Fatness Beef Cattle Purchase Transactions Study in a Abattoir Firm in the Rio Grande Do Sul State

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Abstract

The objective of this study is to describe the frequency of the process of buying fat cattle at a meat packing company the state of Rio Grande do Sul state at 2012 year. Was studied the purchase of 121,960 animals, divided into 3,720 lots, involving bulls and females for slaughter. Analyzing the marking periods that occur the purchase of animals was evident biggest difference in the time between the purchase and shipment of animals occur in October/November period (difference of 7.02 days) and the smallest difference occur in February/March (difference of 4.51 days). Other period of difficulty purchases, represented by days from purchase to boarding to slaughter, were December/January (5.28 days) and April/May (5.54 days) periods. It concludes with the work that there are clear changes in beef cattle trading conditions in response to supply and demand laws of this commodity.

Keywords: agribusiness, commercial relations, commodity prices, finished beef cattle, rural economy, spot market

1. Introduction

In case the the active fed cattle for slaughter Trade assumes the establishment of a set price per carcass weight, which is measured in the beef industry after the slaughter of animals. Caleman and Zylbersztajn (2012) write that exist uncertainty regarding the measurement of weight and subsequent calculation of yield of slaughter or carcass yield, which serves as the basis for estimating producer revenue earned your animals. This because the production control is made by the producer based on a weighing the animals at the time of boarding of these for the beef industry. Thus, Caleman and Zylbersztajn (2012) mention that it is not clear to the producer at the sale moment, which will be final amount value that he will receive for their animals, which generates a set of aspects uncontracted as a result of the multidimensionality of the product and subjectivity related to the slaughter and industrial dressing.

Caleman and Zylbersztajn (2012) write that this trade is conflicted because it generates discussion about the carcass yield, remuneration by quality attributes, discounts for non-adequate animal characteristics and others. As the income of rural organization (I) is calculated by a function that is determined by the difference between revenues (R) and costs (C) or I = R - C. Being "R" and "C" results from multiplying the quantities (Q) of the "x" product (Qx) or input in "i" index (Q_i) by the price (P) of the product (Px) or input "i" (P_i) for the same index. In this equation "i" can take an order from "1 to n". Unfolding this function, we have: $I = Qx.Px - (Q_1.P_1 + Q_2.P_2 + Q_n.P_n ...)$, being "n" the different inputs used in production.

Different researchers have studied ways to increase the beef cattle productivity, working in the coefficients that interfere with the enjoyment and rate of slaughter of the herd, as a reduction of ages reproduction herding and slaughter, increased weaning rate and reduced mortality, beyond research directed to increasing slaughter weight of animals (Resende Filho et al 2001, VAZ et al 2002, Pacheco et al 2006, KUSS et al 2007). All these studies are directed to increase the amount of product, regardless of the sales price.

Researchers became concerned about the viability of proposed production systems outlined some economic assessments of the costs of production of beef cattle and point to the purchase price of the raw material "skinny cattle" as a key factor in determining the projects viability, compared to sales prices that were achieved in the commercialization of experimental units worked in the researches (Koknaroglu et al 2005, Pacheco et al 2014).

Understanding the importance of the price of inputs is necessary to make an effort to understand the behavior of the beef cattle product price which is governed, in perfect competition, by supply and demand laws. However, one must understand which variables regulate these laws, operated by the agents involved in the negotiation processes of agricultural commodities, since the firms interact with the market looking for fireworks competition that can improve your profits. In summary, by the laws of the market, price changes occur in response to the sellers bargaining in times of short supply or as a way to pressure to lower the price by the buyer firm in times of abundant supply of product.

Second Batalha (1997) the formation of prices for beef cattle at the market have variables that influence its commercial value and trade. The supply and demand of internal and international markets, together with the stocks speculations, are factors that have a strong influence on price. For the same author, from the moment that the Brazil has come to occupy a prominent position in the international beef trade at the early of century, due to leadership in exports increased attention on the negotiations of beef cattle, although few studies have studied the important variable beef cattle price for the Brazilian agribusiness.

In other countries the beef cattle price variation were studied by several researchers (Franzmann and Walker 1972, Ward 1981, Bessler and Covey 1991, Ward 1992, Mondelli 2007), but similar initiatives work in Brazil did not happen. The objective of this study was to describe and to analyze the frequency of buying fat cattle in a beef industry localized at the Rio Grande do Sul Sate, during the 2012 year, discussing the factors that affect the beef cattle trades for slaughter.

