precios de compra para mejorar las condiciones de competencia en el mercado. El análisis empírico se centra en estudiar el efecto de esta decisión en los precios de compra de leche fresca, usando data agregada y a nivel de planta procesadora. Los resultados muestran que la decisión causó un aumento en el precio de la leche fresca. Considerando el desarrollo del mercado en los últimos años, es poco probable que las obligaciones estén cumpliendo sus objetivos originales. Por lo tanto, es probable que la decisión esté causando ineficiencias en el mercado y mayores precios para los consumidores finales de productos lácteos.

KEYWORDS IN ENGLISH (3): ex-post evaluation, buyer power, dairy market.

KEYWORDS IN CATALAN/ SPANISH (3): evaluación ex-post, poder de compra, mercado lacteo.



MASTER PROJECT

CHILEAN FRESH MILK MARKET: EX-POST EVALUATION OF COMPETITION AUTHORITY'S DECISIONS

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MASTER IN COMPETITION AND MARKET REGULATION 2021

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Abstract

This report presents a conceptual and empirical analysis of the Chilean Antitrust Authority's decision in the upstream dairy market. In 2004, the Antitrust Court decided that the biggest milk processors should not discriminate and publish their buying prices in order to improve the competitive conditions in the market. The empirical analysis focuses on the effect of the decision in the prices of fresh milk, using aggregated and plant level data. Estimation results show that the decision caused an increase in price of fresh milk. Considering the development of the market in the last years, it is unlikely that the decision is achieving the original objectives, so it is likely that it is causing inefficiencies to the market and higher prices for final consumers of dairy products.

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²This report was done independent to any institution or firm. Nevertheless, I must disclose that I worked in the Chilean Antitrust Court from 2016 to 2019, but never saw the cases related to this thesis. Between 2019 and 2021 I worked at the law firm FerradaNehme in Chile and I worked with Nestlé during 2020, which is one of the affected processors. During that period I did not work in any of the cases described in this report. So, I have no conflict of interest.

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1 Introduction

Analyzing the effect of Antitrust Authorities' decisions is important, since it contribute to improve policy making, evaluate predictive power of methodological tools and improve accountability. The aim of this report is to contribute as an independent assessment of a particular decision by the Antitrust Authority in Chile: the obligation of non-discrimination and price publication imposed to the biggest milk processor in the buying process of fresh milk.

These measures were imposed by the Chilean Antitrust Court in 2004, and confirmed in 2018, with the objective of improving the competitive conditions in the upstream market of fresh milk, where some milk processors had buyer power. The reasoning behind this decision was that improving the mobility of producers would assure that every competitor have access to this crucial input.

This study presents an economic analysis, through theory and empirical estimations, of the decision and its impact in prices and quantity. I focused on the effect of the measures in price and their effectiveness in improving the entry conditions in the market. Proving the effectiveness of the measures is important because they are not free, since they introduce a friction to the market that may produce inefficiencies and higher prices to final consumers.

I found that the decision had a positive and significant impact in prices of fresh milk, especially in areas where processing plants are closer. The effect in received liters of fresh milk is less clear. Nevertheless, it seams unlikely that big processors reduced their received liters and there is no sign that entry and consolidation conditions were improved by the decision, which would mean that it did not have the desired effect and it may be harming competition in the market.

The report is structured as follows. In section 2 the Chilean dairy industry is explained.

Then, the competition cases in this market are described in section 3. A literature review is presented in section 4 and then a theory of the case is exposed in section 5. Section 6 presents the available data and some descriptive statistics, followed by section 7 in which I present the econometric models and the empirical results. Finally, in section 8, conclusion and discussion are exposed.

2 Chilean Dairy Industry

The dairy industry in Chile, and generally everywhere, is composed of different steps that are shown in Figure 1. . At the beginning of the value chain, producers that own cows and farms produce fresh milk, which is a highly perishable good that needs to be maintained at low temperatures. The producers offer their milk to the processors. With fresh milk, processors make different dairy products in their plants such as, milk, powdered milk, cheese, cream, among many others. The transport between the producer’s farm to the processor’s plant is in charge of the latter, both in terms of logistics and costs. The distance traveled cannot be too long because there is a limited time to maintain the milk at a low temperature in the specialized trucks.

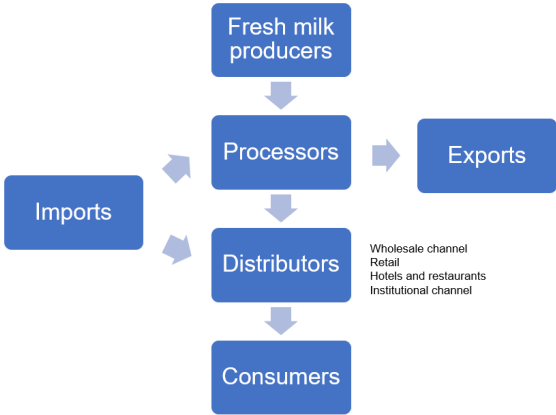


Figure 1: Dairy value chain

Once the fresh milk is in the plant, processors make the dairy products and then offer

them to distributors, which include wholesalers, retailers, hotels and restaurants, government’s institutions, among others. They then offer the products to final consumers.

In this industry there is an important international market in which dairy products are traded almost as a commodity and prices are internationally set. Both processors and distributors receive imports and processors export some of their goods. As a result, local prices are heavily influenced by international prices.

In Chile, processing plants are located mainly in the southern central area of the country, between the metropolitan region, where the capital of the country is located, and the 10th region. As shown in the map in Figure 2, regions 14th and 10th³ contain most of the plants while the other areas are less concentrated. Producers are fragmented and distributed throughout the valley area of these regions.

