

COMPETITIVENESS OF BOVINE MEAT PRODUCTION IN THE NORTHERN REGION OF VERACRUZ

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ABSTRACT

Knowledge of the competitiveness of bovine meat (beef) production in the northern region of Veracruz is important because it allows to know the level of profit obtained by the producers and their chances of survival within a free trade environment. In order to know if Governmental intervention has favoured the level of competitiveness in beef production in northern Veracruz to recommend the granting of subsidies, a Policy Analysis Matrix (PAM) was constructed for the following groups of producers: conventional, in transition and in business. Results indicated that private profit was positive, and the ratio of private cost was less than one, indicating that the activity is competitive. Similarly, the economic gain was positive, and the resource cost ratio was less than one, indicating that all three systems have comparative advantages. The value of the effective protection coefficient, less than one, indicates that the activity has no protection over the price of the product, or the price of inputs. Finally, the subsidy equivalent to -510, -688 and -538 for producers in groups 1, 2 and 3 indicated that the intervention of the Government through economic policy has not favoured the competitiveness of the livestock sector. Considering the results, the granting of subsidies is justified to counteract the negative effects that the current economic policy has on beef production.

Keywords: groups, producers, politics, protection, subsidies.

INTRODUCTION

Cattle farming accounts for 40% of the total value of global agricultural production and is a source of work and food security for approximately one billion people, according to the United Nations Food and Agriculture Organization (FAO, 2018). Similarly, livestock is one of the most important activities in the Mexican Agricultural Sector. In 2018 it was recorded that the production and marketing of beef was 1.98 million tons (Megagrams, Mg), exports 230 thousand Mg, and imports of 190 thousand Mg, Apparent National Consumption amounted to 1.90 million Mg; figures that reflect a deficit Trade Balance, since 91% of consumption was supplied with national production and the remaining 9% with meat from abroad according to Mexico's Agri-food Information System for Consultation (SIACON, 2020).

The largest production of beef is concentrated in the states of Veracruz, Jalisco, San Luis Potosí, Chiapas and Sinaloa, generating 42% of national production according to Mexico's Agri Food and Fisheries Information Service (SIAP, 2018). Veracruz contributes 13%, followed by Jalisco and San Luis Potosí with 12 and 6%, respectively, of national production. In 2018, the state of Veracruz reported an inventory of 5.8 million head of

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cattle, where extensive or semi-extensive dual-purpose systems predominate, based on pasture monocultures (Bacab *et al.*, 2013). The production of beef in the state of Veracruz is obtained practically throughout the state, although the northern region contributes 28% of state production according to Mexico's Individual ID System for Livestock (SINIGA, 2012).

The macroeconomic sectoral policy and the trade liberalization agreed in the North American Free Trade Agreement (NAFTA) have had effects on the competitiveness of the Mexican livestock sector, since a large part of cattle farming is developed in extensive conditions with little integration of the links and strong participation of economic agents in the commercial chain. Thereby leading to an increase in imports of meat products that are purchased at lower prices than domestic prices (Del Moral and Murillo, 2015). With the opening of NAFTA in 1994 and the consequent elimination of tariffs, US meat products positioned in the Mexican market because of commercial strategies based on quality, product differentiation and promotional services to consumers (Carrera and Bustamante, 2012). From 1994 to 2018, imports increased by 52%, from 100 thousand Mg to 190 thousand Mg (FAO, 2018). In 2018, imports of beef and bovine offal came from the United States (USA) 84%, Canada 8% and Nicaragua 6% according to the Mexican Meat Council (CMC, 2018).

The process of trade liberalization has generated imbalances in the beef production chain. For Mexico this chain is complex and competes against the leading country in production, the United States of America, because the input shows a lower cost to final consumers, and to access these markets Mexican farmers need good production and government support according to the Mexican Agency for Marketing Services and Agricultural Markets Development (ASERCA, 2019). It is noteworthy that the commercial liberalization also favoured Mexican beef exports, which increased from 160 thousand Mg to 252 thousand Mg from 1994 to 2019 (SIAP, 2018), despite the fact that Mexico is not a large exporter of beef in carcass worldwide (Del Moral and Murillo, 2015).