2. Materials and Methods

Data of 2,815 contracts for the purchase of cattle that occurred from January to December 2012, at a beef company localized at Rio Grande do Sul Brazilian State, totaling 121,960 animals, represented by 3,720 batches of animals for slaughter were recorded, considering just steers and females for slaughter. Buffaloes and bulls batches and dairy animals and traction bullocks that were slaughtered in the slaughterhouse studied were excluded from the analysis, because their purchase prices differentiated.

Data were analyzed using the statistical software R, Independent variables (or class variables): i) the genre of the animals, classified in steers and females; ii) the day of the week that the purchase occurred, ranging from Monday to Friday; iii) the weeks of the month were the purchase and boarding occurred, considering the day 1-7 as the first week, 8-15 as the second week, 16-22 as the third week, 23 to 28, 30 or 31 depending on the month, as the fourth week of the month; iv) the month that occurred the animals boarding for the beef industry, characterizing the realization of trade; and v) two months of boarding, characterizing the forage system that fattened the animals: a) December and January - production of early summer, characterized by fatness of animals grazing legumes spring as clovers and *Lotus curniculatus*; b) February and March - summer production coming from pastures of annual grasses such as forage sorghum and millet; c) April and May - autumn production, with termination of animals on natural pastures and extensive systems; d) June and July - producing animals in confinement due to the transition between grazing warm season and cool season pastures; e) August and September - initial production of grazing cool season grasses; f) October and November - high supply of animals according to the final cool-season pastures and release of areas for cultivation of summer crops, mainly soybeans, corn and rice.

For all analyzes of class variables, the dependent variables were price paid per cold carcass weight, interval days from purchase to boarding, commercially called "medium-scale slaughter", the average number of cattle by batch, promised average weight of animals and average weight of their arrival at the slaughterhouse, as well as the difference between promised weight and arrival weight. For class variables gender and purchase day, also the dependent variables-week average of purchase and boarding, ranging from 1 (first week) to 4 (fourth week) and average months of purchase and boarding were analyzed, ranging from 1 (January) to 12 (December). For these variables, the averages are 2.5 and 6.5, respectively, indicating that values for week of less than 2.5 indicate month purchase or slaughter in the first half, while above 2.5 values indicate purchase or slaughter in the second half of the month. Likewise, for the month of slaughter, values below 6.5 indicate slaughter in the first half of the year, and higher values indicate that the slaughter in the second half.

For variables of class week of the month was the purchase and boarding occurred, was analyzed the average months of purchase and boarding, also quantitatively transformed into numbers 1-12 and the class variable two months of purchase. For classes variables month and two months of boarding were analyzed week averages that occurred and that the purchase was boarding.

The data were tabulated in a spreadsheet imported into the R statistical software (R Core Team, 2012), which undertook the analysis of variance by the least squares method. Subsequently filtering data was taken, excluding the values considered outliers that exceeded two standard deviations from the mean and second analysis of variance was performed. Further, the variables that showed significant difference at 5% were subjected to Tukey's Test for means comparisons, also at the level of 5% significance. Correlation analysis was also performed between all variables at the 1% level of significance, and only considered the average magnitude ($r > | 0.3 |$) and high magnitude ($r > | 0.7 |$) correlations.

3. Results and Discussion

In Table 1 is observed comparing the variables of purchase, contrasting steers and females for slaughter. The difference in price paid was 4.72% (R$ 6,43 versus R$ 6,14) in favor of males is a result of the overvaluation of steers compared to females, a factor that meatpacking industry justifies for the best males conformation, resulting in higher deboned yield of these compared to females. Vaz et al. (2010) studied the carcass of Braford steers and heifers of the same age, observing similarities between the categories for carcass conformation, muscle / bone ratio and muscle + fat / bone. However, instead of when heifers are considered in the group of females also cull cows, conformation and muscle / bone ratio are higher for steers (Vaz et al. 2002).

Industry also argues that sawcut yield is higher for steers compared to females, results that were not found by Vaz et al. (2002) and Vaz et al. (2010), although the first paper the ribcut percentage was higher in cows. There are no significant differences between males and females of the same age, some industries are beginning to pay similar male price to heifers, and the meat quality programs even subsidize these females, whose carcasses are deboned and sold with higher value added (Carne Angus 2014; Carne Certificada Hereford 2014).

Caleman and Zylbersztajn (2012) classify the bargaining transaction between producers and meat industry as spot market, which involves the sale of a multidimensional product, because it has varying gender, weight and age. Besides these dimensions, attributes of quality, health, traceability and fancy meats also traded at the sale moment (Caleman and Zylbersztajn 2012).

