

ECONOMICS OF PIG FARMING IN GREECE

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ABSTRACT

In this paper an attempt is made to present the economics of pig farming based on the reproductive data of 11,270 sows from 42 pig farms and three Research Stations of Animal Husbandry and the physical and economic data of 18 modern and well organized pig farms from the regions with the biggest pork production in our country. The economics of pig farming in Greece is not satisfactory when the number of piglets produced and fattened is 15 and lower per sow per year, since it is impossible for gross return to cover production costs. On the other hand, a pig farm which produces and fattens 18 piglets per sow per year is viable but not competitive. On the contrary, pig farms which produce and fatten more than 18 piglets per sow per year are not only viable but also competitive. It is believed that the viability and competitiveness of the Greek pig farming must be based on the increase of the productivity of sows up to at least 20 pigs fattened per year, the decrease of the feed required per piglet of 25 kgs l.w. to 90 kgs and its price to 25 ECU per 100 kgs, the increase of the average daily gain over 700 grams, the decrease of the feed conversion rate under 2.80 and the decrease of the interest rate of short and long term loans under 10%.

RÉSUMÉ

Ce travail porte sur l'économie de l'élevage porcin basée sur les données de reproduction de 11270 truies provenant de 42 exploitations d'élevage porcin et trois Stations de Recherche de l'Exploitation du Bétail ainsi que sur les données physiques et économiques de 18 exploitations d'élevage porcin des régions ayant la plus grande production de porcins en Grèce. L'économie de l'élevage porcin en Grèce n'est pas satisfaisante lorsque le nombre de porcelets produits et engraisés est inférieur ou égal à 15 par truie par an, car il est impossible de couvrir les coûts de production par les bénéfices bruts. D'autre part, une exploitation de porcins qui produit et engraisse 18 porcelets par truie par an est viable mais non compétitive. Au contraire, les exploitations de l'élevage porcin qui produisent et engraisent plus de 18 porcelets par truie par an sont viables et compétitives aussi. On est convaincu que la viabilité et la compétitivité de l'élevage porcin grec doivent être basées sur l'augmentation de la productivité des truies jusqu'à 20 porcs au moins engraisés par an, sur la diminution de fourrage requis par porcelet de 25 kilos poids vif à 90 kg et son prix à 25 ECU par 100 kilos, sur l'augmentation du gain moyen journalier au-dessus de 700 grammes, sur la diminution du taux d'utilisation du fourrage au-dessous de 2,80 et sur la diminution du taux d'intérêt des prêts à court et long terme inférieur à 10%.

Pig farming is nowadays one of the most important branches of our livestock economy, taking into account that it contributes 30% to the total meat production and it covers about 60% of the total pig meat needed annually.

Modern pig farming began its development in our country during the 1950-60 decade by creating family pig farms of 10-30 sows for covering small needs in pork.

The increase of demand in meat because of the increase in the standard of living and tourism and the inability of covering the increased demand in red meat (beef and mutton) had as a result the fast increase of the production of white meat (pork and poultry).

This fast increase began during the 1970-80 decade by creating both large size of the business type (200-500 sows per farm) and small and medium size of the family type (50-200 sows per farm) pig farms.

A special investigation in 1994 showed that there were 920 pig farms with a total 124,200 sows, namely an average size of 135 sows. It is believed that in 1997 the average size is at least 150 sows, because the number of small size pig farms continually decreases.

This paper attempts to present the economics of pig farming according to the number of pigs produced per sow per year (average, \bar{X} , average minus two standard

deviations $\bar{X}-2S$, average plus two standard deviations $\bar{X}+2S$).

More specifically, this paper presents the cost of producing a piglet of 25 kgs l.w., the cost of fattening pigs (e.g. from 25 to 100 kgs l.w.) per kgs l.w. and the returns, costs, profits, incomes and return to capital per sow per year and per fattening pig per year.

The data used are based on the reproductive data of 11,270 sows from 42 pig farms and three Research Stations of Animal Production and the physical and economic data of 18 modern and well organized pig farms from the regions with the biggest pork production in our country.

The selection of pig farmers was made in a systematic way and not randomly, because of the inability and unwillingness of the majority of them to keep detailed, reliable and accurate reproductive, physical and economic data for a long period.

The economic data refer to 1997 and are expressed in ECU.

TECHNICAL AND ECONOMIC ANALYSIS OF PIG FARMING

Reproductive, physical and economic data for breeding and fattening according to the number of pigs produced per sow per year

Table 1 shows on the one hand the reproductive, physical and economic data from the first mating of sows until the final live weight of fattening pigs, and on the other the physical and economic data referring to

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Table 1 Reproductive, physical and economic data for breeding and fattening according to the number of pigs produced per sow per year.

