CONTRACTS IN BRAZILIAN PORK AND POULTRY MEAT CHAINS: IMPLICATIONS FOR MEASURING AGRICULTURAL STATISTICS

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ABSTRACT

The predominant supplying strategies of the main Brazilian pork and poultry meat companies and cooperatives rely on coordination through contracts. According to the last Brazilian agricultural census, there were 61.5 thousands contracted poultry and swine producers in 2006. This organization model is named by practitioners as integration, in which the producer is tied to a slaughterhouse or a processing industry which, in most cases, also coordinates the feed production and other upstream activities. Contracts importance is increasing in all Brazilian regions and poultry and swine production systems. The goal of this study was to characterize contracts in Brazilian pork and poultry meat chains in order to highlight its implications for measuring agricultural statistics. The results can carry to a better comprehension of this world consolidated trend, and also can help statistical organizations to better focus surveys and census.

Keywords: Animal production; Contracts; Costs; Prices; Statistics

1. Introduction

The predominant supplying strategies of the main Brazilian pork and poultry meat companies and cooperatives rely on coordination through contracts. More than 39.9 thousands poultry producers and 21.6 thousands swine producers were contracted in 2006 (IBGE, 2006). Despite the economic success of these agribusiness chains, emphasized by Brazilian leading position on global markets, the contracting system is being questioned by its critics and analysed by governments, legislators and researchers. The central question is its capacity to continuously improve efficiency

and competitiveness and, at the same time, provide conditions to producer's sustainability. Underlying criticisms there is a lack of information disclosure on contracts spread among different Brazilian regions and poultry and swine production systems and, above all, on its impacts on farms income, profitability and long term economic sustainability. The goal of this study was to contribute to statistics improvements in order to consider deep organizational changes occurred in Brazilian pork and poultry meat chains, which are continuously more contracted, and subject to conflicts regarding added value distribution and rural development. To attain this objective, it is presented contract main characteristics and their impact on costs, prices and risk exposure and related criticisms. The paper finishes with proposals to improve agricultural statistics and institutional bases in Brazil.

2. Brazilian pork and poultry supply chains leading organization and contracts characteristics

Brazilian pork and poultry supply chains have experienced a huge development during last two decades, with increasing production and exports. Nowadays, the country produces 11.5 million tons of poultry meat and 3.5 million tons of pork meat per year (IBGE, 2012), and represents 39% of poultry meat world exports, ranked in first position, and 9% of pork meat world exports, ranked in forth position (USDA, 2012). This has been attained thanks to increasing sanitary controls, massive technology adoption, grain supply at international competitive prices and last, but not least, due to its organization model focused on the supply chain coordination, where contracts have been playing a central role. This organization model (Figure 1) is named by practitioners as integration, in which the producer is tied trough a contract to a slaughterhouse or a processing industry which, in most cases, also coordinates the feed production and other upstream activities. In Brazil, leading companies diversify its activities both with pork and poultry meat (ALTMANN, 1997; IPARDES, 2000a, 2000b; GUEDES, 2001; NOGUEIRA, 2003; CARLETTI FILHO, 2005; MIELE & WAQUIL, 2007).