There wasn't statistical difference between genders (Table 1) for the variables time from day of purchase to day of boarding of the animals, which was on average 5.73 days, and purchase week average (P> 0.05). However, when analyzing the purchase month average, statistical difference between genders was observed, indicating that the supply of females is more concentrated at the year end. The reason for this may be associated with the largest number of disposal of cows in the second year half, possibly due to termination in cultivated winter pastures or disposal of cull cows before the mating, associated with greater use of males in the cultivated summer pastures. This statement is empirical, as there is in the literature description of the variation of the slaughter of males and females over the months of the year, seeking to interpret the existence of a pattern of slaughter cycle. On the other hand, some authors infer that the killing of females in response to opportunistic behavior in times of rising prices, may be an explanation for a possible change in the rate of killing of females (Bragança and Bueno, 2010).

Noting the number of cattle in each batch (Table 1) it appears that males are sold in major batches (36.25 versus 28.97 heads). The explanation for this might be related to the fact that females for slaughter represent only the disposal of animals for breeding of production systems, while males are all destined for slaughter, except breeders that market bulls. Another hypothesis to be considered is the fact the fattening of male animals start with a more uniform body condition, while the fattening of cull cows from more disuniform batches in relation to body condition, which depends on the previous reproductive history of those females. Studying the marketing of fed cattle in Uruguay Mondelli (2007) cites that the average batch size traded in this country is 27.0 cattle heads.

In Table 1 is verified that the males weights is higher at purchase moment and also at industry download than females, as a result of further development of males. These variables related to live animal weights could be waited results favorable to females, because the higher amount of males slaughtered in the Rio Grande do Sul State is composed by young animals, that still in the growth phase, while the cull cows finished is adulthood (Vaz et al. 2002). But the higher weight of males is may be reflecting a significant percentage of young females purchased by the analyzed industry, since the company having up price, comparable to steers, for heifers from zero to four (Carne Angus 2014) or six teeth (Carne Certificada Hereford 2014).

When analyzing the weekday that purchase is realized, it is observed that almost one quarter of the batches are bought on Monday and Tuesday and, together, these days represent half of purchases realizes by the meat industry analyzed (48.9%). Already purchases on Friday are just 14.4% of the total purchases. Perhaps the greatest number of animals purchased at the beginning of the week to explain the lower prices paid in those days, compared to prices obtained by producers from Wednesday through Friday (P <0.01).

The analysis of the weekday that the purchase occurs shows that the largest scales, in other words, the time elapsed since the purchase completion to animals boarding, happen in Wednesday (5.95 days) and Fridays (5.96 days) purchase commercial turns. Smaller scales were observed Mondays purchases, representing over short ranges, 5.46 days in average.

The analysis of the number of trades carried on each day of the week shows that even with lower prices, the purchase of the Mondays is almost 73% higher than the purchases on Fridays, also noting a decline in the number of batches purchased at the throughout the week. This is probably due to the producers expectations for prices improve at each week begins, the fact that the results have shown an inverse behavior. However, it is known that the highest price obtained by producers as week effect is a negotiation between seller and buyer, although the standard deviations of the prices were similar between days of the week, indicating little change in prices in purchase contracts. According to the meatpacking industry where data were collected at the beginning of the week working with more stable prices and, depending on the required number of cattle to be bought, not reaching the negotiation becomes more flexible when approaching the end of the week therefore it is necessary to achieve the number of cattle purchased determined by the commercial department of the company, responsible for fulfilling requests for buying meat.

Another important factor is related to the fact that the killing of Monday are supplied by boardings that occur on Sundays, due to the need to fasting and rest of the animals in the slaughterhouse. To meet the full shipments of Sunday the purchases on Friday need to occur until mid-afternoon, as the shipping documents must be issued by the State Department of Agriculture, represented by the veterinary inspectorates in each city, whose time of service currently closes at 17 hours and 30 minutes. Already boarding on Monday through Thursday purchases may occur even in the same day of boarding, at times that happen short scale or unexpected boarding occur due to weather and roads conditions, or even problems with the issuance of documentation boarding.

There wasn't difference between the days of the week for the variable number of cattle in each batch traded (P> 0.05), with a mean of 32.6 animals per batch. Empirically, the data supplier believed that larger lots are purchased in the last days of the week, because they generally represent a more protracted negotiation that he believed the company, begins on Monday and manifests two or three days. As mentioned, this was a hypothesis that the meatpacking company believed occur, based on empiricism, since previous scientific studies are not found in the literature. Likewise, it is difficult to find explanations for the statistical difference observed for the variables month and week of purchase (Table 2).