The promotion of rural producers with competitive potential determines whether the market and policies have a competitive impact on this sector (Salcedo, 1999). Competitiveness is considered the private profit (income *vs.* costs) obtained by producers; or as the capacity of a company, sector, region or country to generate advantages from the price, quality, productivity, efficient labour, excellent marketing, among others to enter the world market efficiently (García, 2008).

For Ruesga and Da Silva (2007), the main determinants of the evolution of microeconomic competitiveness are prices and factor costs, highlighting in the second case the quality of products, economies of scale, process and product technology, production organization, efficient distribution systems, adequate after-sales assistance and the self-motivation ability of workers. The relatively more efficient use and development of these factors positively affects competitiveness indicators, providing a higher competitive level to companies (Buendía, 2013).

With the NAFTA, the growth of the value of agricultural exports in regard to the Gross Domestic Product (GDP) of the primary sector was favoured, in the livestock sector direct and indirect jobs were generated (Ruiz and Robles, 2021).

Vidaurrázaga and CortezLara (2000) indicated that, while in the United States and Canada they follow a policy of protection for livestock sector, in Mexico support and subsidies for this activity were withdrawn. This situation resulted in a more than proportional increase in imports of meat and cattle for slaughter compared to the exports of calves.

Competitiveness has been studied at national or sector scales, but there are few studies for the rural environment, especially in the livestock sector, where different conditions influence and determine their characteristics and capacity to participate in local, regional and global processes. Rural production units can improve their conditions by increasing the productivity (yield) of the factors of production (land, labour and capital), considering that each unit of labour, land, input, credit, animal or tractor can generate higher production at the lowest cost, leading to higher incomes (Lacki, 2002).

Facing the proposed scenario, this research aims to identify the policy effects on the competitiveness of three cattle production systems located in the North of Veracruz. The hypothesis states that cattle production systems are profitable, presenting competitive advantages with different technologies and inputs in this region.

MATERIALS AND METHODS

Structure of the Policy Analysis Matrix (PAM)

A PAM was built to meet the objective of this research, to quantify the profitability of livestock activities in private and social (or economic) terms and to allow determining the effects of the intervention of the Government through macroeconomic and by sector policies on competitiveness. The PAM (Table 1) is the product of two identities, one that defines profitability as the difference between revenues and costs, and another that measures the effect of divergences due to the intervention of economic policies and market failures, as the difference between the parameters observed and those that would exist if the divergences were eliminated (Monke and Pearson, 1989).

The PAM organizes information from private and social budgets to facilitate the evaluation of the effects of policy and market distortions. The matrix is a tool that describes the

Table 1. Structure of the Policy Analysis Matrix (PAM).

Concept	Income	Production costs		Revenue
		Supplies tradable	Production factors	
Private prices	A	B	C	D
Economy pricing	E	F	G	H
Policy effects	I=A-E	J=B-F	K=C-G	L=D-H

Source: Monke and Pearson (1989).

economy of a sector based on a theoretical model of general equilibrium. Thus, it is an analysis tool that operates within the inevitable constraints of time and availability of data, which are obtained directly at different stages of the production chain, then integrated into rows and columns (Salcedo, 2007).

The following variables are included in the rows: i) private budget, covering income, costs and profitability, valued at market prices; they are those received or paid by producers, including economic cost plus the effect of policies and market failures; ii) social or economic budget, covering costs, and profitability valued at social or economic prices; those that would exist in the absence of government intervention and market failures, reflecting scarcity values or opportunity costs, and correcting for the effects of distorting policies leading to inefficient use of resources; iii) Policy effects which are the difference between private and economic values of income, costs, and profits; any divergence between private and economic prices is explained by policy distortions or the existence of imperfect markets (Salcedo, 2007).