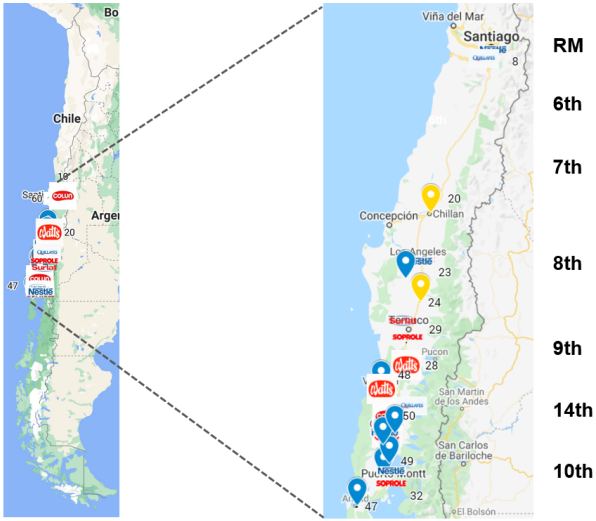


Figure 2: Map showing processing plant’s location and main regions

The weather is an important factor in milk production because cow grazing and nourishment change significantly across different seasons. Because of this, the availability of milk decreases significantly during the winter season in Chile (from May to September), meaning an average of 12% increase in price.

³Before 2010, 14th region was part of the 10th. In this report, these regions will be treated as one, since is the main area of milk production and were considered one in the time of the Court’s decision

Finally, it is important to understand how producers are paid. Payments have a particular structure that consist of a base price plus bonuses for volume delivered, amount of protein and fat, health certificates, improvements and innovation in the process, among others ⁴. So, even though fresh milk could appear as a highly homogeneous good, in practice it can be differentiated by quality and composition of nutrients.

3 Competition cases in the upstream dairy market

Before describing the antitrust cases concerning this market, it is important to mention that the competition system in Chile was going through important changes in the beginning of the 2000, when the investigation was developing against the big processors of milk. Before 2004, the antitrust system was based on the Resolutive and Preventive Commissions (“RC” and “PC”, respectively), which were administrative institutions that were not as autonomous as their successors.

In 2004, a big reform was implemented, creating the Tribunal de Defensa de la Libre Competencia (Defense of Free Competition Tribunal, “DFCT”), giving jurisdiction to autonomously manage all antitrust cases, brought by the prosecutor or private, both firms and people. In addition, the Fiscalía Nacional Económica (National Economic Prosecutor, “NEP”) was created, to investigate and prosecute antitrust cases. This reform is considered to be the most important in the development of the competition system in the country (Bernedo, 2013)[3]. From 2004 the Chilean antitrust system was established as we know it today and the prosecution and investigation of competition infringement became more polished and strong. Following this reform, competition law became more generally known, bringing big cases to the DFCT, both by the FNE and firms.

⁴Processors publish their price guidelines in their websites. Examples can be found here for [Nestlé](#), [Watt’s](#) and [Soprole](#).

So, this case⁵ started with the old antitrust system. In May of 1996, the PC expressed its concerns about the dairy market because of the abuse of oligopsony power by the processors through price discrimination between fresh milk producers, among other accusations⁶. The accused group included Nestlé, Soprole, Parmalat, Loncoleche (today Watt's), Dos Alamos, and Colún, which represented almost 80% of the market, considering 8th through 10th regions. Finally, the PC asked the prosecutor to charge the processors in the RC.

The prosecutor did this in June of 1997, filing a suit against the same processors indicated by the PC, which the RC declared admissible. In August of 2002, the prosecutor changed the suit to restrict it only against Nestlé, Soprole, Parmalat⁷ and Loncoleche. The length of this case is mainly explained by the reforms that were being implemented during this period.

In August of 2004, in the Judgement N° 7 (“J7”), the DFCT decided to reject the action of the NEP, except for the discrimination claim against Nestlé. Nevertheless, it imposed measures to the accused processors:

- Maintain a guideline of purchasing prices, including all the details of its different components.
- Announce at least one month in advance any change in the purchase guidelines.
- Justify any purchase denial to producers.
- Keep a registry if purchase denials and inform the NEP every 6 months about important changes in suppliers.
- Not to use historic sales in the determination of the paid price.
- Design a sample collection system that gives guarantees to all involves parties, that must be approved by the NEP.

⁵Case N° C 01-04

⁶The prosecutor also alleged that the acused processors had a producer's non-poaching agreement and manipulation of fresh milk test. These conducts were not condemned because of lack of evidence.

⁷Parmalat stop it's operation in the market in 2004.

After that, Nestlé, Soprole and Watt's (together, "Big processors" or "BP") had the obligation of publishing their purchase prices.

In 2018, Watt's consulted the DFCT about the measures imposed in 2004⁸, specifically about the fact that they were asymmetrical, since it only applied to half of the market of fresh milk purchasing. In response, the DFCT stated that the market has not had relevant changes⁹ and have even become more concentrated since 2004, thus decided to maintain the obligations and not extend them to other competitors. The Court assured that the obligations were effective to achieve the objectives that were originally intended: transparency and nondiscriminatory conditions in the purchase of fresh milk spot market.

Also, in this decision it became *clearer*¹⁰ that the objective of the obligation was to prevent the use of buyer power of the processor to exclude entry and expansion of more efficient rivals. Therefore, it is clear that the goal of the obligations was to prevent exclusion of processors, not to protect fresh milk producers. These obligations would help to achieve this objective by promoting the mobility of producers to make entry and consolidation of competitors more likely in this market.

What was not clear after this procedure is how the obligations have been effective to achieve the original objectives, when both the DFCT and the NEP recognized that since 2004, the market has become more concentrated and had little entry in the market. As previously explained, this thesis seeks to find the effects of the obligations on the market and if they are promoting competition in the industry. This is important because these measures are not "free" in the sense that, if they are not necessary to prevent exclusion in the market, they may harm consumers. This is a possibility because the obligations

⁸Case NC° 445-18

⁹The only relevant change they identify was that now it was very common that processors and producers had fresh milk purchase contracts. They imposed a few more conditions on this matter, to guarantee that the processors were not using the contracts to make mobility more difficult.

¹⁰I say *clearer* because in the 2004 decision, the objectives of the obligations imposed were not clearly explained. Neither was the theory of harm exposed by the NEP.

create friction in the market that makes it difficult for the BP to choose prices, as they are obliged to justify any difference in the purchase prices and to do it with a month in advance.

4 Literature review

These kind of markets, which are very common in food industry, lead the way to market power. This happens because usually, there are few processors and many small producers to buy the input from.