Physical and economic data for breeding and fattening	$\bar{X}-2S$	\bar{X}	$\bar{X}+2S$
Number of piglets born alive/sow/litter	9.2	9.7	10.2
Mortality of piglets during the suckling period (7 kgs l.w.) %	16.0	13.0	10.0
Number of piglets weaned (7 kgs l.w.)/sow/litter	7.7	8.4	9.2
Mortality of piglets during growing period (from 7 to 25 kgs l.w.) %	2.5	1.5	1.0
Number of piglets of 25 kgs l.w./sow/litter	7.5	8.3	9.1
Mortality of pigs during prefattening and fattening period (from 25 to 100 kgs l.w.)	2.5	2.5	2.0
Number of pigs finishing (100 kgs l.w.)/sow/litter	7.3	8.1	8.9
Number of litters/sow/year	2.05	2.15	2.25
Number of pigs finishing (100 kgs l.w.)/sow/year	15.0	17.5	20.0
Starting live weight in kgs	25.0	25.0	25.0
Finishing live weight in kgs	100.0	100.0	100.0
Average daily gain of pigs between 25 and 100 kgs l.w. (gram)	641	664	688
Average duration during prefattening and fattening period in days	117	113	109
Feed required by sow, boar and piglets/piglet of 25 kgs l.w. in kgs	115.7	105.4	96.9
Average feed price for sow, boar and piglets 25 kgs l.w. (E.C.U./100 kgs)	26.1	26.3	26.5
Feed required by a pig from 25 to 100 kgs l.w. in kgs	240.1	230.3	220.5
Average feed price for pigs prefattening and fattening (E.C.U./100 kgs)	24.3	24.3	24.3
Feed conversion rate (from 25 to 100 kgs l.w.)	3.20	3.07	2.94
Sow replacement rate (%)	37	37	37
Boar " " (%)	50	50	50
Average number of sows per boar	17.85	17.85	17.85
Total investment in land, buildings and machinery for breeding and fattening/sow in E.C.U.	2,964	2,964	2,964
Labour required for breeding and fattening/sow/year in hours	47.9	51.2	54.5
Labour wages/hour in E.C.U.	3.29	3.29	3.29
Finance of total investment by borrowed capital (%)	70	70	70
Interest rate (%) of long term loans	16	16	16
Finance of total investment by own capital (%)	30	30	30
Interest rate (%) of long term own capital	8	8	8
Finance of current assets by borrowed capital (%)	50	50	50
Interest rate (%) of short term loans	17	17	17
Finance of current assets by own capital (%)	50	50	50
Interest rate (%) of short term own capital	8.5	8.5	8.5
Purchase price of a sow (E.C.U.)	296.4	296.4	296.4
Selling price (culled) of a sow (E.C.U.)	131.7	131.7	131.7
Purchase price of a boar (E.C.U.)	724.5	724.5	724.5
Selling price (culled) of a boar (E.C.U.)	164.6	164.6	164.6

labour, buildings, livestock, miscellaneous expenses and interest. More specifically, this table presents the number of piglets born, weaned, growing, prefattening and fattening per litter and year per sow, the average daily gain of pigs during fattening period and the feed conversion rate, the feed required and its price of sow, boar and piglets of 25 kgs l.w. per piglet and the corresponding ones of a pig from 25 to 100 kgs l.w.

This table also presents the labour required for breeding and fattening per sow and its wages, the total investment in land, buildings and machinery, the value of sows and boar, the miscellaneous expenses and the interest of long and short term loans and own capital. Taking into account the above mentioned reproductive, physical and economic data, we see the low productivity of sows, the low average daily gain of pigs fattened, the high feed conversion rate, the high feed quantity required per piglet of 25 kgs l.w. and per pig fattened, the high labour required and the high interest rate of

long and short term loans in relation to other countries-members of the European Union and especially to Denmark and the Netherlands which are the main competitors of Greece.

Costs of producing a piglet of 25 kgs l.w. according to the number of piglets produced per sow per year

Of the six various kinds of expenses for producing a piglet of 25 kgs l.w., the most important are those of feed (46.5-48.5%) and interest of buildings, machinery, livestock and current assets (17.2-15.9%), which represent the 63.7-64.4% of the total costs. This is due on the one hand to the high average quantity of feed required and its price, and on the other to the high interest rate of the long and short term loans (**table 2**). Although the fluctuation of the total cost of producing piglets of 25 kgs l.w. per sow per year is very small (1,000.8-1,084.5 ECU) in relation to the number of piglets produced (15,375-20,475), the cost of producing a piglet however differs considerably (65.1 to 53.0 ECU).

This is due to the fact that some expenses (e.g. 3, 4 and 6) remain unchanged in relation to the number of piglets produced.

In other words, a lot of expenses show a very small increase in comparison to the number of piglets produced. So the cost of producing a piglet of 25 kgs l.w. decreases 18.6%, when the number of them increases 33.2%.

Table 2 Costs for producing a piglet of 25 kgs l.w. according to the number of piglets produced per sow per year.

