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The Direct Economic Effects of Stricter Standards towards the Protection of Human and Animal Health in Swine Sector

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THE DIRECT ECONOMIC EFFECTS OF STRICTER STANDARDS TOWARDS THE PROTECTION OF HUMAN AND ANIMAL HEALTH IN SWINE SECTOR

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Abstract

The objective of this study is to present the results of a research carried out on a group of farms involved in pig fattening (48 farms) to evaluate the economic impact of implementing human and animal health regulation. The five types considered in any case represent 90-95% of the total health costs, there are therefore economies of scale and considering the types of expenditure, veterinary medicines have a strong incidence on fattening farms, together with medicated feed for consumption on the farm and the control of Aujeszky's disease. The overall health costs have on average reached the 2% of total costs and the same value of the net income.

Keywords

Human health

Animal health

Standards

Economic impact

Introduction

Since the beginning of the 1990s, the process of legal harmonisation within the European Union has led to a revision of the legal fabric of the zoo-technical and veterinary sector in Italy, the subject of this study, as in all other Member States. This remarkable legal review concerning animal breeding for human consumption, which for some aspects is still ongoing, has in just a few years modified a legal structure dating back more than half a century, fully inspired by the Italian law no. 320 of 8th February 1954, the Veterinary Police Regulation. This regulation lasted for only a short time, soon to be replaced by a copious regulation that was often late in being put into practice and not always with clear instructions.

In this context, which due to its own intrinsic nature and due to the structure of the farmers to whom it applies (above all in those environments with a majority of small and very small zoo-technical concerns) is already complex, we have seen a progressive weighing down of the health regulations, which have aimed at achieving the primary objective of consumer protection, through the control of the hygiene and health aspects of the production chain. The economic resources the farms need to reach these objectives are only partly aimed at animal health (programs of animal diseases), and therefore only allow an economic return for the farmer through the increase in zoo-technical production in both quality and quantity terms, but are above all aimed at greater food safety.

This has led to the need for the farmers to modify their structures, to request the consultancy and other kinds of interventions from external companies, to activate the records procedures required by the health regulations in force, and to manage the collection of linked documentation, adopting internal hygiene and sanitary controls for the production of animal feed (HACCP standards).

These activities have led to an increase in quality for company management, which requires a change in mentality for both the farm owners and their families and workers, and increased commitment in terms of financial and human resources to carry out these activities.

The objective of this study is to present the results of the research carried out on a group of farms involved in pig fattening, closed cycle and open cycle reproduction (48 farms subdivided according to their size) to evaluate the economic impact of implementing the human and animal health regulation.

The farms are located in an important area : Padana Plain in Italy.

Materials and methods

The total group for each category was twelve farms, divided as follows:

Type A	12 FATTENING farms	---	5,000 pigs
Type B	12 BREEDING farms	250 sows	4,500 pigs
Type C	12 BREEDING farms	500 sows	9,000 pigs
Type D	12 BREEDING farms	1,000 sows	18,000 pigs

The first aspect considered, which required a decision to be taken to allow for the correct management of the survey, was the identification of the health regulations that had the greatest economic impact on the pig farms, in order to leave aside those with very little or no impact at all.

We then decided to consider 5 specific sectors of those health regulations that had a strong economic impact (the first four have impact on human health; the last one only on pig health and ... farmer income !):

1. Farm management of veterinary medicines (medicinal specialities, pre-produced veterinary medicines);
2. Farm management of medicated feed produced on the farm using medicated pre-mixes for consumption by the animals bred on the farm;
3. Farm management of feed integrated with additives or pre-mixes produced on the farm for consumption by the animals bred on the farm;
4. Pig breeding farm records and the management of tattoos and the stock accounts for the pigs held on the farm;
5. Control and eradication of Aujeszky's disease according to the instructions in the Italian Plan.

It is clear that these are important health matters that, we repeat, do not completely cover the whole economic outlay of the farms in applying the health regulations, but they do represent a very large portion of it.