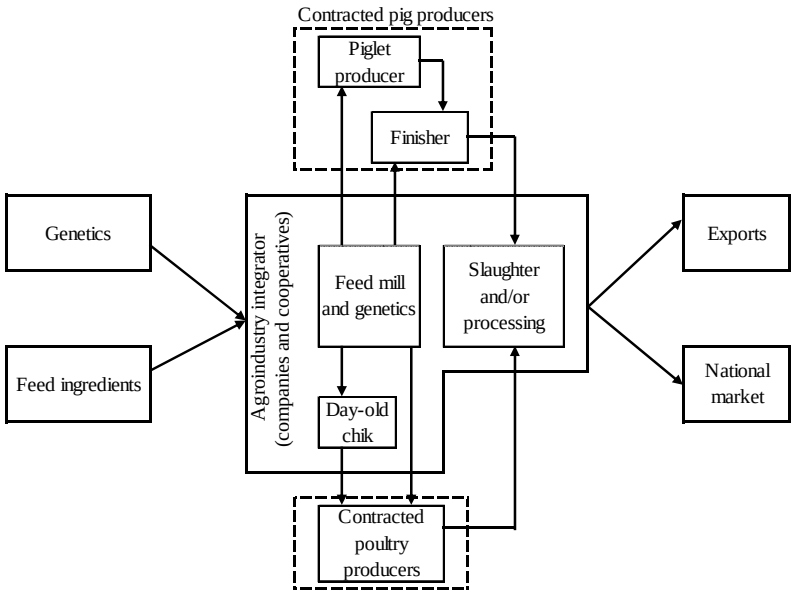

Figure 1: *Typical integrated pork and poultry supply chain.*

In geographical terms, these activities are concentrated in the South region, which represented 60% and 65% of slaughters of poultry and pigs, respectively, in 2010 (IBGE, 2012), and 74% and 76% of exports, respectively (MDIC, 2012). This region embraces most of contracted producers, most of them small farms with familiar labour (Table 1). In general, swine production is less integrated than poultry, where almost all producers are contracted. Swine finishers are also almost contracted, and among piglet producers contracting is the predominant supply coordination form (MIELE & WAQUIL, 2007). The expansion that is taking place by leading companies from the South toward Southeast and above all Central West region is changing predominant supply chain organization in this region toward contracts.

Table 1: *Participation (%) of contracted producers and small producers with familiar labour on total swine and poultry producers, by region, in 2006.*

Region	Poultry*		Swine**	
	Contracted	Small producers with familiar labour	Contracted	Small producers with familiar labour
South	91	83	72	80
Southeast	72	47	11	35
Central West	84	51	18	38
Others	52	45	3	55
Brazil	85	72	58	72

Source: developed by the author from IBGE (2006).
* Includes poultry, laying hens and other bird producers with more than 5.000 heads.
** Includes producers with more than 100 pig heads.

Agricultural contracts in Brazilian swine and poultry production can be classified based on liabilities, tasks and property rights division between producers and integrators (Table 2). In a typical production contract, the integrator company or cooperative supplies feed, genetics, veterinary inputs, logistics and technical support, while producers provide investments on housing and equipment, their maintenance, labour, water, energy (electricity, firewood and gas), litter and manure handling. Moreover, integrators use to settle technical specifications and to determine new housing patterns and equipment investments, with a high level of interference on farm decisions.

Property rights are quite different between production contracts and marketing contracts. While in production contracts (named “partnership” by supply chain practitioners) the integrator owns feed and animals which are transported until farm where the producer will ultimately provide a growing or breeding service, in marketing contracts producers are owners of all inputs and outputs, even when the contract specifies its origins or destination. Regarding this, marketing contracts are quite similar to risk exposure and working capital demands faced by independent producers trading on spot market, except by the fact that the last are free to auction with different suppliers and customers, without interference on farm decisions. Independent producer’s income depends on scale, productivity and efficiency, live or carcass weight and, above all, on spot market prices. In the other hand, production contracts determine remuneration rules based on efficiency criteria (based on feed conversion ratio, mortality and relative performance) and conformity to best available techniques. Most integrators often use ranking systems, what represents a competitive and selective process between contracted producers.

Table 2: *Production and marketing contracts and spot market characteristics.*

Dimension	Production contract	Marketing contract	Spot market
Market access	Assured	Assured	Not assured
Production control	Slaughterhouse	Slaughterhouse	Producer
Producer inputs ownership	Labour, electricity, firewood, poultry litter, buildings and manure handling.	Feed, genetics, medicines, labour, electricity, firewood, poultry litter, buildings and manure handling	Feed, genetics, medicines, transport, labour, electricity, firewood, poultry litter, buildings, manure handling and veterinarian support
Producer output ownership	Growing and breeding service and manure nutrients	Piglets, finished swine and birds and manure nutrients	Piglets, finished swine and birds and manure nutrients
Remuneration formula	Base price x Efficiency ratio (based on feed conversion ratio, mortality and relative performance)	Base price + Bonus (based on a weight target and a check-list of best practices)	Spot market price + Bonus (based on carcass yield)

Source: authors based on IPARDES (2000a, 2000b); Guedes (2001); Talamini et al. (2005) and Miele & Waquil (2007).

3. Challenges posed for statistical systems by contracts

Challenges posed for statistical systems by contracts derive from their impact on agricultural costs, prices and on farm risk exposure. It becames more and more an important issue not only because the wide spread of this organizational change trough Brazilian pork and poultry supply chains. In fact, the increasing lack of public information held private by integrators, and continuos conflicts for a more equitative division of the aded value along these supply chains, require inovation on public policies, what reinforces the need for improved information and statistics.

3.1. Impact of contracts on costs, prices and risk exposure and related criticisms

Contracts and spot market differences (Table 2) determine that farms operating with production contracts have total costs (operational costs + capital cost) that correspond to 12% to 28% of a farmer's cost trading through marketing contracts or in the spot market, depending production system analyzed. When comparison is made with the income, this share drops to 9% to 19% (Table 3).