Historically, buyer power has received little attention from Competition Authorities in comparison to seller power, however it has been increasing over time. As described by Waterson and Dobson (1998)[6], it is important to pay attention to buyer power because it may give more favorable terms to some firms over others in the competition in the downstream market. In this case, for example, if some processors buy fresh milk at a lower price, they will have an advantage in the downstream market when selling dairy products, because they will have a lower cost than the competitors. On the other hand, buyer power may undermine the long-term viability and innovation of suppliers. In the milk industry this could mean that producers would end up with such a low mark-up that they could not survive in the long term, or that they would not have any incentive to innovate and improve the productive process, which would prevent them from being efficient.

This must be considered in the assessment of a competition case in a market with buyer power. Additionally, this kind of assessment will heavily depend on the objective of competition policy in each jurisdiction, because the analysis changes if the aim is to maximize social, supplier's or consumer's surplus. In Chile this distinction has not been specified but the competition law states that the aim is to protect competition in the

market¹¹. Additionally, and the Antitrust Court has clearly stated, in several decisions, that this objective is different from protecting competitors¹².

This distinction is important because it establishes the need to differentiate between competition problems and unfair trading practices derived from buyer power. Competition problems arise when a buyer has market power and through different practices harms competition by not allowing competitors to participate in the market in a level playing field, ending up with a concentrated market and, finally, with high prices charged to consumers. On the other hand, unfair trading practices, as the European Commission (“EC”) explained in 2018, occurs when the firm with market power is able, through bargaining power, to put supplier’s profits and margin under pressure. As further explained by the EC, this issue is very common in the food supply chain and that “unequal bargaining power and resulting imbalances in trading relationships only rarely imply an infringement of competition law” (European Commission, 2018)[5].

So, this is an industry that has been of interest for economist for its characteristics. For example, Xia and Sancewich (2018)[7], study the interaction between buyer power in upstream markets and market power in the retail market, and its impact on antitrust decisions. They show how important it is to analyze both market when assessing the imposition of measures or regulating, because a decision in one market can have important implications on the other, since usually both present some degree of market power. The existence of market power naturally leads the way to the existence of double marginalization. This issue and the policy implications in the Canadian dairy industry was studied by Abassi and Larue (2012)[1]. Also, the importance of location in the way firms compete has also been a topic, for example, in Alvarez et al. (2000)[2]. In this paper, the authors show, theoretically and empirically with data from the fresh milk market in Asturias (Spain), that it is optimal for processors to pay higher prices to producers that are closer to competitors. This proves the importance of the plant’s

¹¹Law N° 19,911 of November 14th, 2003.

¹²For example, decisions N° 87/2009 and N° 138/2014

location in the competitive dynamic of the market. In the next section, these results will be used to understand how the Court's decision could impact the fresh milk prices.

In the context of the different DFCT procedures, other economists had analyzed the market. For example, in the procedure started by Watt's in 2018, Joaquin Poblete¹³ analyzed the effect of having an asymmetric regulation in the market, since the measures imposed by the Court only affected Soprole, Nestlé and Watt's, but not Colún, which is also a big processor in the market. Claudio Agostini¹⁴ argued that it didn't make sense to apply the same restrictions to Colún, because it is a vertical integrated cooperative. Leonardo Basso¹⁵ worked in the definition of the relevant market. These reports, among others, refer to specific topics reviewed in the procedure but none of them estimate the effect of the decision in prices and received liters, through the lens of evaluating the efficacy of it in achieving the original objective. That is why this thesis differentiates from the work done before regarding these cases.

It is clear that the industry is very complex and has many aspects to it that one could study. In this limited time thesis, the emphasis will be on the effect of the decision in the upstream market prices and try to test some hypothesis with the available data, while keeping in mind that a more complete analysis is necessary to arrive at stronger conclusions.

¹³Report for Watts, "Análisis Económico de un Requerimiento Parcial de Publicación de Pautas de Precio en el Mercado de la Leche en Chile". In english: "Economic Analysis of a partial requirement of publication of Price Guidelines in the chilean milk market".

¹⁴Report for Colún, "Publicación de Pautas de Compra en el Mercado de la Leche". In english, "Publication of Buying Price Guidelines in the Milk Market".

¹⁵Report for Watts, "El Mercado Relevante para el Aprovechamiento de Leche Cruda en Chile". In english "Relevant Market in the Supply of Raw Milk in Chile"

5 Theory of the case

As previously mentioned, I followed the findings of Alvarez et al. (2000) to model the market affected by J7 and to have a theoretical base to interpret the results of the estimations exposed in the next section. To have a simple vision of the market, I assume that the producers are uniformly distributed in the areas where plants are. Since milk is costly to transport there is a limit on how far the processor can go to pick up the bought fresh milk, each plant has an influence area. Depending on the distance between competitors and the defined length of the influence area, the areas of different competitors will have different degrees of overlapping, as shown in Figure 3.

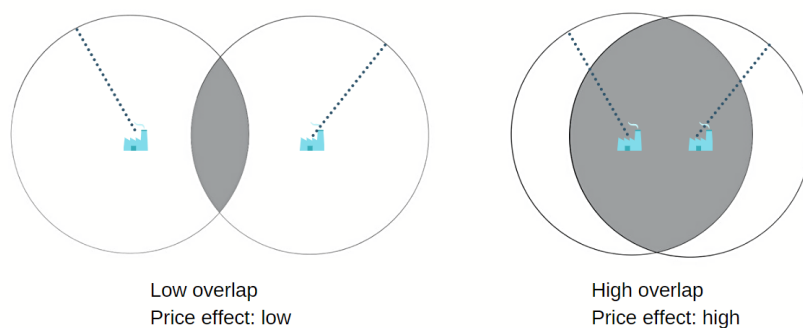


Figure 3: Overlapping areas and expected price effect of J7

Without the restriction on discriminating prices, is expected that the processors would pay a higher price to producers that are in the overlapping area, since they would compete more fiercely for these producers' fresh milk. If processors are forced to charge uniform prices, the degree of change in the price will depend on the size of the overlapping areas, since processors will be interested in maintaining the amount of received liters to maintain production to supply the downstream market. So, if the overlapping area is small, like in the left side of Figure 3, the effect of the DFCT's decision should be low, since increasing price is not crucial to maintain most of the producers. But in the opposite case, the processors would have to significantly increase their average price to maintain their received liters.