A further aspect that required deep thought and careful decision in order to make a correct assessment of veterinary costs lay in the different contractual methods adopted between the farmer requiring veterinary assistance and the vet offering his services.

There are three main ways of managing this relationship:

- Direct payment of the services effectively delivered on the basis of the regional tariffs;
- Payment of the number of hours of service delivered on the basis of an hourly rate contract;
- Payment based on an all-inclusive annual contract.

The three vets who collaborated in the determination of the considered farm costs used the third method of payment, with an annual fee covering all veterinary activities performed on the farm¹.

As far as the non-veterinary activities under the health regulations (such as ear tattooing or the physical containment of animals during vaccination against Aujeszky's disease), we calculated the time needed to carry out a certain number of interventions (e.g. tattooing or vaccinating 100 pigs), calculating the cost on the basis of the hourly rate of the operator and dividing it by the number of interventions.

One particular aspect of the operational support activities emerged from the realisation that, above all in small farms, most of the non-veterinary activities are carried out by the farm owner or his relatives (e.g. keeping the pig stock accounts). In this case, and for practical reasons, we decided to calculate these activities as if they had been carried out by an employee, using the above-described methods.

¹ Because of this contractual method, in order to evaluate the costs of a given intervention (e.g. entering a veterinary medicinal treatment given in the treatment records) each vet apportioned the total time dedicated to the farm in question to the various activities considered. In this context and using this method, it was possible to allocate the costs for each veterinary activity, which will be described in more detail below.

Health regulations considered for cost determination purposes

1. Farm management of veterinary medicines

Up until 1991, veterinary medicines were sold to and used in farms without any specific regulations to govern their use. The public health operator wishing to carry out any pharmaceutical surveillance activities had to rely, often inappropriately, on the existing regulations governing pharmaceuticals for human use.

Since 1992, with the introduction of Italian legislative decree no. 119, this situation has changed greatly, and the legislators have imposed very detailed regulations also for the sale and use of veterinary medicines. Later, following the transposition of various European community directives, the regulation has been broadened to cover other matters.

2. In-house production of medicated feeds for consumption on the farm

Italian legislative decree no. 90 of 3rd March 1993 (regulation for the implementation of the community Council Directive 90/167/EC) radically innovated the regulations on the production of medicated feed, placing them on the same level as veterinary medicines, and making it necessary for all farmers wishing to produce medicated feeds using the medicated pre-mixes available on the market for the consumption by their own animals to possess a ministerial authorisation issued on the basis of well-defined structural, health and hygiene requirements.

3. Rules on in-farm production of feed containing additives or additive pre-mixes

Italian legislative decree no. 123 of 13th April 1999 regulated the sector concerning the production, marketing and use of additives and additive pre-mixes (this decree is connected with the Italian presidential decree no.433/2001, regulation for the implementation of the community legislation on animal feed, Council Directive 95/69/EC).

As this law foresees two levels of authorisation of farmers wishing to use additives or additive pre-mixes in feed for consumption on the farm, approval and registration, according to the type of additive used and the level of danger connected to such use, and as the minimum requirements for recognition are fairly complex, and have a greater bearing in economic terms compared to those for registration, separate management costs have been established for the two different levels of authorisation.

4. Pig identification and registration

With the Italian Presidential Decree no. 317 of 30th April 1996, the Directive 92/102/EEC was applied and the obligation was established for farmers to identify and register some animal species, including pigs.

The main objective of this regulation is to ensure the application of a system for some species that permits the correlation of the animal with its original farm, and through registration, to be able to trace the commercial movements of the animals.

5. Control and eradication of Aujeszky's disease according to the instructions in the Italian Plan.

The reference regulation is the Italian Presidential Decree of 1st April 1997, regulation for the implementation of the directive 64/432/EEC and 93/24/EEC and 93/244/EEC concerning the Control and eradication of Aujeszky's disease.

