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<https://doi.org/10.5109/9308>

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出版情報：九州大学大学院農学研究院紀要. 52 (1), pp.221-227, 2007-02-28. Faculty of  
Agriculture, Kyushu University

バージョン：

権利関係：

## The Relationship among the Agents in the Distribution System of Pigs and Pork in Hanoi

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(Received November 9, 2006 and accepted December 1, 2006)

The food distribution system has a very important role in the economy. An efficient distribution would promote farming production and enable a sustainable supply of food. A well-organized and supervised distribution channel also makes sure that the consumers could have access to healthy food. This paper investigates the organization of the distribution of live pigs and pork in Hanoi and especially the relationship among the three most important agents to find out its strengths and weaknesses as well as to make some recommendations to improve it.

### INTRODUCTION

Pork accounts for the largest percentage of the meat consumption in Hanoi. Being a developing city, the distribution system of pork as well as other food in Hanoi is still facing a lot of problems. Small-sized operation dominates all stages from production, live pig trading, slaughtering to retailing activities. All the transactions in the distribution are based on individual negotiations. Price is also determined by individual negotiations. The competition is not so hard in the market with the biggest power being in the hand of the slaughterers. The current institutional organization of the distribution system also put constraints against the modernization and improvement of itself. Only a breakthrough in the retailing system could bring about significant changes in the distribution system as a whole.

### THE RELATIONSHIP AMONG TRADERS - SLAUGHTERERS - RETAILERS

The Fig. 1 depicts the channel that accounts for around 70% of the whole supply to Hanoi market. The three agents: traders, slaughterers and retailers have the biggest influence on the distribution channel of pigs and pork to the market. This paper would focus on these three agents and their relationship.

The slaughterers are found to impose the biggest influence in this relationship. As there is no direct relation between traders and retailers, the slaughterers play as the bridge to source the products from the production sector to the retailing sector and at the same time, it is the slaughterers who have the greatest influence on the transmission of prices from live pig market to carcass market and vice versa.

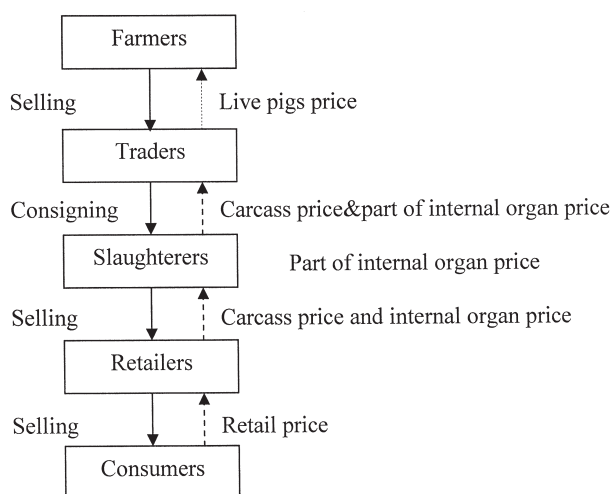


Fig. 1. Transactions among market agents.

It is possible to say that for the time being, the market is in favor of the slaughterers. The slaughterers have established for themselves a power that allows them to get the highest benefit in comparison to other participants in the distribution system.

The relationship between the slaughterers and traders are not that of buyers and sellers. Instead, the live pigs are consigned to the slaughterers who in most of the case do not hold either the ownership or any responsibilities for the animals to be killed at their site. The pigs will be killed upon the selection of the retailers who come to the slaughterhouse to buy the carcasses or upon the orders by those retailers who buy the carcasses through the telephone. The prices for the carcasses are the results of the compromise between the slaughterers and the retailers. The pork grading system is not in place, as the carcass specifications differ from one to another, the price of carcasses, therefore, vary. There are no official recordings of the prices for carcasses traded between slaughterers and retailers. The slaughterers are running bookkeeping system for the prices that they got from the retailers based on which pay-

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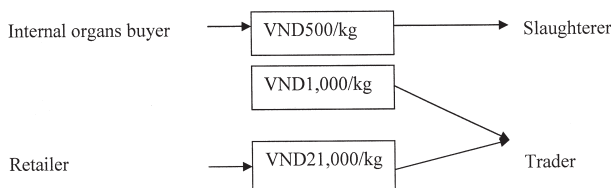
ments to traders are to be made.