Analyzing the weight promised in the trading of animals in the meat industry is evident that lots of heavier animals are traded on Thursdays, statistically superior to lots purchased in the early days of the week. Also the weights of arrival at the slaughterhouse keeps the same trend as the purchases of Thursday are heavier animals than the purchases of all other days of the week (P <0.05). There are no papers in the literature that has studied these variables, which difficult the discussion of the data and suggests future work to examine hypotheses related to regionalization of purchases, for example.

Observing the week of the month that occurs the purchase of lots (Table 3) it appears that the trading in the second week of the month price is significantly higher than the prices of the third and fourth week of the month. Also the purchase scale in the third week of the month is longer, which results in lower prices offered to producers, but there is no difference in the number of days between the second and fourth weeks of trades, but these are higher than the scale observed in the first week of purchase. Shorter scale purchase in the first week of the month is similar to that behavior observed on the first weekday, discussed in Table 2. This would be a result of higher price expectations that suppliers demonstrate the cattle market openings in the weeks and months, as empirically the meatpacking industry claims exist. Unlike earlier in the week, it is observed that the early months represent better prices than in the second half, represented by the third and fourth week of the month. In an informative about beef cattle prices in Brazil markets, is commented on a low business movement, that occur all Mondays of the weeks (Scot Consultoria 2014).

There wasn't difference (P>0.05) for variables boarding month, average cattle quantity per batch, promised weight and arrival in the refrigerator weight and their differences between these weights. Already, observing the Table 4 it can be seen that the week of boarding was due the week of purchase, but no difference between prices, supporting the argument made about the data in Table 3, where it was inferred that the price differences obtained in the first half of month are the result of bargaining between rural producers for higher prices. Thus, one can say that there is no price change over the weeks of the month, if considered week boarding of the animals, but the effect of week on the adjusted purchase price between buyer and sellers industry.

If the slaughter scales shown in Tables 2 and 3 are on average 5-6 days, it can be inferred that the industry works buying in a week what will pick up and slaughter in the following week, behavior empirically observed in others Brazilians meat industries. Also in Table 4 is verified that the ease of purchase obtained by the meat industry in the second half of the month resulting in longer ranges for boarding that occur in the fourth week of the month (P <0.01).

Studying a smaller meat industry, Casagrande and Hoss (2010) analyzed the demand for cattle purchase as a result of forecast sales of meat and can generate purchase of animals for shipment in intervals of 30 days. In a company with stable commercialization contracts, such as the industry studied in this research, the scales of slaughter are determined by the maximum production capacity with amount of purchased cattle must attend this potential. When occur increased of animals for slaughter supply, a price reduction is verified and vice versa. For Malafaia et al. (2011) organizational culture of the agents of the state's beef production chain has immediate and opportunistic vision, making it difficult cooperation and the relationship of governance, making the exclusively individual strategies among participants of the production chain.

Studying the production chain of beef which formed a strategic alliance to differentiation of the meat, Ferreira and Barcellos (2006) identified in the meat industry an agreement that the producers are aloof to partnerships with industry. Furthermore, among price, farmers speculate "one or two more cents" per kilogram of carcass, which can generate an illusory gain and encourage bad debt, in opinion of the respondent meat industry (Ferreira and Barcellos, 2006).

In the analysis of the variables compared by buying bimesters (Table 5) observed that the number of days from purchase to shipment which were higher in the months supply of fat cattle is higher, ie in late winter and late summer. These periods are characterized by closing the cycles of feeding animals, whether they are finished in natural or cultivated pastures. Analyzing the remote data livestock production in the state of Rio Grande do Sul, five decades ago 64.9% of cattle slaughtered in the state were concentrated between the months of April to June. This is because, at that time, were insignificant the fattening of animals in winter pastures (Rio Grande do Sul, 1970), since only 11.9% of slaughters occurred between August and December.

Studying demand for animals, represented by the number of days of purchase to boarding, it is observed that the ease of purchase occur in October / November period (7.02 days of scale) and the greatest difficulty in two months February and March (4,51 days of scale). Other bimesters of difficulty (short scale) are December / January (5.28 days) and April / May (5.54 days). The results reflect the empirical understanding of the difficulties discussed in the introduction and method of this work.

Regarding prices, is observed that the high bid in October / November result is price decrease, as well as the intermediate station in February / March and the season of June / July have repercussions on the greater beef cattle valorization, as well as in other states wich response to the market laws (Aguirre and Aguirre, 2000). These data are consistent with the argument made by CEPEA (2014) who analyzed the monthly and quarterly price changes of beef cattle in Rio Grande do Sul State market.