Cost analysis

We calculated the various costs for the farmers generated by the application of the regulations, and in this chapter we will analyse the total and average (per head) costs.

The calculations made are based on the data provided by the Chamber of Commerce of Mantua concerning the average production of the province for the year 2002².

1. Veterinary medicines

The storage and administration of veterinary medicines generate the following costs:

² To calculate the cost per head, we had to consider: depreciation of the structure over 5 years, an average of 18 piglets per sow per year and an average pig weight of 160 kg.

1. Costs for the application and authorisation on legal paper and official veterinary site visit to verify the suitability of the storage area.
2. Documentation to support the application (planimetries, technical reports).
3. Costs of veterinary prescriptions for the purchase of veterinary medicines in accordance with article 32, or for the replenishment of the stores of veterinary medicines in accordance with article 34, and costs for holding the stock accounts for the veterinary medicine stores (article 34).
4. Costs for maintaining the veterinary medicine treatment records in accordance with article 15 of Italian legislative decree 336/99 and article 33 of Italian legislative decree 119/92.
5. Costs for any immunisation treatments other than those against Aujeszky's disease.
6. Costs for the issue of the declarations of completed pig treatment in the 90-day period preceding the date the pigs are sent for slaughter.

Table 1: Total Costs for “veterinary medicines” per head.

	Euro per head
Type A	1.0780
Type B	0.7811
Type C	0.7489
Type D	0.7328

In table 1 there are the sum of six different costs generated by veterinary medicines, for each pig on the farm. We can see that for this type there is a great difference between the different farms: those for fattening farms are very much higher (+0.3 hundredths per head) and for breeding farms, the larger the size the lower the costs per head. Each cost has a different incidence on the total, in this case we can see that for all 4 farm types the highest incidence is given by point 2, “costs for veterinary prescriptions and costs for holding veterinary medicine stock accounts”. The lowest incidence is given by point 1, “health authorisation”, and these costs tend to decrease as the farm size increases.

2. Medicated feed for consumption on the farm

The storage and administration of medicated feed for consumption on the farm generate the following costs:

1. Costs for the application and authorisation on legal paper and provincial commission site visit to verify the suitability of the storage area and equipment.
2. Documentation to support the application (planimetries, technical reports).
3. Costs relative to structural requirements expressly required under the ministerial authorisation: suction system, washing and waste water drainage and collection system, rooms with washable walls and floors, hygiene area with toilet and shower facilities, pest control.
4. Costs for laboratory analyses to verify the uniformity, stability and preservability of the produced medicated feed.
5. Regular keeping of production records and medicated feed analysis records and prescription activities concerning the medicated feed treatments.

Table 2: Costs for “medicated feed” per head.

	Euro per head
Type A	1.0480
Type B	0.9700
Type C	0.4989
Type D	0.2633

Table 2 shows the five different costs generated from the production of medicated feed for consumption on the farm, per pig present on the farm. We can see that for this type of cost there is a slight difference among the different farms: those of the fattening farms were 0.078 hundredths of a euro higher than those of breeding farms of the same size; while there is a much greater difference when comparing only breeding farms; the larger the size, the smaller the cost per head. For all four farm types around 95% of costs are

generated by point 3 and point 5, which are the costs for structural requirements of the ministerial authorisation: suction system, washing and waste water drainage and collection system, rooms with washable walls and floors, hygiene area with toilet and shower facilities, pest control (75 – 92%) and regular keeping of production records and medicated feed analysis records and prescription activities concerning the medicated feed treatments (3 – 19%).

3. Feed containing additives or additive pre-mixes

In-house production on the farm of feed containing additives or additive pre-mixes generates the following costs:

For “approved” farms

1. Application for and issue of the recognition, site visit by veterinary doctor and attached documentation (planimetries, technical reports etc.).
2. Organisation of the written procedures by a qualified external consultant responsible for production and quality control (quality control plan), identification and control of critical points in the production process (HACCP plan), management of non-conformities, identification and preservation of samples.
3. Costs for laboratory analyses to verify the uniformity, stability and preservability of the produced feed.
4. Stock accounts management for the integrated feed produced.