No weighing is done before the animals are killed as the purchases between traders and slaughterers are based on carcass weight. The weighing is done by the slaughterers with or without the witness of the retailers–buyers. In almost all the case, the traders do not attend the weighing process and they only know their animal weights by the record made by the slaughterers. The traders in my surveys usually base on the carcass weight ratio to judge if the weighing of the slaughterers is fair or not. As this ratio is somewhere around 70%, the traders will recognize it if the recorded weight of the carcasses is quite different from their estimated weight.

As shown in Fig. 2 and Table 1, the prices involved in the exchange among traders, slaughterers and retailers are the prices for carcasses and the prices for the edible internal organs. The slaughterers sell the carcasses to the retailers and receive the amount of money equivalent to the unit price multiplied by the weight of the carcasses. 100% of this amount is said to be returned to the traders. The edible internal organs are sold to a specific processor who specializes in these parts of the carcasses.

Part of the amount got from the sales of internal organs (equivalent to the unit price multiplied by the carcass weight) will be paid back to the traders, the rest is kept by the slaughterers as a pay for their work. Note that the amount paid for the internal organs is calculated upon the carcass weight, not the weight of the organs themselves.

100% of the slaughterers in my survey handled the payments in this way which means they receive the live pigs as the consignment and keep a part of the sale as



**Fig. 2.** How payments are exchanged among traders–slaughterers–retailers.

the pay for themselves.

As mentioned above, there is not an open system for the price and weight record which could only be read from the slaughterers' bookkeeping. The lack of such a clear and open system makes room for any attempt of the slaughterers to cheat. One out of the 8 traders claimed that they were cheated by the slaughterers as they were underpaid with the prices and weights much lower than the actual levels otherwise paid if an appropriate clear record system is in place. The possibility of cheating is even higher if the pigs are not selected to be killed within the day and left until later when the traders have left the slaughtering site. Those pigs also suffer from weight loss as they are not fed during the waiting days because the slaughterers see hardly any benefit and pay no attention to feeding the pigs. The traders have almost no control over the sales of the left–over pigs both in terms of price and weight.

The current relationship between the traders and slaughterers is not a balanced one in which the latter have imposed a greater influence. The slaughterers in Hanoi are sharing the same way to handle the relationship with the traders and to some extent they are setting up an oligopsony, the term used to define an input market which is dominated by a number of buyers which is much smaller than the number of the sellers. The buyers (in this case, the slaughterers), in an implicit way, have squeezed a higher portion of profit out of the difference between the carcass price and purchase price that the traders have to pay for their inputs. The characteristics of an oligopsony are not quite apparent as the products (live pigs/carcass) involved in the market are not standardized and the prices of them vary from one to another. The slaughterers are trying to enlarge their share of profit as much as possible while leaving the traders with the profits only enough to keep them stay in business. All the traders in my survey stated that their income is instable, one of them claimed huge losses have forced him out of the market and he had to turn to shorter channels inside his province.