This means that the effect of the decision will depend on the plants' location and the distance to competitors' plants. As it was shown in the map in Figure 2, different areas have different levels of overlapping. For reference, in Figure 4, two examples are shown with a radius of 50 kilometers in plants in 9th and 10th regions. Since in the former the overlapping degree is lower than in the latter, the effect of the decision on the 9th region is expected to be lower than the 10th. In more general terms, as it can be seen on the map in Figure 2, higher degrees of overlapping are observed in the Metropolitan, 10th and 14th regions, in comparison to 8th and 9th regions.

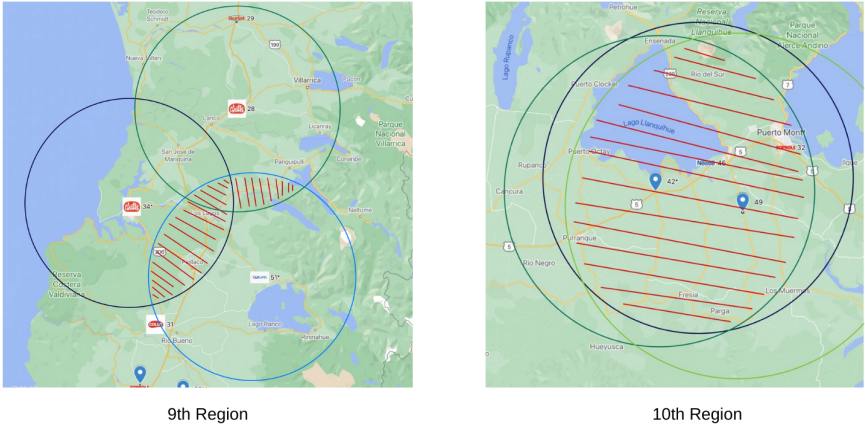


Figure 4: Examples of plant location and overlap area

6 Data and Descriptive Statistics

The data was obtained from the Oficina de Estudios y Políticas Agrarias (ODEPA, in english “Chilean Office of Agrarian Studies and Policies”). This institution publishes on their website a rich amount of information from different areas of agriculture in the country. In the dairy industry, the level of aggregation of the information has changed over time and that is why I mainly have two kinds of data: aggregated and by plant, which will be used for the implementation of different methodologies which will be described in the next section.

Specifically, the data used in this report was the following:

- Liters of fresh milk received by plant (2003-2021)
- Average price paid for fresh milk by plant (2003-2014)
- Average price paid for fresh milk by region (1992-2021)
- International prices, imports and exports both in volume and value (1990-2021)
- Location and property of each plant (processors have more than one and property of them has change in time)

The available prices were actualized using Chilean inflation, available in the Servicio de Impuestos Internos de Chile (Chilean Internal Revenue Service). So, all prices used in the estimation are real prices updated as of February of 2021.

Figure 5 shows the average monthly prices paid by processors from 1990 to 2020. The red line marks the date of the Court’s decision. At first sight, it seems like there is a change in the trend after the decision, although many things could explain this. For example, Figure 6 show the same prices and the international prices of dairy products. This show that the national prices since the mid 90’s are heavily influenced by the international prices, which follows a similar trend as the national price.

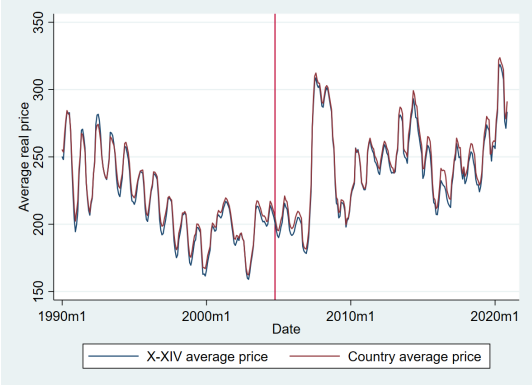


Figure 5: Fresh milk real price at country and 10th-14th regions level

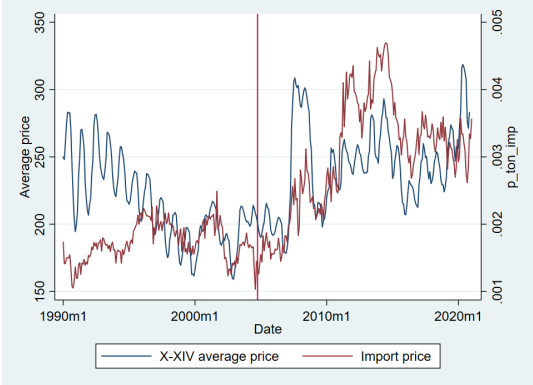


Figure 6: Fresh milk real price and import dairy products price per ton.

On the other hand, we can compare the average prices of the BP and other competitors. Figure 7 shows that after the decision it appear that BP’s prices are consistently higher

than the other, a relationship that was not that clear prior to that date. Nevertheless, the previous period in this case is quite short, so no robust conclusion can be taken based on this.

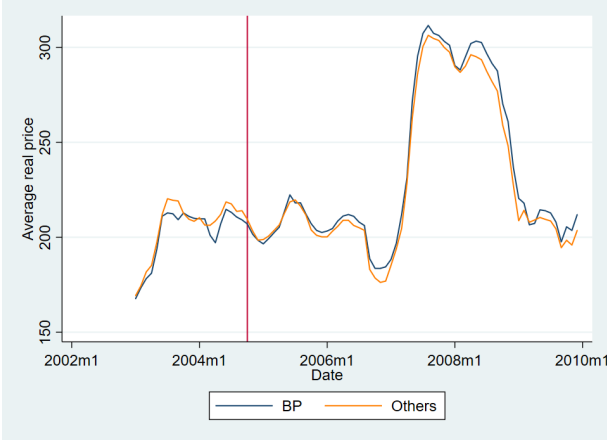


Figure 7: Fresh milk real price paid by BP and other processors.