Whereas the columns of PAM account for the income or return on price; costs of tradable inputs, those that can be traded between countries; domestic factor costs, those that cannot be traded between countries; and profitability, the difference between private and economic gain (Table 1).

Once the PAM is built, indicators of competitiveness or private profit can be estimated, which is indicated by (D) and the Private Cost Ratio (PCR), the latter results in dividing the cost of internal factors (C) by the value added ($A-B=B+C+D-B=C+D$), both valued at market prices. If PCR is less than one, the activity is competitive, the producer is receiving extraordinary profits, because after remunerating the factors of production (own and contracted), there is a residue in the added value that is the remuneration to the producer for management. If PCR is equal to one, no extraordinary profits are generated, then the producer only pays for the factors of production, including labour and capital.

Three factors can also be obtained: i) Nominal Product Protection Coefficient (CPNP), which results from dividing the private income (A) by the economic pricing (E), it measures the degree of divergence by the price of the product caused by trade policy and the exchange rate. If CPNP is greater than one, then the product is protected, and if it is less than one, then the product is unprotected; ii) Nominal inputs protection coefficient (CPNI) shows the degree of divergence in tradable inputs and is determined by the quotient between these inputs evaluated at private prices (B) and their corresponding evaluation at economic efficiency prices (F). If this quotient is greater than one, the output is unprotected on the input side; and if it is less than one, the product is protected; iii) Coefficient of Effective Protection (CPE), ratio between value added at market prices (A-B) and value added at economic prices (E-F), measures the degree of divergence by product and input derived from trade and exchange rate policies; if this ratio is greater than one, then the product is protected, and if it is less than one, the product is unprotected (Forero y Saboya, 2007).

An indicator that measures the intervention of the Government through subsidies is the Producer Subsidies (SSP), which shows the part of the income that corresponds to the subsidies granted to the activity. The information generated through a PAM allows to obtain the benefit-cost ratio (RBC) using the following formula:

$$RBC = \frac{\sum_{t=1}^T \frac{\beta_t}{(1+r)^t}}{\sum_{t=1}^T \frac{C_t}{(1+r)^t}}$$

where t is time; β_t is gross profit in t ; C_t is the cost in t and; r is the discount rate.

Other indicators derived from a PAM are: a) value added at private and economic prices (VAP=A-B and VAE=E-F), an amount expressed in monetary terms that remains in the income received after the cost of tradable inputs is paid without considering the cost of domestic factors; b) intermediate consumption in total income (CINT=B/A), which represents the payment of the activity to the rest of the economy, that is, the expenditures originated in the income and destined for the acquisition of indispensable inputs to boost the activity; c) aggregate income in the total income (PVAP=(A-B)/A).

Data

A survey was designed to elaborate the PAM; the agricultural phase of production was considered for each technology used by the cattle producers of the Northern region of Veracruz. The survey was conducted in 16 of the municipalities that compose the northern region of Veracruz, these are Platon Sanchez, Panuco, Tantoyuca, Tamalin, Tempoal, Ozuluama, Tamiagua, Benito Juarez, Chicontepec, Ixhuatlan de Madero, Temapache, Castillo de Teayo, Citlaltepétl, Cerro Azul, Tuxpan and Zontecomatlan. In this region the topography is flat with some low hills; with humid-warm climate, according to Mexico's National Institute of Statistics and Geography (INEGI, 2020). The total of questionnaires was distributed by municipality based on the density of cattle population of each of them. A total of 240 questionnaires were applied to producers, the information was interpreted through principal components and cluster analyses to determine the typology and characteristics of each group; data were analysed in SAS®, through the Wardy method (Ward Jr., 1963).