Table 3: Costs for feed containing additives or additive pre-mixes for approved farms, per head.

	Euro per head
Type A	0.3480
Type B	0.1922
Type C	0.1378
Type D	0.0967

Table 3 represents the four costs generated for feed containing additives or additive pre-mixes, per single pig present on approved farms. From the table we can conclude that for recognised fattening farms the costs are almost double those for breeding farms, and it can be seen that, as the number of sows increases, and thus the number of pigs bred increases, the costs per head tend to decrease. The incidence of the single costs on the total costs generated. 80-86% of the costs are generated by point 2 and point 4: organisation of the written procedures by a qualified external consultant responsible for production and quality control (quality control plan), identification and control of critical points in the production process, management of non-conformities, identification and preservation of samples (28 – 60%) and stock accounts management for the integrated feed produced (14 – 57%). Fattening farms have a higher incidence for point 4, which brings the total costs to almost double those of a breeding farm of the same size.

For “registered” farms

1. Application for and issue of the recognition, site visit by veterinary doctor and attached documentation (planimetries, technical reports etc.).
2. Organisation and preparation of the quality control plan.
3. Costs for laboratory analyses to verify the uniformity, stability and preservability of the produced feed.
4. Stock accounts management for the integrated feed produced.

Table 4: Costs for feed containing additives or additive pre-mixes for registered farms, per head.

	Euro per head
Type A	0.2880
Type B	0.1256
Type C	0.0878
Type D	0.0633

Table 4 represent the costs for registered farms, and are similar to the tables for the approved farms (Table 3), and it can be seen that even though the costs are slightly lower, also in this case around 80% of the costs

are generated by points 2 and 4: organisation and preparation of the quality control plan (14 – 37%) and stock accounts management for the integrated feed produced (22 – 69%). Also in the registered farms, fattening farms have higher costs that are generated by the greater value of point 4, stock accounts management.

4. Pig tattooing and registering

Pig tattooing and registering activities generate the following costs:

1. Costs for ear marking (these costs are calculated on the basis of the time taken by two operators for tattooing activities during the year).
2. Costs for pig stock accounts management (calculated on the basis of the time taken for one operator to carry out the registrations during the year).

Table 5: Costs of ear marking, per head.

	Euro per head
Type A	0.0700
Type B	0.3889
Type C	0.3889
Type D	0.3889

Table 5 shows how the costs are generated on the farm. We can see that in fattening farms there are no tattooing costs, as the pigs are tattooed before reaching these farms, and this cost is therefore indirect, when purchasing the piglets. For breeding farms there are no fixed costs, but only variable costs, and the cost per head is the same whatever the size of the farm (0.3889 euros), mainly due to cost for ear marking in terms of time (point 1).

5. Implementation of the Aujeszky's disease control plan

The costs relative to the implementation of the Aujeszky's disease control plan are the following:

1. Costs relating to 3 vaccinations for each fattening pig and for each breeding pig (these costs are evaluated considering the cost of 3 doses of vaccine, live deleted for fattening pigs and inactivated deleted for breeding pigs, the cost of the veterinary intervention and the cost of a collaborator).
2. Costs for serological tests on blood samples to maintain the disease-free farm status (four-monthly testing). The testing is done on a sample of sows, the number of which is set in specific tables.

Table 6: Costs relative to the implementation of the Aujeszky's disease control plan, per head.

	Euro per head
Type A	1.0172
Type B	1.3747
Type C	1.3373
Type D	1.3187

Looking at table 6, we can see how the fattening farms of the same size have lower costs because the live deleted vaccine costs less than the inactivated deleted one, which is used only in breeding farms, and we can also see that the cost is directly attributable to each pig and is 1.30 euros. The costs of implementing the Aujeszky's disease control plan are mostly generated by point 1, costs for 3 vaccinations for each fattening pig and for each breeding pig (93 – 98%), and we can also see that as the size of the breeding farm increases also point 2, the costs for the serological tests on blood samples to maintain the disease-free farm status, decreases as production increases as the number of sow samples to be submitted for serological testing is still the same.