Finally, Figure 8 and the tables in Appendix A show the evolution of market share at country and region levels. This evidence supports what was stated by the DFCT and NEP in the last procedure, since the market has become more concentrated and competitors have left the market. The only important entry in the market was Lactalis in 2017¹⁶ with 4 processing plants.

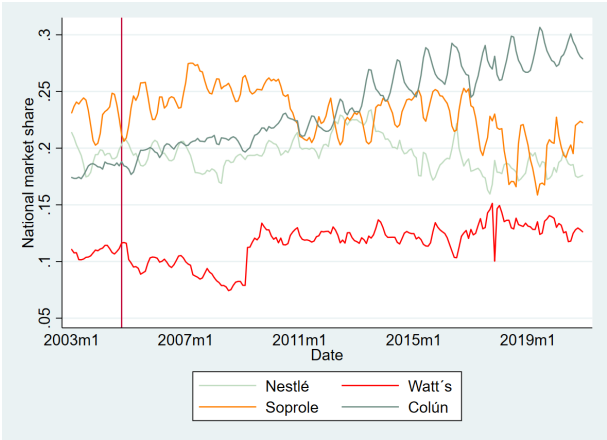


Figure 8: Country level market share of main processors

¹⁶This is the year in which ODEPA started reporting information about Lactalis. It is probable that it enter the market before this year.

7 Econometric Estimation

Considering the industry characteristics, the DFCT's decision and the theory described in the previous section, two econometric strategies were implemented to estimate the effect of J7 in prices paid by the processors and their received liters, taking into account the location of plants to consider the findings of Alvarez et al. (2000), among other relevant plant and firms' characteristics.

This was done using two different methodologies and data: (i) Before-after with aggregated data; and (ii) Difference-in-Differences with plant level data. Both will be described in the next subsections.

7.1 Before-and-after with country level data

As described in Davis and Garcés (2009)[4], to implement the before-and-after methodology, historical time series of price is used to estimate the effect of an event that happens in a moment of time. So it compares the prices before and after the event, controlling for different factors that may affect price, to identify the effect of the event on them. This is an extremely simple method, but may provide a preliminary idea of the effect of J7, to later compare it with the estimations with plant level data in the next subsection.

With the available aggregated data of monthly average fresh milk real prices, both at country and 10-14th regions level, from 1990 to 2020, the following model was estimated:

$$\ln(p_t) = \alpha + \beta_1 CourtDecision_t + \beta_2 CourtProcedure_t + \beta_3 P_{import} + \beta_4 \tau_t + \epsilon_t$$

Where $CourtDecision_t$ is a dummy that takes the value of one when the Court's decision takes place, which is October of 2004. This variable will measure the effect of J7 in price. $CourtProcedure_t$ is a dummy that takes the value of one from the date the

investigation started. As it was explained, there were many changes happening during the procedure in the antitrust system, which was quite long. Because of this, is not easy to anticipate which part of it could influence the prices. That is why in the estimation, the $CourtProcedure_t$ dummy was tried with different dates to check if there were significant differences among the relevant dates in the procedure. Also, import price and time fixed effect were included in the model.

Since the period is very long and other factors could be affecting prices, as a robustness exercise, different periods were used in the estimation. The results for 10-14th regions are shown in tables 7 and for country level are in Appendix C, along with the results for different periods for both country and 10-14th regions level.

Table 1: Before-and-after estimation results: different periods for Court Procedure dummy, 10th-14th regions

	(1)	(2)	(3)	(4)
	ln(Price)	ln(Price)	ln(Price)	ln(Price)
Court procedure start	-	05-1996	06-1997	08-2001
Court Decision dummy	0.0409** (2.78)	0.0403** (2.73)	0.0402** (2.74)	0.0401** (2.72)
Import Price	82.87*** (4.57)	82.21*** (4.54)	82.85*** (4.57)	83.19*** (4.59)
Court Procedure dummy 1		-0.0303** (-2.61)		
Court Procedure dummy 2			-0.0362* (-2.06)	
Court Procedure dummy 3				-0.0322* (-1.99)
Observations	371	371	371	371
Adjusted R^2	0.873	0.873	0.873	0.873

Fixed effects: plant, month and year. t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The average effect of the decision in prices was around 4% in different models. The results are less robust to different periods, especially when the before period is shorter. This make sense because the investigation started in 1996, so using a period that start after that date will definitely influence the results, since the different $CourtProcedure_t$ dummies in the first estimation are significant under any definition. That is why, the estimation recovers significance in the last column, where the before period is a bit longer and the after period is as short as column 5.

This methodology, because of its simplicity, has some shortcomings. First, because of the aggregation of the data, the effect cannot be differentiated by firm nor by affected and unaffected processors. Second, I cannot study if there is difference in the effect between regions. Finally, there is no information on received liters on the same period. Since I also have plant level data, the methodology explained in the next subsection will take care of some of this issues and will be a robust check on these results.

7.2 Difference-in-Differences with plant level data

To take advantage of the plant level data, following Davis and Garcés (2009)[4] I implemented a Difference-in-Difference (DiD) methodology that relies on the comparison of prices and received liters in plants that belong to the BP and were affected by J7, to those that were not, before and after the Court’s decision. This is done with the objective to precisely identify the effect of J7 in prices and quantity. This relies on the parallel trend assumption, which is tested in Appendix B.

For the implementation of the strategy I used plant level information of real monthly average prices and received liters of fresh milk, between 2003 and 2014. The following model is estimated:

$$y_{ti} = \alpha + \beta_1 BP + \beta_2 CourtDecision_t + \beta_3 BP \times CourtDecision_t + \beta_4 P_{int} + \beta_5 \tau_t + \beta_6 X_i + \beta_7 + \epsilon_{ti}$$

Where the dependent variable was prices or received liters. $CourtDecision_t$ is a dummy that takes the value of one when the DFCT’s decision takes place. BP is also a dummy that indicates if the plant belongs to a processor affected by the Court’s decision. τ_t are month and year fixed effect, and X_i are region fixed effects. Also, plant fixed effect were included.

In this implementation of DiD, the treatment is J7 and the treated group are the BP. So,

as a traditional DiD approach, the coefficient of interest is the one of the interaction between the dummies (β_3), since it will indicate the effect of J7 in the dependent variable. The model is estimated at country and region level. The results for price at country and regions are shown in tables 2. In Appendix C, results for price with different specification of error treatment at country level and for different periods, and also the results for received liters.