The traders usually get paid immediately for the pigs slaughtered right after delivery at the abattoirs. For the pigs left over the next days, the traders would receive a pay in advance of around VND500,000 that is

**Table 1.** Price shares

Item	Unit price (VND/kg)	Weight (Kg)	Amount (VND)	Note
Live pigs	15,000	70	1,050,000	Cost of live pigs (1)
Carcass (70%)	21,000	49	1,029,000	Sales to retailers (2)
Internal organs	1,500	49 applicable	73,500	Sales to specific processor (3)
				(3) = (4) + (5)
	1,000	49	49,000	Paid to traders (4)
	500	49	24,500	Paid to slaughterers (5)
Receipt by traders			1,078,000	(6) = (2) + (4)
Income for traders			28,000	= (6)–(1)
Receipt by slaughterer			24,500	= (5)

Source: Minh's survey 2005

about half of a value per one pig. The rest would be paid later when the pigs are killed and sold. This method of payment reflects the dependence of the traders on the finance support from the slaughterers. On the other hand, the slaughterers also maintain the payment to keep the partnership with the traders and hence ensure their supply. The advance payments to some extent represent a barrier against the exit of the traders from the relation with his slaughterer partners.

THE RELATIONSHIP BETWEEN LIVE PIG PRICE AND PORK RETAIL PRICE

Descriptive analysis suggested that there is no cointegration between the market of pork and the market of pigs because the middle men especially slaughterers are intervening the market so deeply and exerting so great power in price determination process.

Cointegration tests (Johansen test) are applied to determine whether a group of non-stationary series are cointegrated or not.

Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be cointegrated. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

The objective of the analysis is to check whether there is the cointegration among Hanoi and its supplying markets. Data is therefore collected as the price of pork in Hanoi market and the prices of live pigs in the markets that supply to Hanoi, including Hanoi itself, Haiphong, Namdinh, Thaibinh and Nghe An.

The starting point for a cointegration test is based on the Vector Autoregression (VAR) which is written as follows:

$$X_{kt} = A_1 X_{kt-1} + A_2 X_{kt-2} + \dots + A_p X_{kt-p} + e_{kt}$$

Where:

k = 1, 2, ..., n refer to n markets. n = 6 in this analysis.

t = 1, 2, .....refer to the week from February 17, 2002 until December 25, 2005.

p is a priori unknown integer to be determined

$X_t$  is an n x 1 vector of wholesale market price variable and  $X_s$  are I(1).

$A_i$  is n x n matrix of coefficients

$e_{it}$  is an n x 1 vector of error terms.

The meaning of this VAR is that the price in each market does not only depend on its own lags but also the lag of other variables *i.e.* the prices of the other markets.

We may rewrite this VAR as:

$$X_t = \sum_{i=1}^{p-1} \alpha_i X_{t-i} + \sum_{i=p}^p \alpha_i X_{t-i} + \epsilon_t$$

Where  $\alpha_i$  and  $\epsilon_t$  are defined by:

$$\alpha_i = A - I \quad \text{and} \quad \alpha_j = A_j$$

is a n x n matrix of the coefficients that define  $X_t$  at p<sup>th</sup> lag.

The Johansen technique for testing for cointegration consists of testing the rank of the matrix  $\alpha$ . If the rank, r, is zero, the variables are not cointegrated; if the rank is greater than one but less than the number of variables in the vector autoregression, then the variables are cointegrated. If the matrix is of full rank, the variables are stationary and cointegration analysis is unnecessary.

Step 1: Testing for stationarity

Note that since this is a test for cointegration, this test is only valid when you are working with series that are known to be nonstationary. We start by pre-testing all variables to assess their order of integration by an Augmented Dickey Fuller (ADF) test on a unit root.

Let's start from a simple AR(1) process:

$$X_t = \alpha X_{t-1} + \epsilon_t$$

where  $\epsilon_t$  are assumed to be white noise. If  $|\alpha| \geq 1$ , X is a nonstationary series and the variance of X increases with time and approaches infinity. If  $|\alpha| < 1$ , X is a trend-stationary series. Thus the trend-stationarity can be evaluated by testing whether the absolute value of  $\alpha$  is strictly less than 1.