The analysis of the week's purchase shows that in April / May the trades occur at last weeks of the month, maybe the need to sale of animals before the first winter frosts related to animal weight loss, along with smaller days lengths and grazing cycles. Studying the market for live cattle Abitante (2008) describes that the cycles of large supply of animals for slaughter is result to fact that beef cattle is classified as a non storable commodity.

Table 5 shows that sales in bimesters December and January and February and March occurs in the early weeks of the month, maybe end of the Christmas holidays in late December, in the first case and the carnival holiday in 2012, occurred in the second half of February. In the others bimesters, do not perceive significant differences of the week that occur purchases and there are no significant differences between the relative bimesters week occurring shipments of purchased animals, confirming the discussion made in the previous and regular table in a meat company working to assure their full capacity to slaughter, regardless of time of year. In this sense, the results of this study serve to attend both vendors and buyers, for times of fluctuating prices that may occur due to shorter hours of markets and sellers or buyers.

Table 5 shows that the larger batches coincide with sales of winter pastures in October and November, at which time the batch sizes are on average 38.0 animals, bigger than lots of bimesters ranging from February to September. In Rio Grande do Sul Brazilian State, oats and ryegrass crops are deployed mainly in rotational cropping with soybean and corn cultures, fairly representative in the state. Traditionally these pastures are placed large batches of finishing animals, which are sold at the time that the areas must be vacated for the planting of grain crops to be started. Treated as a coproduct of the crops, beef cattle this time is offered on a large amount for the meat industries, resulting in lower prices for the year ($P<0.01$), as shown in Table 5.

With a forecast prefixed products, the option of commercialization through the “Bolsa de Mercadorias e Futuros” (BM&F) could be an alternative for producers who seek to escape the low price that occur in October and November. Abitante (2008) suggests that the fat cattle producers use futures contracts maturing in September and October to reduce the risks related to reduction of prices in the physical market. However, the futures market for live cattle is a little known option and fetched in the extreme Brazilian South. According to Jay et al. (2005) transactions with assets in futures commitments are governed by a set price on the trading floor. These transactions arose from the need to protect the risks of price fluctuations and are currently denominated risk management operations and prices are important both for producers and for the meat industry (Hull, 1996). As explained Bittencourt et al. (2006) the short hedger is appropriate for producers who wish to sell the cattle at a future date, if protecting or managing a possible price drop. Already beef industry work with long hedge to manage risks from fluctuations in high prices, mainly from the increase in exports and exposure to foreign markets, where the risk of price fluctuations are larger due to the currency market.

In animal weights analyses (Table 5) was observed that heaviest batches are purchased in April and May bimester, time with large adult animals supply, finished on natural pastures, and the minor animal weights is the animals traded in August and September bimester, when the animal for slaughter bid is composed by a representative share of steers finished in feedlot and the first animals fattened in ryegrass pastures, still with minor fat thickness and consequently low live weight. The correlation analyses show that the price variation is not correlated ($P>0.05$) to promised weights ($r=0.005$) or arrival to industry weights ($r=0,014$).

The estimation of absolute difference between promised and arrival weights show significative difference among analyzed bimesters, but this is normal if observed that the rural producers offered yours animals with farm weight and during the travel to slaughterhouse is waited a loss, that range from 2.5 to 4%, depending to travel time, weighed time and food type. Transformed to percentage values the difference ranged from 2.49 to 4.07% ($P>0.05$).

4. Conclusions

Batches of steers are commercialized a higher prices and are largest that batches of cull females. The steers commercialization is more frequent in the first semester of the year and the animals are heaviest than females traded to slaughter.

There is effect of trade period on purchase dependent variables, resulting in higher prices at Wednesday, Thursday and Friday, being the Wednesday and Friday purchases is response to minor days difference from purchase to boarding time than Monday observed scales.

The finished beef cattle purchases occurred in the second week of the month resulting in higher prices to rural producer than in the third and fourth weeks of the month.

The time between purchase and boarding in October/November bimester is longest and consequently the price is lowest than others bimesters, and the batches is major than lots commercialized in February/March, April/May, June/July and August/September bimesters.

The bathces are heaviest in April and May bimester than lots commercialized in August/September bimester.

5. References

Abitante, K. G. (2008). Co-integração entre os mercados spot e futuro: evidências dos mercados de boi gordo e soja. Revista de Economia e Sociologia Rural, 46: 75-96.

Aguirre, A. & Aguirre, L. A. (2000). Time series analysis of monthly beef cattle prices with nonlinear autoregressive models. Journal of Applied Economics, 32: 265-275.