To build the PAM, the information was obtained from a previous study where the Typology of cattle producers was used (Méndez-Cortés *et al.*, 2019), the following three cattle production systems for the northern zone of Veracruz were considered: a) Group 1, corresponded to conventional producers who are dedicated to the sale of calves at weaning, they have an average area of 55 ha and 55 animals per herd; b) Group 2, composed by the producers in transition that have an area dedicated to grazing 177 ha on average, with 174 animals per herd; and c) Group 3, formed by business producers with an average area of

382 ha and a cattle herd of 280 animals on average, that are dedicated exclusively to the fattening of calves.

One of the main points of the survey was to obtain technical coefficients (amount of inputs for cattle production and yield per 100 kg of meat); market price of cattle and tradable inputs (pasture, medicines, vaccines); price of the internal factors of production (labour, land, mechanized work and contracted services); cost of machinery and other inputs used in the production of cattle. In order to build the matrices of technical coefficients the data obtained from questionnaires were used; along with the recorded information from the interviews with livestock producers, and stored in Excel® 2013, from where they were exported for further analysis. Based on Ávila-Soler *et al.* (2018) the information collected from the questionnaires was complemented with information obtained from the Mexico's Secretariat of Agricultural, Rural Development and Fishery (SEDARPA, 2017), Mexico's Secretariat of Communications and Transportation (SCT, 2019), Mexico's Revenues and taxes Administration Service (SAT, 2019), and the National Agricultural Statistics Service under the United States Department of Agriculture (NASS-USDA, 2019).

For the survey application a non-probabilistic sampling by quotas was used, a total of 240 questionnaires were applied to producers. The questionnaire consisted of quantitative and qualitative variables, grouped into ten sections, because the producers were included based on their availability to be interviewed, until completing the number of interviews required. The municipality was considered as the stratification criterion based on the bovine population density of each of the livestock partners. The questionnaire was applied from November 2017 to March 2018. The sample design was determined based on sampling for finite populations (Aguilar-Barojas, 2005). Some aspects of land tenure, infrastructure of the grazing system, type of livestock farming, reproductive aspects and knowledge of the activity, food, equipment, labour and professional staff, associations among producers, marketing characteristics and waste management were also considered.

Data obtained from the questionnaire and from the interviews with livestock producers were recorded in Excel®. In order to build the first row of the PAM, which corresponds to the private budget, it was necessary to elaborate other matrices of economic technical coefficients, of the prices of inputs (tradable and indirectly tradable), of the internal factors of production, of the budget (labour, land, use of water, technical assistance and contracted services), the cost of machinery, constructions, price of cattle and other inputs used for the fattening and rearing of cattle, with data directly from the survey. Private budgets were obtained by multiplying the technical coefficients by the market price.

For the valuation of the economic budget, the economic technical coefficients were multiplied by the economic prices. Inputs economy pricing was calculated based on import and export parity prices (Salcedo, 2007). The information necessary to obtain these prices was obtained through the economic import or export parity prices. For which

the average of the 2019 projection of prices was obtained, from the US Department of Agriculture and the World Bank (Lara *et al.*, 2003), adjusted to the base year (2019) for marketing costs, to make them comparable with farm prices. The conversion of foreign currency to national currency was calculated with the equilibrium exchange rate (Banxico, 2019).

Based on Salcedo (2007), for the economic export price of cattle, the international price of cattle for the United States was considered, from the regional livestock association located in the municipality of Tuxpan, Veracruz. To obtain the cost of freight and insurance from the producers farm, data from the Mexico’s Secretariat of Communications and Transportation were consulted, together with the data obtained in the field. The nominal economic interest rate and the equilibrium real exchange rate proceeded from the US Department of Agriculture (USDA, 2018). The information to obtain the economic price of tradable inputs that are not quoted on the international market proceeded from the interviews with producers. Once the private and economic budgets were organized, three policy analysis matrices were built for the three production systems in the 2017–2018 period.