The standard DF test is developed from an AR(1) process by subtracting  $X_{t-1}$  from the both side.

$$X_t - X_{t-1} = \alpha(X_{t-1} - X_{t-1}) + \epsilon_t \quad \text{where } \alpha = -1.$$

The null and alternative hypotheses may be written as:

$$H_0: \alpha = 0.$$

$$H_1: \alpha < 0$$

and evaluated using the conventional t-ratio for  $\alpha$ :  $t_\alpha = \hat{\alpha} / se(\hat{\alpha})$  where  $\hat{\alpha}$  is the estimate of  $\alpha$ ; and  $se(\hat{\alpha})$  is the coefficient standard error.

The simple Dickey-Fuller unit root test described above is valid only if the series is an AR(1) process. If the series is correlated at higher order lags, the assumption of white noise disturbances is violated. The Augmented Dickey-Fuller (ADF) test constructs a parametric correction for higher-order correlation by assuming that the series follows an AR(p) process and adding lagged difference terms of the dependent variable to the right-hand side of the test regression:

$$X_t = \alpha X_{t-1} + \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + \dots + \alpha_p X_{t-p} + \epsilon_t$$

The number of lagged difference terms (which we will term the "lag length") to be added to the test regression (0 yields the standard DF test; integers greater than 0 correspond to ADF tests) should be specified. The usual (though not particularly useful) advice is to

**Table 2.** Unit root test on price series in different markets

Market	Observation	Unit root test on price levels			Unit root test on first differences		
		ADF <sup>(1)</sup>	se ( ' )	t-value <sup>(2)</sup>	ADF <sup>(1)</sup>	se ( ' )	t-value <sup>(2)</sup>
RHN	133	ADF(0)	0.025	-1.114	ADF(2)	0.148	- 8.738
FGHN	132	ADF(1)	0.045	-2.326	ADF(0)	0.082	-16.474
FGHP	131	ADF(2)	0.041	-1.667	ADF(1)	0.142	-12.004
FGND	132	ADF(1)	0.039	-2.064	ADF(0)	0.084	-15.369
FGTB	132	ADF(1)	0.030	-1.631	ADF(0)	0.082	-16.049
FGNA	133	ADF(0)	0.026	-1.766	ADF(0)	0.086	-13.354

Note: <sup>(1)</sup> the number of lags that was allowed for in the unit root test automatically based on the Schwartz criterion. ADF analysis was carried out in EVIEWS @5.1

<sup>(2)</sup> Critical values of t-statistic: t = -2.88, 5% level of significance

Source: Weekly live pig price and retail pork price from February 17, 2002 to December 25, 2005 <http://www.mard.gov.vn>

include a number of lags sufficient to remove serial correlation in the residuals. Some criteria could be used to determine the appropriate number of lags p among them are AIC, SC, HQ information criteria. In the unit root tests carried below to determine the number of lags p, Schwartz criterion was used.

The results are presented in Table 2 indicate that the price series for the five markets under study are I(1).

**Step 2: Testing for the lag length**

To proceed with Johansen test, it is necessary to set up a VAR with an appropriate number of lags.

$$X_{kt} = A_{k1}X_{kt-1} + A_{k2}X_{kt-2} + \dots + A_{kp}X_{kt-p} + e_{it}$$

To determine the lag length to be included in the VAR, we estimate another VAR with the first differences of the price series. This is to avoid the serial correlation that may lead to incorrect estimation due to the non-stationarity of the price series. The results of cointegration tests can be quite sensitive to the number of lags included in the VAR.

We use the Akaike information criterion (AIC) to

select a suitable lag length.

The Akaike Information Criterion (AIC) is computed as:

$$AIC = -2l/T + 2k/T$$

Let l be the value of the log of the likelihood function with the k parameters estimated using T observations. The lag length that is corresponding to the lowest value of the AIC should be chosen.

The VAR analysis on first differences in Table 3 shows that the smallest for AIC is obtained with lag length 1.