Table 3: *Production, gross income, operational and total costs and gross margin of different types of contracts and production systems, Santa Catarina state, Brazil, in 2010.*

Type of contract and production system	Poultry finisher on sport market	Poultry finisher with production contract	Farrow to finish pig producer on sport market	Pig finisher with production contract	Piglet producer with marketing contract	Piglet producer with production contract
Production scale	16,000 heads/flock	16,000 heads/flock	50 sows	750 heads/flock	500 sows	500 sows
Full time workers (n.)	1	1	1	1	5	5
Production (ton/year)	253	253	138	258	276	276
Investment (US$ th.)	101	101	111	112	567	567
Annual results (US$ 1,000/year)						
Gross income	205	22	165	18	604	111
Operational cost*	191	16	149	8	484	63
Gross margin	14	6	16	10	119	43
Working capital cost**	6	0.5	4	0.3	15	2
Capital cost**	9	9	10	10	52	52
Per live kg results (US$/live kg)						
Price	0.813	0.085	1.199	0.070	2.187	0.403
Operational cost*	0.750	0.061	1.082	0.033	1.755	0.221
Gross margin	0.063	0.024	0.117	0.037	0.432	0.176
Working capital cost**	0.023	0.002	0.032	0.001	0.053	0.007
Capital cost**	0.036	0.036	0.073	0.040	0.187	0.187
Per worker results (US$ 1,000/worker/year)						
Investment	101	101	111	112	113	113
Gross income	205	22	165	18	121	22
Operational cost*	191	16	149	8	97	13
Gross margin	14	6	16	10	24	10
Working capital cost**	6	0.5	4	0.3	3	0.4
Capital cost**	9	9	10	10	10	10

Source: estimated by the author from Miele et al. (2010a; 2010b; 2011); Santos Filho et al. (2011).
* Includes family labour opportunity cost.
** Considers a capital opportunity cost of 6% per year.

There are also cost composition and risk exposure differences. While feed is the main cost of independent pig and poultry producers which operate on spot market (68% to 70%) and of piglet producers with marketing contracts (59%), among farmers with production contracts prevails capital, labour and energy costs (Figure 2). It is important to highlight that production contracts represent an increasing capital's share over total costs and income, and also higher asset specificity, represented by the impossibility to the farmer to change customer without high setup and transaction costs. By the other way, producers under production contracts have less working capital demands (Table 3).

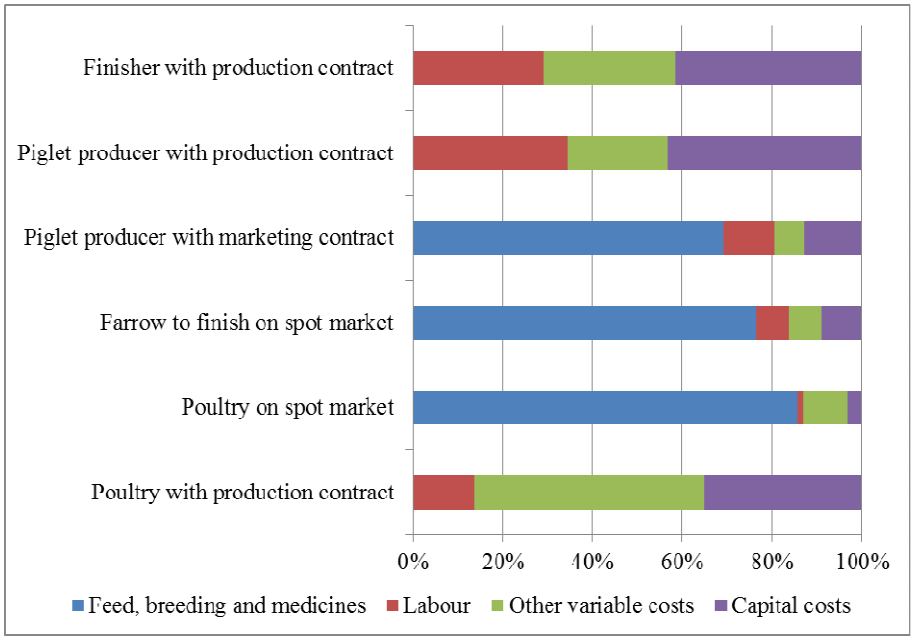

Figure 2: *Cost composition of different types of contracts and production systems, Santa Catarina state, Brazil, 2010.*
Source: estimated by the author from Miele et al. (2010a; 2010b; 2011); Santos Filho et al. (2011).