Table 2: DiD result in price. Country and region level

	(1)	(2)	(3)	(4)	(5)
	ln(Price)	ln(Price)	ln(Price)	ln(Price)	ln(Price)
Area	Country	RM	7th	9th	10th-14th
(%)	100	9.3	7.4	13.7	69.6
Court Decision dummy	-0.0486*** (-5.20)	-0.0519* (-2.43)	0.0101 (0.34)	-0.0242 (-1.18)	-0.0656*** (-5.08)
Big processors dummy	-0.0437*** (-4.80)	-	-0.0332 (-0.95)	-0.0318** (-2.77)	-
Court Decision x BP	0.0335*** (4.80)	0.0525** (3.10)	-0.0350 (-1.26)	0.0148 (0.81)	0.0460*** (4.93)
International price	0.0610*** (24.98)	0.0450*** (6.98)	0.0398*** (6.91)	0.0641*** (11.71)	0.0691*** (20.49)
Observations	3067	330	452	574	1711
Adjusted R^2	0.809	0.797	0.842	0.836	0.802

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The country average effect of the DFCT's decision is 3.35%, as shown in column 1. As predicted, the decision has a stronger effect in areas with higher degree of overlapping, which is in the Metropolitan region (column 2) and in the 10th-14th regions (column 5), with a positive and significant effect on prices between 4.6 and 5.3%. In the other areas, the effect is not significantly different from zero. Is important to notice that the results from this methodology are not that different from the ones obtained in the before-after estimation, which support the robustness of the estimations.

These results support the theory described in the previous section and show that, before the decision, BP were discriminating prices in the overlapping areas. After J7, with the obligation on uniform prices, they have to increase their average price to, at least,

maintain their received liters, in order to have enough input for their production of dairy products.

The effect on received liters is not clear, because it depends more on the reaction of the unaffected processors. Also, entry and exit in the markets will have an important effect on this variable, so it is not that easy to interpret the results showed in table 10 in the Appendix. It appears that BP increased their received liters after the decision, although the results across regions are mixed. The main area (10th-14th regions) shows an increase of received liters, which make sense since it is the area with highest overlap, BP increased prices and are forced to buy from any producer that offer their milk.

These results, together with the development of the market shares in the years after the decision showed in Figure 8, are not enough to make a strong conclusion, but at least establishes a likelihood that the decision did not have a significant effect on entry in the market.

8 Conclusions and Discussion

In 2004, the DFCT decided to put some measures to the three most important milk processors in the national market. The goal of this was to improve the competitive conditions in the market, since the previous situation was apparently not letting entry and consolidation of competitors in the market. Fifteen years later, the Court decided to maintain this decision, since they were successful in achieving the original objectives.

The logic behind this was that if processors are able to discriminate among producers, small and new competitors would not be able to get fresh milk which is clearly a crucial input in the market. So, if the measures were being effective, better competition's conditions should have been detected when the market was analyzed again in 2018. But, as the Court and the NEP stated, the market got more concentrated, and by

revising the market share evolution in time, no major entry has happened.

In this report, a further analysis of the decision was done. With different kind of data bases and methodologies, I found that the prices increased because of the measures. This make sense since the affected processors had to increase their prices to maintain their received liters. It was predictable that, since BP probable have some level of market power, they had the capacity to increase prices in order to maintain their production in the downstream market. On the other hand, competitors may not have the ability to compete with higher prices, so this increase in price by the BP may be the reason of the exit and higher concentration levels in the market. It is not certain, but very likely that the measures are not improving the entry and consolidation condition in the market.

This would mean that the only effect of the measures is the increase in surplus received by the fresh milk producers, which from the statements of the authorities in the different decisions was not a concern in the procedures. So, in this case, the best scenario is that the measures are not improving the conditions in the market but there is also a possibility that they are increasing prices in the downstream market, thus harming consumers.

Further analysis must be done to confirm this preliminary findings. With the available data, the degree of buyer power of processors and potential countervailing power of producers can be estimated. Even though producers are fragmented, in the past year they have been organizing in associations, which can reduce the processors' ability to decrease prices and also could explain the difficulties to enter the market. Also, the pass-through of higher fresh milk prices into final product can be estimated, to asses if consumers are being harmed by the decision.

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A Market shares

Table 3: Market share in fresh milk market reception by processor and region, years 2004 and 2020

Processor	RM		8th		9th		14th		10th	
	2004	2020	2004	2020	2004	2020	2004	2020	2004	2020
Nestlé			47%	51%					39%	33%
Watt´s				32%			16%		16%	23%
Soprole	82%	92%	39%		18%		13%	9%	15%	21%
Colún							67.8%	87.9%		
Parmalat			14.0%		23.0%					
Quillayes	11.6%	8.2%				9.1%	3.8%			
Surlat					59.0%	90.9%				
Lactalis				17%						14%
HHI	6,851	8,488	3,933	3,898	4,335	8,347	5,023	7,818	2,218	2,343
Region share in country	9.3%	9.0%	7.4%	5.7%	13.7%	6.7%	27.3%	32.3%	42.3%	46.3%

Table 4: Market shares of processors measured in received liters of fresh milk and HHI, country level by year