RESULTS AND DISCUSSION

Competitiveness

Table 2 presents the results of the PAM for the three beef production systems in northern Veracruz for the production of 100 kg of meat. Results indicated that the gain at private prices was 142, 506 and 355 (MXN \$ per 100 kg) of meat for producers in Groups 1 (Conventional), 2 (Transitional) and 3 (Business), respectively. These values indicate that

Table 2. Policy Analysis Matrix of livestock production in northern Veracruz, in Mexican pesos (MXN \$) per 100 kg of meat.

Concept	Income	Production costs		Revenue
		Tradable inputs	Internal factors	
Group 1: Producers of the conventional system				
Private prices	4552	2943	1467	142
Economy pricing	4802	2715	1435	652
Policy effects	-250	228	32	-510
Group 2: Producers of the transitional system				
Private prices	5000	3878	615	506
Economy pricing	5470	3669	606	1194
Policy effects	-470	209	10	-688
Group 3: Producers of the business system				
Private prices	4955	4043	557	355
Economy pricing	5255	3810	552	892
Policy effects	-300	233	5	-538

Source: elaborated by the authors, based on the results of the PAM.

profitability in production systems is very low. Results are consistent with those obtained by Rebollar-Rebollar *et al.* (2011), who conducted a study of cattle in pens in the south of the State of Mexico; and by Rodríguez-Hernández *et al.* (2013), who evaluated production systems of family units in southern Oaxaca.

The private profit obtained by Group 1 was lower than those obtained by Groups 2 and 3; it should be noted that the tradable inputs of Group 1 were lower (MXN \$2,943.00 per 100 kg), which indicates those producers that keep cattle free grazing acquire only what is necessary to feed livestock; that is, they dedicate little investment for production. The sum of private costs of group 1 was MXN \$4,410.00 per 100 kg, less than those of groups 2 and 3 (MXN \$4,493.00 and MXN \$4,600.00 per 100 kg of meat). The income of Group 1 was higher than that found in a cattle fattening farm in the State of Mexico (Rebollar-Rebollar *et al.*, 2011).

The highest private profit obtained corresponded to producers of Group 2, with MXN \$506.00 per 100 kg of meat. It was observed that for this group the costs of tradable inputs and internal factors (labour, credit, technical assistance and water) decreased to MXN \$615.00 when combining grazing with the maintenance of livestock in pens. By increasing the cattle herd, the use of inputs was optimized, unit cost was reduced, and profits were increased (Gamboa-Mena *et al.*, 2005). Cattle was sold when calves reached 300 kg of live weight.

The cost of marketable inputs was higher for producers of Group 2, than that of Group 1, MXN \$3,878 per 100 kg of meat. This is because they acquire more vaccines and dewormers in order to avoid diseases or epidemics that occur in the region. It is estimated that about one billion head of cattle are found in tropical and subtropical areas of the world exposed to tick infestations or diseases transmitted by them, causing significant losses in livestock production (Pegram *et al.*, 1993). Thus, the economic impact generated by the use of tradable inputs and internal factors is of paramount importance.

Group 3 had a higher technological index than those observed in Groups 1 and 2; so that in Group 3 a private return of MXN \$355.00 per 100 kg of meat was obtained, although the profit was lower than that observed in Group 2. This is because the producers of Group 3 invest more to have cattle from which higher quality meat is obtained, this implies a higher cost. It is important to note one that producers perceive that one of the main problems they face is the scarce or null financing, which means that they either invest their capital or acquire loans to cover expenses.

In regard to the cost of internal factors (labour, credit and technical assistance), a value of MXN \$557.00 per 100 kg of meat was obtained for Group 3, a result derived from the technological index and the knowledge that producers have about the activity; both factors allow the efficient use of labour and reduce medical expenses. Family labour, whose cost was also included, is of paramount importance from the economic point of view. Since the use of this comparative advantage on the part of the human capital provided by small-scale systems is crucial to maintain the productive system (Martínez-

Castañeda and Perea-Peña, 2012). The costs of inputs account for the largest expenditure, followed by salary, while the lowest proportion of total cost is for depreciation (Nava *et al.*, 2009).