Batalha M. O. (1997). Sistemas agroindustriais: definições e correntes metodológicas. In: Batalha, M. O., Silva, A. L., Toledo, J. C., Nantes, J. F. D., Paulillo, L. F., Alves ,M. R. P. A., Azevedo, P. F., Stahlberg Filho, P, Figueiredo, R. S., Sproesser, R. L. and Bialoskorski Neto, S. Gestão agroindustrial, v 1. São Paulo: Atlas, p. 24-48.

Bessler, D. A. & Covey T. (1991). Cointegration: Some results on U.S. cattle prices. Journal of Futures Markets, 11: 461-474.

Bitencourt, W. A., Silva W. S. and Sáfadi T. (2006). Hedge dinâmicos: uma evidência para os contratos futuros brasileiros. Organizações Rurais & Agroindustriais, 8: 71-78.

Bragança, R.C. & Bueno N. P. (2010). O ciclo pecuário no Brasil: uma análise usando a metodologia da dinâmica de sistemas. Revista de Economia e Agronegócio, 8: 199-220.

Caleman, S. M. Q. & Zylbersztajn, D. (2012). Falta de garantias e falhas de coordenação: evidências do sistema agroindustrial da carne bovina. Revista de Economia e Sociologia Rural, 50: 223-241,

Carne Angus. (2014). Disponível em http://angus.org.br/carne-angus-2/. Acessado em 20 de maio de 2014.

Carne Certificada Hereford. (2014). Disponível em http://www.carnehereford.com.br. Acessado em 20 de maio de 2014.

Casagrande, L. F. & Hoss, O. (2010). Métodos de forecasting conjugado com um método qualitativo e um método com a média das previsões quantitativas e qualitativas. Revista Científica do TECAP - Tecnologia e Contabilidade em Pesquisa, 4: 94-100.

Cepea. (2014). Agromensal - CEPEA/ESALQ. Disponível em: http://cepea.esalq.usp.br/agromensal. Acessado em 02/06/2014.

Ferreira, G. C. & Barcellos, M. D. (2006). Vantagens e desvantagens das alianças estratégicas: uma análise sob a ótica dos agentes da cadeia produtiva da carne bovina. Organizações Rurais & Agroindustriais, 8:117-130,

Franzmann, J. R. & Walker, R. L. (1972). Trend models of feeder, slaughter, and wholesale beef cattle prices. American Journal of Agricultural Economics, 54: 507-512.

Gaio, L. E, Castro Junior, L. G and Oliveira, A.R. (2005). Causalidade e elasticidade na transmissão de preço do boi gordo entre regiões do brasil e a Bolsa de Mercadorias & Futuros (BM&F). Organizações Rurais & Agroindústriais, 7: 282-297.

Hull, J. (1996). Introdução aos mercados futuros e de opções. São Paulo: Bolsa de Mercadorias & Futuros, 448 p.

Koknaroglu, H., Loy, D. D, Wilson, D. E., Hoffman, M. P. and Lawrence, J. D. (2005).Factors affecting beef cattle performance and profitability. Journal of Animal Science and Technology, 21: 286-296.

Kuss, F., Restle, J,, Brondani, I. L, Pascoal, LL, Menezes, L. F. G., Leite, D. T. and Santos, M. F. (2007). Componentes externos do corpo e gordura de descarte em vacas mestiças Charolês - Nelore, abatidas com pesos distintos. Revista Brasileira de Zootecnia, 36: 865-873.

Malafaia, G. C., Azevedo, D. B. and Kamargo, M. E. (2011).Análise das configurações interorganizacionais na pecuária de corte gaúcha. Revista de Negócios, 16: 11-31.

Mondelli, M. (2007). Coordenação do sistema agroindustrial da carne bovina: determinantes dos arranjos contratuais entre produtores e processadores no Uruguai. Dissertação (Programa de Pós-Graduação em Economia) Universidade de São Paulo, Faculdade de Economia, Administração e Contabilidade. São Paulo.

Pacheco, P. S., Restle, J., Vaz, F. N., Freitas, A. K., Pádua, J. T., Neumann, M. and Arboitte, M. Z. (2006). Avaliação econômica da terminação em confinamento de novilhos jovens e superjovens de diferentes grupos genéticos. Revista Brasileira de Zootecnia, 35: 309-320.