Processor	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Colún	18.0%	18.5%	19.2%	20.1%	20.7%	20.7%	20.9%	22.4%	21.8%	23.0%	24.9%	25.6%	26.5%	27.2%	26.8%	28%	28%	28%
Soprole	22.6%	22.5%	23.9%	24.0%	26.3%	25.1%	25.6%	24.4%	21.5%	22.5%	22.7%	23.6%	24.4%	24.0%	22.0%	20%	19%	21%
Nestlé	19.3%	19.9%	19.6%	19.8%	18.4%	18.5%	19.6%	20.3%	19.9%	22.1%	22.1%	20.1%	18.3%	19.4%	17.6%	18%	18%	18%
Watt´s	10.6%	11.3%	9.8%	10.1%	9.1%	8.0%	11.6%	12.2%	12.2%	12.3%	12.5%	12.2%	12.3%	11.9%	13.3%	14%	13%	13%
Lactalis															8.8%	8%	7%	7%
Surlat	7.3%	8.1%	7.7%	7.8%	8.6%	11.0%	8.8%	5.9%	5.9%	6.2%	6.3%	6.9%	6.1%	5.5%	4.5%	5%	6%	6%
Valle Verde									2.6%	2.5%	2.7%	2.9%	3.5%	3.3%	3.7%	4%	4%	3%
Quillayes	2.2%	2.1%	2.2%	2.0%	1.8%	1.9%	2.0%	3.5%	3.7%	3.5%	2.7%	2.4%	2.4%	2.2%	2.2%	2%	2%	1%
Comercial del campo																1%	1%	1%
Chilolac	2.1%	2.3%	1.5%	0.7%	0.4%	0.4%	0.4%	0.5%	0.6%	0.7%	0.8%	0.9%	1.0%	1.0%	1.1%	1%	1%	1%
Lácteos del Sur									1.7%	1.7%	1.9%	2.5%	2.6%	2.6%				
Danone					1.7%	2.0%	2.7%	2.8%	2.5%	2.5%	2.5%	2.3%	2.2%	2.1%				
Bioleche												0.5%	0.6%	0.7%	0.1%			
Agrolácteos Cuinco	1.4%	1.4%	1.6%	1.6%	1.4%	1.2%	0.7%	0.0%										
Campo Lindo	0.1%																	
Cumelen Mulpulmo	4.7%	5.5%	5.7%	6.1%	6.1%	6.6%	6.5%	6.9%	4.5%	0.2%								
Lácteos Frutillar	2.1%	1.9%	1.7%	2.4%	2.1%	1.9%	0.5%											
Lácteos Puerto Varas	1.1%	1.8%	1.2%		1.1%	1.7%	0.7%	1.0%	3.1%	2.8%	1.1%							
Parmalat	7.7%	4.2%	5.5%	5.1%	2.2%	0.9%												
Vitalac	0.8%	0.6%	0.5%	0.2%														
HHI	1,472	1,503	1,557	1,612	1,670	1,651	1,744	1,764	1,579	1,748	1,842	1,841	1,856	1,890	1,804	1,770	1,786	1,851

B Parallel trend test

To test if control and treated group have parallel trends, the model of subsection 7.2 was estimated without the $CourtDecision_t$ and BP dummies, and including interaction of BP dummies with a dummy for each year. If the assumption of parallel trends holds, the interactions for the period before $J7$ should be zero and the one's after, should be positive and significant. Figures 9 through 12 shows the result of the test for prices and received liters at country and 10th-14th region level:

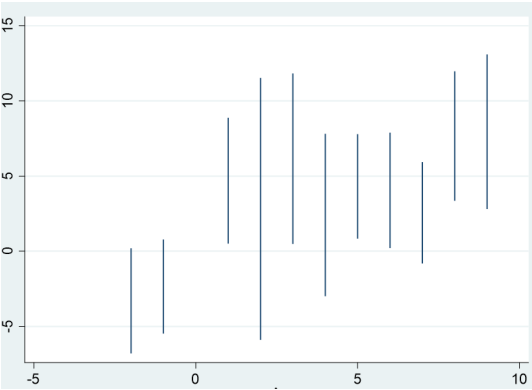


Figure 9: Price-Country level

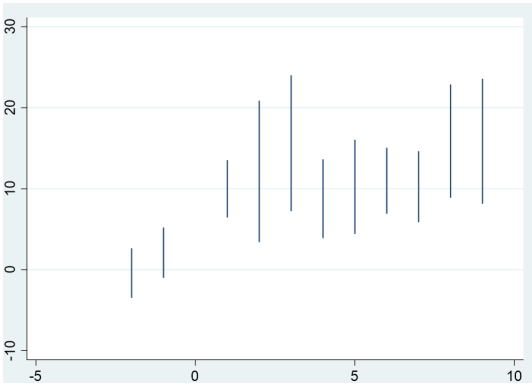


Figure 10: Price-10th-14th region level

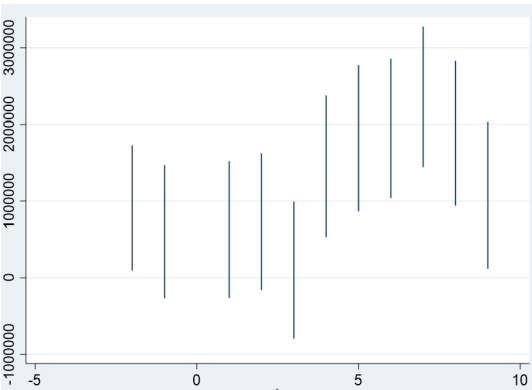


Figure 11: Liters-Country level

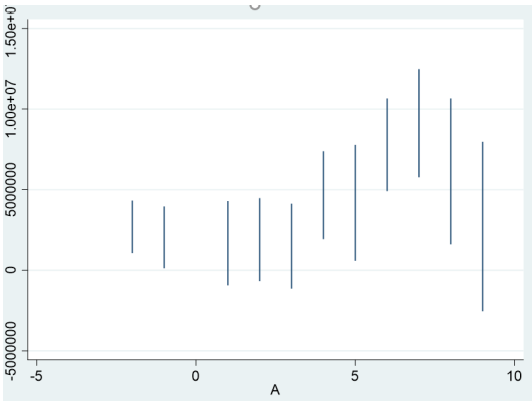


Figure 12: Liters-10th-14th region level

In the case of prices, it can be seen that there are parallel trends, especially at the south regions area where the effect is higher because of the high degree of overlapping between plant's influence area. For received liters the results are weaker and it seems that the

effect, if there is any and is attributable to the decision, took a few years, especially in the south area. This is related to the complexity in the interpretation on the results in this variable, because many factors influence liters that cannot be controlled for.