The indicators of competitiveness, comparative advantages, protection, subsidy and profitability are presented in Table 3. Results of the private cost ratio (PCR) obtained were 0.91, 0.55, and 0.61, respectively for groups 1, 2, and 3; which indicate that the value added to production covers all costs of internal factors. These results are similar to those found in two cattle production systems for milk production in Jalisco in which every MXN \$0.85 invested in internal factors generated an added value of MXN \$1.00 (Lara *et al.*, 2003). In their study on competitiveness in the production in pens of bovines for meat at southern State of Mexico, Hernández *et al.* (2016) obtained indicators 0.51, 0.52 and 0.51 for three types of production, small, medium and large producers, respectively.

Results above proved the hypothesis that the cattle production systems of the study area are competitive. Although the competitiveness is very low, just MXN \$142.00 per 100kg of meat for conventional systems.

Comparative advantages

The results of Table 2 indicate that the three production systems are efficient, since the economic profitability was 652, 1,194 and 892 (MXN\$ per 100kg of meat) for Groups 1, 2 and 3, respectively. As it can be seen, economic gain is notoriously greater than private profit. These results indicate that economic policy (macroeconomic and by sector that affect livestock) leads to differences between economic and private gain.

RCR is an indicator of comparative advantage. Table 3 shows that the value of this indicator was 0.68, 0.34 and 0.38 for the three groups of producers. These results indicate comparative advantages, indicating that the resources spent on producing beef are less than the foreign exchange that would be spent if such meat was imported.

Table 3. Indicators of competitiveness, protection and profitability of livestock production for the northern region of the state of Veracruz, Mexico.

Production system	Competitiveness		Protection coefficients			Subsidy	Benefit/Cost
	RCP	RCR	CPNP	CPE	CNIC	ESP	RBC
	Private cost ratio	Resource cost ratio	Producer nominal protection coefficient	Effective protection coefficient	Nominal coefficient of marketable inputs	Producer subsidy equivalent	benefit-cost ratio
Group 1	0.91	0.68	1	0.88	1.08	-0.06	1.03
Group 2	0.55	0.34	0.91	0.62	1.06	-0.14	1.11
Group 3	0.61	0.38	0.94	0.63	1.06	-0.11	1.08

Source: elaborated by the authors, based on the results of the PAM.

Protection of the activity

The effect of policies on cattle production systems for the northern region of Veracruz was determined by protection coefficients. The first was the nominal producer protection coefficient (CPNP). Results in Table 3 indicate that the production system for Group 1 was 1.0, demonstrating neutrality. For groups 2 and 3 was 0.91 and 0.94, respectively; this is the result of the low domestic price of products, compared to the world import price. The values of CPNP, less than one for the three systems, were the result of the low domestic price of the products compared to the world import price, which is associated with an undervalued exchange rate derived from macroeconomic policies based on what was reported by Pearson *et al.* (2004) and Salcedo (2007).

The CNIC for the three production systems was greater than one, 1.08, 1.06 and 1.06, respectively, demonstrating that producers do not receive protection from tradable inputs since the price paid is higher than the price they would pay if there were Government intervention. The value of this indicator can be reduced with the granting of subsidies for the purchase of food or medicines. With that, the payment of this input by producers would be reduced; therefore, subsidy is required for these systems, as noted in another study on policy analysis in Indonesian agriculture (Pearson *et al.*, 2004).

The value of the CPE for groups 1, 2 and 3 was 0.88, 0.62 and 0.63, respectively; those values less than one indicate that the producer receives a lower price for the sale of cattle to the international reference, while pays a higher price for inputs in relation to the international price. These results are similar to those obtained in the pig farming in Michoacán (Barrón *et al.*, 2000) and in the milk production systems in Jalisco (Lara *et al.*, 2003).