Pacheco, P. S., Restle, J., Pascoal, L. L, Vaz, F. N., Vaz, R. Z., Valença, K. G. and Olegario, J. L. (2014). Use of correlation between input variables in estimating the risk of feedlot finishing of steers and young steers. Anais da Academia Brasileira de Ciências, 86: 353-362,

Core Team, R. (2012). R: A language and environment for statistical computing. Viena: R Foundation for Statistical Computing. Disponível em: http://www.R-project.org/.

Resende Filho, M. A., Braga, M. J. and Rodrigues, R. V. (2001). Sistemas de terminação em confinamento: perspectivas para dinamização da cadeia produtiva da carne bovina em Minas Gerais. Revista Brasileira de Economia, 55: 107-131.

Rio Grande do Sul (Brazil State). (1970). Cartilha do agricultor, v 1. Porto Alegre: Publicação da Secretaria da Agricultura do Estado do Rio Grande do Sul.

Scot Consultoria. Mercado do boi gordo começou a semana calmo. (2014) Disponible in www.scotconsultoria.com.br/noticias/todas-noticias/35251, accessed at june, 10.

Vaz, F. N., Restle, J., Arboite, M. Z., Pascoal, L. L., Alves Filho, D. C. and Pacheco , R. F. (2010). Características de carcaça e da carne de novilhos e novilhas superjovens, terminados com suplementação em pastagem cultivada. Ciência Animal Brasileira, 11: 42-52.

Vaz, F. N., Restle, J. and Quadros, A. R. B. (2002). Características da carcaça e da carne de novilhos e de vacas de descarte Hereford, terminados em confinamento. Revista Brasileira de Zootecnia, 31: 1501-1510.

Ward, C. E. (1981). Short-period pricing models for fed cattle and impacts of wholesale carcass beef and live cattle futures market prices. Southern Agricultural Economics Association, 13: 125-132.

Ward, C. E. (1992). Inter-firm differences in fed cattle prices in the southern plains. American Journal of Agricultural Economics Articles, 74: 480-485.

Table 1: Comparison of Purchase Variables According to Gender of the Animals Purchased

Dependent variable	Females	Steers	P>F
Price paid, R$ (30 days of prize)	6,14±0,01	6,43±0,01	0,01
Days from purchase to boarding	5,74±0,06	5,71±0,06	0,77
Purchase week	2,51±0,03	2,50±0,03	0,86
Purchase month	6,65±0,08	6,46±0,08	0,01
Average number of cattle by batch, heads	28,97±0,78	36,25±0,78	0,01
Promissed weight, kg[A]	464,9±1,0	472,3±1,0	0,01
Arrival weight, kg[B]	449,5±1,1	458,7±1,1	0,01
Difference [A-B], kg	15,47±0,82	13,43±0,83	0,08

Table 2: Comparison of Purchase Variables According to Day Week That Occur the Trade

Dependent variable	Day of week					P>F
	Monday	Tuesday	Wednesday	Thuersday	Friday	
Number of batches	901	871	723	608	520	
Percentage	24,9	24,0	20,0	16,8	14,4	
Acumulated perc.	24,9	48,9	68,9	85,6	100,0	
Price paid, R$[2]	6,25±0,01[b*]	6,27±0,01[ab]	6,30±0,01[a]	6,30±0,01[a]	6,31±0,01[a]	0,01
Scale, dias[3]	5,46±0,09[b]	5,73±0,09[ab]	5,95±0,10[a]	5,65±0,11[ab]	5,96±0,12[a]	0,01
Batch size, heads	31,5±1,1	32,5±1,1	35,0±1,2	31,0±1,4	33,1±1,5	0,18
Purchase month	6,55±0,11[abc]	6,76±0,12[ab]	6,91±0,13[a]	6,09±0,14[c]	6,28±0,15[bc]	0,01
Purchase week	2,52±0,04[ab]	2,51±0,04[ab]	2,62±0,04[a]	2,37±0,05[b]	2,47±0,05[ab]	0,01
Prom. weight, kg[A]	463±1[b]	466±2[b]	469±2[ab]	473±2[a]	471±2[ab]	0,02
Arrival weight, kg[B]	452±1[b]	452±2[b]	455±2[b]	460±2[a]	453±2[b]	0,02
Difference [A-B], kg	13,8±1,2	14,0±1,2	14,1±1,3	12,9±1,4	18,6±1,5	0,06

[*] Different lowercase letters in the same line represent means that differ by Tukey test (5%); [2] price paid within 30 days; [3] is the difference in days from the purchase to boarding.