**Step 3: Determine the number of cointegration equations**

After the second step, the VAR for cointegration test is asserted to be as follows:

$$X_{kt} = A_{k1}X_{kt-1} + e_{kt}$$

The main task of this test is to determine the rank of and to estimate the cointegrating equations. The trace test and Max-eigenvalue test indicate that the rank of is 0 (for both trace and max tests at 95% sig-

**Table 3.** VAR analysis on pork/pig price series in different market places

	RHN1	FGHN1	FGHP1	FGND1	FGTB1	FGNA1
RHN1(-1)	-	-	-	0.155003 [2.60261]	0.139233 [2.45556]	-
FGHN1(-1)	-	-	-	-	-	-
FGHP1(-1)	-0.467957 [-2.08460]	-	0.343145 [-2.51177]	-	-	-
FGND1(-1)	-	-	-	-	-	-
FGTB1(-1)	-	-	-	-	-0.344152 [-2.63619]	-
FGNA1(-1)	-	-	-	-	-	-

Note: The results of the VAR analysis are based on one lag (with the smallest AIC). All figures in parenthesis are t-values, non significant values are omitted. Critical value of t-statistic is 1.645; significance level of 10%, two-sided test.

**Table 4.** Testing for the number of cointegrating relations

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.203962	90.34892	95.75366	0.1111
At most 1	0.180257	60.23864	69.81889	0.22 81
At most 2	0.094127	34.00175	47.85613	0.5018
At most 3	0.087184	20.95278	29.79707	0.3606
At most 4	0.048947	8.911564	15.49471	0.3736
At most 5	0.017177	2.287102	3.841466	0.1305

Trace test indicates no cointegration at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon–Haug–Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max–Eigen Statistic	0.05 Critical Value	Prob.**
None	0.203962	30.11028	40.07757	0.4167
At most 1	0.180257	26.23689	33.87687	0.3065
At most 2	0.094127	13.04897	27.58434	0.8822
At most 3	0.087184	12.04121	21.13162	0.5436
At most 4	0.048947	6.624462	14.26460	0.5345
At most 5	0.017177	2.287102	3.841466	0.1305

Max–eigenvalue test indicates no cointegration at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon–Haug–Michelis (1999) p-values

nificant level).

The test in Table 4 confirms that there is no cointegration among the markets. The distribution agents: traders, slaughterers and retailers are the chains that absorb all the changes in the prices in both the retail markets and the production markets. The policies from the government, though no one available at the moment, which target to the farmers with aim at reducing the retail prices would fail to have the same influence on the retail market. By contrast, any growth in demand that leads to increase in retail price would hardly be transferred to farmers.

#### SOME ASSESSMENTS OF THE CURRENT INSTITUTIONAL ORGANIZATION OF THE SLAUGHTERING PRACTICES

##### Strengths:

–Flexible: All the trade among traders, slaughterers and retailers are based on individual relationship so it is easy to make arrangements concerning price, delivery and payment.

–Low cost: All the trade is made directly without the involvement of any other agent except for traders, slaughterers and retailers, so the expenses are reduced.

##### Weaknesses:

–Lack of the transparency in the process of determining market equilibrium price: All the trade is individually based and price is determined by negotiations.

–Lack of competition: Because the number of traders is much larger than the slaughterers, traders for the sake

of a stable business, usually tend to set up relation with only one or two slaughterers. Traders are separated from retailers and have to depend on the slaughterers and their connections. The overdependence on the slaughterers has left the traders with no choice other than accepting the prices offered by the slaughterers. The prices of the individual negotiations therefore fail to reflect the real relation between market supply and demand.

–Lack of transparency in the way trade is handled: The weights and prices based on which the traders are paid, are determined in the way that is unfavorable for the traders.

–Poor market information: There is no system for information collection, also the information is so scattered and could not be seen as representative for the market.

–It is hard to apply inspection, quality control and grading system. As there are so many players in the distribution system, it is very hard for the application of standards of hygiene in slaughtering practices, the measures to prevent disease spreading, the standards of weighing and grading of carcasses.