Subsidies and Government intervention

The third row of Table 2 quantifies the effects of Government intervention on meat production systems. Through the price of meat, producers in Groups 1, 2 and 3 received 250, 470 and 300 (MXN\$ per 100kg of meat) less, for the effects of the Government policy. Similarly, through the price of tradable inputs, meat producers in Groups 1, 2 and 3 paid more 228, 209 and 233 (MXN\$ per 100kg of meat), for the effects of domestic policy. In net terms, the negative gains -510 for Group 1, -688 for Group 2 and -538 for Group 3 indicate that the Government's economic policy was unfavourable to the cattle producers sector not only through the price of meat, but also through the price of inputs.

The value of the subsidy equivalent to the producer was negative, which indicates that in this case governmental intervention determined the existence of a tax due to the magnitude of the divergence between private and economic profitability. The negative values of equivalent subsidy indicator for the producer (ESP, Table 3) -0.06, -0.14 and -0.11 show that the activity does not receive subsidies, also indicating the percentage of income lost due to taxes derived from the unfavourable economic policy for livestock activity.

In regard to inputs and factors of production, the following relations occur, there is a subsidy (or tax) when the difference between the private and economic budget is negative

(or positive); and for the product when such a difference is positive (or negative) (Fuentes *et al.*, 1999). Similarly, a net subsidy (or tax) is presented to the system, if the total transfer is positive (or negative).

Benefit-cost ratio

Another point to evaluate is the benefit-cost ratio (RBC), to accept those projects with results greater than or equal to 1.00, at the selected update rate. For the evaluation of the three cattle production systems, the results were positive 1.03, 1.11 and 1.08 for groups 1, 2 and 3, respectively. These results indicate that for Group 1 for each Mexican peso invested, profits of 3 cents (0.03 MXN\$) are generated, for Groups 2 and 3 the producer generates respective profits of 11 and 8 cents (0.11 and 0.08 MXN\$) for each Mexican peso invested. These results are similar to those obtained in a study on the economics-productive evaluation of a milk production system in the tropics (Zárate-Martínez *et al.*, 2010) and to those obtained in another study in a region of Tabasco (Granados-Rivera *et al.*, 2018).

Results of this research indicate that beef production in northern Veracruz is competitive and has comparative advantages. However, the value of the protection coefficient indicates that the meat producer is unprotected by the price he receives for his product, as well as by the price he pays for tradable inputs. Despite that private profit is positive, it is very low and lower than economic gain. Then, how to improve competitiveness? One way would be through the granting of subsidies, the state should grant subsidies for the difference between private profit and economic profit, another option would be to modify the national policy for currency exchange.

In addition to the above, the meat producing company must establish competitive advantages that help to reduce transaction costs in order to improve the level of competitiveness. Also, companies should obtain better information for the control and replacement of high-cost tasks; reducing the times required for production; in order to add value with effective costs compared to competitors (Luchi and Paladino, 2001).

CONCLUSIONS

Results obtained from the construction of the Policy Analysis Matrix for the three beef production systems (conventional, transitional and business producers), evaluated in northern Veracruz allowed to determine differences in production costs, income and profit levels in private and economic terms. Production systems proved profitable, as revenues enabled tradable inputs and factors of production to be paid for and profited. The value of the benefit-cost ratio was higher than one for the three production systems. The resources cost ratio indicated the presence of comparative advantage for the three groups of producers.

The policy effects were unfavourable for the activity, the cattle producer in northern Veracruz transfers resources to the rest of the economy through income and payment of tradable inputs and factors of production, following macroeconomic and by sector

policies. The subsidy equivalent to the producer was negative, which indicates that the activity does not receive any type of subsidy; on the contrary, it transfers resources to the rest of the economy. This result justifies the granting of a subsidy that compensates for the negative effects of governmental intervention (through policies) on the level of competitiveness of beef production.

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