Table 3: Comparison of Purchase Variables According to Week of the Month That Occur the Trade

Dependent variable	Week of the month				P>F
	1st (1-7)	2nd (8-15)	3rd (16-22)	4th (23-31)	
Price paid, R$[2]	6,30±0,01[ab]	6,33±0,01[a]	6,23±0,01[c]	6,26±0,01[bc]	0,01
Scale, dias[3]	5,16±0,09[c*]	5,80±0,08[b]	6,37±0,09[a]	5,70±0,08[b]	0,01
Boarding month	6,57±0,11	6,38±0,11	6,62±0,12	6,66±0,10	0,30
Batch size, heads	34,3±1,1	33,4±1,1	31,4±1,2	31,0±1,1	0,09
Promissed weight, kg[A]	470,4±1,4	466,1±1,4	468,5±1,6	469,3±1,4	0,20
Arrival weight, kg[B]	453,8±1,5	452,7±1,6	452,7±1,7	456,7±1,5	0,20
Difference [A-B], kg	16,40±1,1	13,52±1,16	15,41±1,25	12,75±1,11	0,09

[*] Different lowercase letters in the same line represent means that differ by Tukey test (5%); [2] price paid within 30 days; [3] is the difference in days from the purchase to boarding.

Table 4: Comparison of Purchase Variables According to Week of the Month that Occur the Boarding

Dependent variable	Week of the month				P>F
	1st (1-7)	2nd (8-15)	3rd (16-22)	4th (23-31)	
Price paid, R$[2]	6,27±0,01	6,29±0,01	6,29±0,01	6,27±0,01	0,28
Scale, dias[3]	5,48±0,09[b*]	5,38±0,09[b]	5,64±0,09[b]	6,34±0,08[a]	0,01
Purchase month	6,70±0,11	6,63±0,12	6,48±0,12	6,42±0,11	0,25
Batch size, heads	32,2±1,1	33,7±1,2	32,5±1,2	32,0±1,0	0,72
Promissed weight, kg[A]	469,2±1,4	470,0±1,5	466,0±1,5	468,9±1,4	0,27
Arrival weight, kg[B]	455,6±1,5	453,6±1,6	453,2±1,6	453,8±1,5	0,70
Difference [A-B], kg	13,8±1,1	15,8±1,2	13,2±1,2	15,0±1,1	0,42

[*] Different lowercase letters in the same line represent means that differ by Tukey test (5%); [2] price paid within 30 days; [3] is the difference in days from the purchase to boarding.

Table 5: Comparison of Purchase Variables According to Bimesters that Occur the Boarding

	Bimester						P>F
Dependent variable	Feb and mar	Apr and may	June and july	Aug and sept	Oct and nov	Dec and jan	
SC, days[1]	4,51±0,11[e*]	5,54±0,10[cd]	6,11±0,13[b]	5,87±0,09[bc]	7,02±0,10[a]	5,28±0,10[d]	0,01
PP, R$[2]	6,53±0,01[a]	6,39±0,01[b]	6,51±0,01[a]	6,09±0,01[d]	6,03±0,01[e]	6,29±0,01[c]	0,01
WP[3]	2,37±0,05[c]	2,64±0,04[a]	2,42±0,06[bc]	2,57±0,04[ab]	2,52±0,04[abc]	2,44±0,04[bc]	0,01
WB[4]	2,55±0,05	2,53±0,04	2,53±0,06	2,53±0,04	2,49±0,04	2,45±0,05	0,60
QB[5]	30,6±1,4[b]	30,4±1,3[b]	31,6±1,7[b]	29,6±1,2[b]	38,0±1,3[a]	35,2±1,3[ab]	0,01
WP, kg[6]	470,1±1,8[ab]	474,8±1,7[a]	467,2±2,2[bc]	461,5±1,6[c]	470,3±1,7[abc]	468,0±1,7[ab]	0,01
WA, kg[7]	453,9±2,0[ab]	459,8±1,8[a]	452,4±2,4[ab]	450,3±1,7[b]	451,9±1,9[ab]	455,6±1,8[ab]	0,01
AD, kg[8]	16,6±1,5[a]	14,5±1,3[ab]	15,9±1,8[ab]	10,5±1,3[b]	12,3±1,4[ab]	18,3±1,4[a]	0,01
RD, %[9]	3,57±0,04	3,26±0,03	3,27±0,04	2,49±0,07	4,07±0,07	2,72±0,05	0,07

* Different letters in the same line represent means that differ by Tukey test (5%); [1] number of days from purchase to boarding; [2] price paid (within 30 days prize); [3] weeks of purchase; [4] weeks of boarding; [5] Average cattle quantity by batch; [6] promised weight (A); [7] arrival weight (B); [8] absolute weights difference (A-B); and [9] relative weights difference (((A / B) -1) x 100).