–The lack of an open and clear record system in the abattoirs makes it difficult for the authorities to keep control over the taxation. The current taxing system applied to the slaughterers is based on a fixed scale, that means the tax does not depend on the actual volume of slaughter but only on the estimated one.

–Last but not the least, the current institutional organization of the slaughtering practices does not encourage improvements in production especially in small-scale farmers. As traders do not get appropriate income for



themselves, farmers are left of course with dismal profits. This creates a vicious circle where the distribution does not bring about enough economic incentives for traders and farmers, farmers will not get enough for further investment to increase the production scale and to improve the quality of meat. There are no strict requirements on the quality of pigs and sanitation of meat so even pigs of higher quality do not necessarily get a higher premium so farmers usually pay attention to lowering production costs at the sacrifice of good and healthy quality.

#### SUGGESTIONS TO IMPROVE THE CURRENT INSTITUTIONAL ORGANIZATION OF SLAUGHTERING PRACTICES

Mitendorf (1976) argues that wholesale marketing systems are necessary in cities with a population of at least one million. Hanoi has a population of more than 3 million, but is it possible to introduce wholesale market to pig distribution system in Hanoi?

Wholesale markets with the operation of the auction sale could be run in one or two ways: Wholesale markets for live pigs and Wholesale markets for pork.

The wholesale market in both cases have the following benefits:

–Improved competition. The price is where the market demand meets with supply. Market signals are reflected exactly through prices and transmitted to the farming sector in very short time.

–Greater stability of supply: The existence of centralized physical locations, known and easily accessible to operators, reduces the number of intermediaries in the distribution channel and improves the flow of information between operators thus reducing uncertainty concerning supplies.

–Improved market information: The price is determined with high transparency so it is highly reliable as a base for decision making process by operators in the distribution system.

–Improved inspection, quality control and grading according to quality: The whole market participants are sharing the same system for quality grading, measuring. The regulations concerning animal health and food sanitary are realized by applying the corresponding specifications that determine the prices for the products.

–Encourage the improvements in farming practices: As wholesale market pay higher premium for better quality, farmers are encouraged to improve the quality of their pigs.

–The application of innovation and new technologies in storage, slaughtering, handling and management would be easier if the trade is physically concentrated in wholesale markets.

Given the benefits of the wholesale markets, one would question if it is possible to improve the operation of the current slaughterhouses in Hanoi by introducing the wholesale market and auction sale? The hypothesis would be examined for the application of wholesale

market to either pork or to livepigs.

#### Wholesale markets for pork

The buyers at these wholesale markets are retailers. The number of pork retailers in Hanoi is very large at around 1900 individual stalls. The gathering of such a large number of retailers for auction sale is impractical. The modern retailing system still accounts for too small a percentage to set up a wholesale markets for themselves. At the moment, most of retailers in large traditional markets inside the city would place order to the slaughterers by telephone. Bargaining on price and other terms is made through phone. Physical gathering would cost them so much of time and cost in travelling, thus impractical. Besides, retailers in Hanoi are running a very small scale operation and face limitation on budgets. The auction sale would require that buyers have to pay on a fixed schedule if not immediately. With the large number of retailers, the management of the debts is a nearly impossible task. The retailers would oppose to this market organization and tend to deal with someone else who could give them more flexible facilities. As the last resort, the auction sale will be held only with the participation of the carcass wholesalers who then provide the retailers with necessary loans. If the number of these carcass wholesalers is not large enough to enable a competitive environment, it is very likely that those wholesalers would play same role as the current slaughterers and extend their power in setting the prices in favor of themselves.

The introduction of wholesale market and auction sale for carcasses requires the establishment of chilling or freezing facilities that enable storage for several days before the carcasses could be cleared out. This would cost a lot of money and hence represents a big obstacle.

In Japan and other countries who apply wholesale markets and auction sale for carcasses, the auction sale is attended by a small number of companies who run the retailing chains each of them would deal with a great quantities of produce. Payment obligations are therefore secured.