Spot market is more speculative, without marketing guarantees and linked to international meat and grains markets behavior. This kind of producer is a risk taker and its gross margins are highly volatiles. The example of Table 3 shows a profitable year for independent producers (2010), but this situation has been alternated with negative gross margins and equity losses, leading to a sharp decrease on spot market herd. By the other hand, production contracts guarantee market access and reduce income variability, transferring price risk to integrator. However, net margins used to be very tights and several producers are not being able to reach productivity patterns that allow them to be top ranked on integrator's payment schemes, receiving price that doesn't remunerate all their productive factors. Contracts also enable technical support and technology and finance access, but farm decision process is highly limited by integrator's choices, and several contractual hold-ups and market power abuses are often related by producer's representative organizations (MIELE & MIRANDA, 2013). Criticisms relative to agricultural contracts in Brazil mainly derive from the asymmetric relationship between producers and integrators associated to an increasing lack of public information on prices, contractual terms and number of contracted producers coming in and going out integrations.

3.2. Proposals for improved statistics on agricultural contracts in Brazil

There are several statistics that could be collected on contract farming. The two most important are the spread of contracts through geographical regions, through both pig or poultry systems, and also the different types of contracts. It is therefore useful to map differences on liabilities, tasks and property rights division between producers and integrators (Table 2) to determine at least three main kinds of transaction governance existing on agricultural activities, namely: spot market, marketing contracts and production contracts. Regarding property rights assignments, it is important to address special attention to remuneration formulas. Mapping these differences may be the best way to determine whether a producer is contracted or not, and through

which kind of contract. This is highly recommended because several different terminologies are being used on regional and also corporate level to identify a same kind of contract, which can puzzle researchers and statistics (MIELE & WAQUIL, 2007).

The main impact of this categorization is to allow separated statistics on prices and cost differences shown in Table 3, that demonstrate that while producers on spot market and with marketing contracts sell products (piglets and finished pigs and birds), producers under production contracts provide growing and breeding services, with totally different cost structure, price level and risk exposure. Beyond prices and costs, this statistics segregation can also allow a better understanding of technical efficiency differences among these organizational forms.

Moreover, transactions continuity and contractual hold-up occurrences are important issues related by practitioners. Thus, statistics should monitor unilateral contract interruption before producer's life time investment has been reached, and also input quality problems and logistics delays (genetics and feed deliveries and finished pig and poultry shipments). Beyond integrators hold-ups, it is also important to enlighten contract interruptions due to producers' inefficiencies and opportunistic behaviour. In order to better understand contract relationships and economics, it would also be useful to collect statistics on the contractual transaction characteristics like exclusivity on input origin and output destination, technical specifications, the faculty to change suppliers and customers and also number of transactions with the same customer, and number of different customers with which a producer traded in a determined period.

To deal with this broad universe of information and also operationalize proxies it is necessary to address different statistical and data systems and define priorities. This paper suggests that Brazilian authorities should first develop legislation and technology information to implement contractors mandatory reporting on three different kinds of data and information, namely:

- Cadaster of contracted producers by type of contract and production system. Although agricultural contracts should not be classified as a labour relationship, the Brazilian Labour Ministry experience with the Employment and Unemployment General Cadaster (CAGED) and the Annual List on Social Information (RAIS) should be taken as examples.
- Contract library to catalog the types of contracts and their clauses, as actually done by the United States Department of Agriculture (USDA).
- Periodically paid price reporting by type of contract and production system, as actually stated by the US Livestock Mandatory Reporting Act of 1999.

To explore more detailed relationships between type of contracts, production systems, main farm characteristics and performance, it is necessary to improve the Agricultural Census conducted by the Brazilian Institute of Geography and Statistics (IBGE) and, moreover, support this institution with supply chains knowledge and also with financial means to develop the innovative proposal of a National System of Farms Sample Survey (SNPA), which projects an specific module on contracts. Finally, there are several national and regional statistical and agricultural economics agencies and institutes, both private and public, which collect prices on a daily or weekly base, which should format its statistics to address prices differences between contracted and spot market production.

4. Final considerations

The main underlying theme of this article is competition promotion and defense through information disclosure. It is important to highlight that there are in course on Brazilian national

Congress two bills which focus on agricultural contract regulation. Despite its valuable proposals, their discussion has taken long time without practical effects and, moreover, has occurred mostly between legislators, producers and slaughterhouses representative institutions, government officials responsible for agriculture and rural development and also some researchers. However, statistical and agricultural economic institutions have not taken part in this process as needed. Their role is quite important to monitor and better understand contracts evolution and impacts on agricultural competitiveness and rural development.

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