6. Total costs generated by health regulations

In the previous paragraphs we have analysed the single incidence of costs on the five types of health costs; we will now establish the total health cost and the single incidences.

As we have said before, the five types we have examined represent 90 – 95% of the total health costs, therefore to find the total health cost we must make a proportion, establishing a conversion value of 92.5%. As far as costs for feed containing additives or additive pre-mixes are concerned, we will use an average of the two types of farm: *recognised* farm and *approved* farm .

Table 7: Total of the five health costs per head.

	Euro per head
Type A	3.5312
Type B	3.6736
Type C	3.0868
Type D	2.7837

Table 8: Incidence in percentage terms of each cost on the total health costs.

	Cost 1	Cost 2	Cost 3	Cost 4	Cost 5
Type A	28.24	27.45	8.33	1.83	26.65
Type B	19.67	24.42	4.00	9.79	34.61
Type C	22.44	14.95	3.38	11.65	40.08
Type D	24.35	8.75	2.66	12.92	43.82

Note: The five costs analysed represent approximately 92.5% of the total health costs.

Table 7 shows the total health costs for the farms. From the tables we can see that costs decrease as farm size increases, all due to the lower incidence of fixed costs on the total costs.

Table 8 shows our analysis of the percentage incidence for each type of health cost, in fattening farms, veterinary medicines, medicated feed for consumption on the farm and the control of Aujeszky’s disease are very important. For breeding farms, on the other hand, there is a greater incidence of costs generated by the control of Aujeszky’s disease, as these are variable costs only and have a greater incidence over a total of lower total costs; in fact, as farm size increases, and total health costs per head decrease, the incidence of the latter costs increases.

The total breeding cost of a pig can vary greatly depending on the type and size of the farm, in fact the interval may run from a minimum of 180 euros, for medium-large farms, to a maximum of 215 euros for small farms so the “health regulation” represent 1.6-2% of the total costs.

Conclusions

Over the past six years there has been a decrease in the number of farms (around 20%), but the graph highlights the general trend of the whole sector: if we make our analysis according to farms, we can see that the small farms have greatly decreased in number, in contrast to the medium-large farms, which have seen an increase. This increase stems from the passage of some smaller farms to a medium-large size.

The health regulations for farms generate not only the direct costs we have analysed here, but also indirect costs, including:

- the management of veterinary medicines, meaning that the farm must obligatorily use special medicines, which are very expensive;
- the production of medicated feed for consumption on the farm and feed containing additives and additive pre-mixes costs more than the production of feed without these substances;
- the laws of the market teach us that the larger the farm, the greater the influence it can have on the market, therefore a medium-large farm producing 18,000 pigs a year has greater raw materials purchasing power than a farm producing 5,000 pigs a year.

The statistics show us that over the past few years, starting from the “mad cow” period when the price of pork per kilo reached extremely high levels, and allowed everyone to make a profit, the smaller farms have begun to close or increase in size, precisely because the management costs are too high, and the farmer is no longer able to generate positive economic results.

Small farms are destined to close not only because the incidence of costs is much higher than in larger farms, but also because the costs themselves cover all of the gross margin.

The closure, or prospect of closure of these small farms is destined to have a negative impact on the local and national agribusiness and economy; to allow these farms to survive, we need either to offer incentives to

the farmers, through subsidies to increase the size of the business, or incentives to farmers to create consortia or cooperatives in order to have greater contractual power on the market, spreading the various fixed costs that these would be obliged to bear directly or exclusively across all the participating small farms.

The coming in force of the animal welfare Community regulations (Directive 93/2001 and 88/2001) would generate new direct and indirect costs. This probably means that the general trend of the whole sector is to become more and more concentrated.

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