#### Wholesale market for live pigs

The buyers are the slaughterers and the sellers are traders/farmers. Because the farmers generally could not reach as far as Hanoi to market their animals, it is estimated that only traders could participate the auction sale. This changes the essence of relationship between traders and slaughterers. The responsibilities of the slaughterers are widened as the owners of the live pigs after the auction sale until the carcasses are sold to the retailers. In the current operation, the slaughterers do not assume any risks whatever the price is paid for the carcasses. The introduction of wholesale markets would face the hesitation if not offense by the slaughterers. Note that the slaughterers are enjoying their favourable position over the traders in the current system.

The traders, on the other hand, may also shun the auction sale because they are not sure if they could sell their pigs. Given the fact that the traders are used to

relying on the slaughterers to market their pigs, they may be reluctant at the risk they face as long as the auction sale has not well shaped especially in the initial stage.

Besides, the introduction of wholesale market and auction sale, either for live pigs or for carcasses would face the following restrictions:

–People in the North in general have the habits of solving all the problems personally or within a small community and do not welcome the intervention of outsiders in making their own decisions. The wholesale market requires the cooperation among the agents as they have to work under the common regulations and strict procedures.

–After all, if the traders, slaughterers and retailers are not welcoming the auction sale, they will find their ways to other sources of pork. One most likely result would be the increasing amount of carcasses killed outside of Hanoi and carried into the city. The current slaughterers may move to locate their operation in the outskirts of the city to avoid any formal regulations on the business. In that case, it will be much more difficult to control the sanitary conditions of the abattoirs.

In brief, the introduction of wholesale market and auction sale for live pigs is more feasible than for carcasses. Yet, many conditions are there to be met even for the wholesale market application to live pigs:

–To move the existing slaughterhouses to the gathering site which is large enough for the live animals and traders who accompany them. The site must provide facilities for wholesale activities.

–To prohibit all the movements of carcasses from outside the city.

–To enforce the regulations that all the live pigs to Hanoi must be sold at the wholesale markets.

The latter two conditions are very hard to be met given the current law infrastructure in Hanoi.

One of the biggest obstacles against the transparency and competition in the distribution system of pigs and pork in Hanoi is the excessive power of the slaughterers. One would question if the efficiency of the system could be improved by separating the slaughterers from selling practices?

If the slaughterers are limited to providing the service of slaughtering only, a wholesale agent (might be the local authority) should be set up to monitor the sale. The sale might be conducted as ordinary sale, not auction. The carcasses still belong to traders until being sold to retailers.

–Orders must be made early, at least from the previous night to prevent any excess in slaughter numbers. As no storage facilities are available, the oversupply of carcasses means that the traders have to accept very low prices for their pigs.

–Pig pens should be provided for the pigs left unsold within the day. Feed, water and care should be provided at fees.

–Payment schedule must be controlled strictly. Deposits might be necessary for those who want to buy the carcasses on credit.

Whatever the changes to be made, the slaughterers will be the first to oppose because their power will be cut down. Their responsibilities will be enlarged with imbalanced increase in benefits. Otherwise, they will be limited in providing slaughtering service only. The slaughterers if deprived of the current advantages may try to set up their own facilities outside the city. If the prohibition of transportation of carcasses from outside the city could not be made effective, the market control would have to face another danger. Any changes in the physical or institutional organization would be accepted by the players only if such changes prove themselves to be convenient, compulsory arrangement will not work.

Last but not the least, given the current small-scaled production system dominating, it is advisable to promote the modern retailing system. Supports from the government, if any, should be directed to the marketing of frozen/chilled pork through the supermarkets, hypermarkets, etc. If the frozen/chilled pork could be sold at low price as the fresh pork at the traditional market, it will become more popular. If the sales by the modern retailing system is improved, the demand for pigs from large-scaled farms will increase, creating incentives for the development of the commercial livestock industry.

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