C Additional Results

C.1 Before-and-After

Table 5: Before-and-after estimation results: different periods, 10th-14th regions

	(1)	(2)	(3)	(4)	(5)	(6)
Period	ln(Price)	ln(Price)	ln(Price)	ln(Price)	ln(Price)	ln(Price)
	1990-2020	1994-2014	1999-2009	2002-2006	10/2003-10/2005	1994-10/2005
Court Decision dummy	0.0403** (2.73)	0.0306* (1.98)	0.0189 (0.74)	0.0461* (2.12)	0.0156 (2.16)	0.0604*** (3.63)
Court Procedure dummy 1	-0.0303** (-2.61)	-0.0319* (-2.16)	-	-		-0.0175 (-1.37)
Import Price	82.21*** (4.54)	79.80*** (3.45)	192.3*** (3.96)	167.1*** (4.49)	64.49* (2.42)	120.2*** (4.69)
Observations	371	252	132	60	25	142
Adjusted R^2	0.873	0.861	0.810	0.665	0.862	0.838

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Before-and-after estimation results: different periods at country level

	(1)	(2)	(3)	(4)	(5)	(6)
Period	ln(Price)	lnP	ln(Price)	ln(Price)	ln(Price)	ln(Price)
	1990-2020	1994-2014	1999-2009	2002-2006	10/2003-10/2005	1994-10/2005
Court Decision dummy	0.0387** (2.67)	0.0307* (2.01)	0.0218 (0.85)	0.0488* (2.16)	0.0169* (2.30)	0.0561*** (3.41)
Court Procedure dummy 1	-0.0212* (-2.23)	-0.0213 (-1.70)				-0.00606 (-0.51)
Import Price	80.74*** (4.58)	84.12*** (3.71)	194.2*** (4.07)	177.4*** (4.61)	63.63* (2.30)	123.8*** (4.81)
Observations	371	252	132	60	25	142
Adjusted R^2	0.879	0.864	0.809	0.660	0.842	0.838

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Before-and-after estimation results: different periods for Court Procedure dummy, country level

	(1)	(2)	(3)	(4)
	lnP	lnP	lnP	lnP
Court procedure start	-	05-1996	06-1997	08-2001
Court Decision dummy	0.0391** (2.71)	0.0387** (2.67)	0.0383** (2.65)	0.0382** (2.64)
Import Price	81.21*** (4.61)	80.74*** (4.58)	81.19*** (4.61)	81.55*** (4.63)
Court Procedure dummy 1		-0.0212* (-2.23)		
Court Procedure dummy 2			-0.0414** (-2.83)	
Court Procedure dummy 3				-0.0346* (-2.19)
Observations	371	371	371	371
Adjusted R^2	0.879	0.879	0.879	0.879

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.2 Difference-in-differences

Table 8: DiD results in price: Country level data with different error treatment specification

	(1)	(2)	(3)	(4)	(5)
Specification	ln(Price) Robust SE	ln(Price) Cluster(Firm type)	ln(Price) Cluster(Firm region)	ln(Price) Cluster(Area)	ln(Price) Plant FE
Court Decision dummy	-0.0526*** (-5.72)	-0.0526* (-6.28)	-0.0526* (-4.28)	-0.0526 (-3.00)	-0.0486*** (-5.20)
Big processors dummy	-0.0181** (-2.94)	-0.0181 (-1.61)	-0.0181 (-1.15)	-0.0181 (-0.87)	-0.0437*** (-4.80)
Court Decision x BP	0.0396*** (5.58)	0.0396 (2.77)	0.0396* (3.72)	0.0396 (2.50)	0.0335*** (4.80)
International price	0.0609*** (14.62)	0.0609*** (106.85)	0.0609*** (10.41)	0.0609 (6.95)	0.0610*** (24.98)
Observations	3067	3067	3067	3067	3067
Adjusted R^2	0.748	0.748	0.748	0.748	0.808

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: DiD results in price. Country with different periods

	(1)	(2)	(3)	(4)
Period	ln(Price) Complete	ln(Price) <2006	ln(Price) <2008	ln(Price) <2010
Court Decision dummy	-0.0507*** (-5.38)	-0.0567*** (-4.91)	-0.0757*** (-6.84)	-0.0555*** (-5.39)
Big processors dummy	-0.0131 (-1.96)	-0.0110 (-1.87)	-0.0128 (-1.84)	-0.0127 (-1.85)
Court Decision x BP	0.0349*** (4.59)	0.0220* (2.50)	0.0314*** (3.35)	0.0327*** (3.73)
International price	0.0609*** (14.62)	-0.0647* (-2.53)	0.154*** (17.67)	0.0970*** (15.80)
Observations	3067	857	1378	1874
Adjusted R^2	0.748	0.589	0.722	0.725

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: DiD results in received liters. Country and region level

	(1)	(2)	(3)	(4)	(5)
Area	Received Lt Country	Received Lt RM	Received Lt 7th	Received Lt 9th	Received Lt 10th-14th
(%)	100	9.3	7.4	13.7	69.6
Court Decision dummy	-514898.0 (-1.32)	197438.7 (1.03)	1291855.7*** (3.57)	480606.7 (1.08)	-1194252.4* (-2.06)
Big processors dummy	2451652.5*** (6.43)	-	714009.1 (1.67)	1435673.5*** (5.72)	-
Court Decision x BP	434936.9 (1.49)	-314944.3* (-2.05)	-1433024.1*** (-4.20)	-1127264.5** (-2.81)	996537.8* (2.37)
Effect (%)	5.8	* -3.0	-32.2	-32.8	11.5
Observations	3074	332	444	578	1720
Adjusted R^2	0.263	0.310	0.496	0.369	0.454

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: DiD results in received liters. Country with different periods

	(1)	(2)	(3)	(4)
Period	Received Lt Complete	Received Lt <2006	Received Lt <2008	Received Lt <2010
Court Decision dummy	-582537.9 (-1.48)	205158.4 (0.81)	58869.5 (0.24)	-85739.1 (-0.30)
Big processors dummy	2200873.6*** (3.75)	1343780.6*** (4.16)	1566285.7*** (4.32)	1589153.6*** (3.80)
Court Decision x BP	597201.7* (2.03)	145465.4 (0.75)	142894.4 (0.74)	165709.7 (0.78)
International price	8631.2 (0.08)	-221702.8 (-0.42)	-196296.0 (-1.40)	-12040.1 (-0.12)
Observations	3056	857	1378	1874
Adjusted R^2	0.257	0.377	0.343	0.301

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$