Data of costs for producing piglets	$\bar{X}-2S$ 15,375	\bar{X} 17,845	$\bar{X}+2S$ 20,475	
I. Costs of producing piglets of 25 kgs l.w./sow/year				
1. Labour costs	%	10.2	10.5	10.8
2. Feed	"	46.5	47.5	48.5
3. Depreciation, maintenance and insurance of buildings and machinery	"	7.8	7.5	7.2
4. Depreciation and mortality of sow and boar	"	8.2	7.9	7.5
5. Miscellaneous costs	"	10.1	10.1	10.1
6. Interest of buildings, machinery, livestock and current assets	"	17.2	16.5	15.9
Total in E.C.U.	1,000.8	1,042.5	1,084.5	
II. Number of piglets produced of 25 kgs l.w./sow/year	15,375	17,845	20,475	
III. Costs of producing a piglet of 25 kgs l.w. in E.C.U.	65.1	58.4	53.0	

Cost of fattening pigs according to the number of pigs fattened per sow per year

Of the five various kinds of expenses for fattening pigs from 25 to 100 kgs l.w., the most important are those of feed (66.8-70.1%) and interest of buildings, machinery and current assets (14.4-12.8%), which represent the 81.2-82.9% of the total costs. This is due to the same factors mentioned in the case of the cost of producing piglets (**table 3**). The increase of the total costs of fattening is smaller (16.7%) than that of the total l.w. produced (33.3%) according to the number of pigs fattened per sow per year, due to the very small change of some expenses (e.g. 1, 3, 4 and 5). The result of this difference is the decrease of the costs of fattening from 1.164 to 1.019 (namely 12.5%) ECU per kgs l.w.

Returns, costs, profits and incomes of pig farming (breeding and fattening) according to the total production per sow per year

The gross return per sow per year increases from 2,113.5 to 2,818.0 ECU when the total production per sow per year increases from 1,500 to 2,000 kgs l.w. This increase of the gross return is the same (33.3%) as the corresponding increase in the number of pigs fattened (15 to 20 e.g. 33.3%), because the price is independent of the total l.w. produced (**table 4**). Of the various kinds of expenses of a sow per year from first mating until final l.w. of pigs fattened, the most important are those of feed (58.0-61.1%) and interest of buildings, machinery, livestock and current assets (15.6-14.1%), which represent the 73.6-75.2% of the total costs. Although the total costs increase from 2,310.7 to 2,612.9 ECU per sow per year (namely 13.1%), the cost of production however decreases from 1.540 to 1.306 ECU per kgs l.w. or from 2.001 to 1.697 ECU per kgs carcass (namely 15.2%), because of faster increase of the total production (33.3%) instead of total costs (13.1%). Comparing gross return and total costs we see that when the number of pigs fattened fluctuates between 15.0 and 17.5 or the total production between 1,500 and 1,750 kgs l.w. per sow per year, the first is impossible to cover the latter, which means a loss between 197.2

and 2.2 ECU per sow per year. On the contrary, when the number of pigs fattened is 20 or the total production is 2,000 kgs l.w. per sow per year, the first covers the latter which means a profit 205.1 ECU. In other words, under the reproductive, physical and economic conditions of our country the break-even is 18 fattened pigs or the production 1,800 kgs l.w. per sow per year. The farm family income (e.g. labour wages, interest of own capital plus profits or minus loss) increases rapidly (from 65.0 to 491.6 ECU per sow per year, e.g. 7.56 times) when the number of pigs fattened increases 0.33 times. This financial result is very important for family pig farming in Greece. The same is true for the return to capital, since it increases 3.4 times when the number of pigs fattened increases 0.33 times. A comparison between return to capital and average interest rate shows the relation 6.4/14.1 for 15 pigs, 14.0/14.1 for 17.5 pigs and 21.9/14.1 for 20 pigs fattened per sow per year. This means that a good utilization of capital invested in pig farming requires a sow with a productivity of at

Table 3 Costs of fattening according to the number of pigs fattened per sow per year.

Data of costs of fattening pigs	$\bar{X}-2S$ 15.0	\bar{X} 17.5	$\bar{X}+2S$ 20.0	
I. Costs of fattening pigs from 25 to 100 kgs l.w./sow/year				
1. Labour costs	%	4.2	4.1	4.1
2. Feed	"	66.8	68.7	70.1
3. Depreciation, maintenance, insurance of buildings and machinery	"	6.9	6.3	5.9
4. Miscellaneous costs	"	7.7	7.4	7.1
5. Interest of buildings, machinery and current assets	"	14.4	13.5	12.8
Total in E.C.U.	1,309.9	1,425.6	1,528.3	
II. Total l.w. produced in kgs from fattening pigs/sow/year				
	1,125.0	1,312.5	1,500.0	
III. Costs of fattening in E.C.U./kgs l.w.				
	1.164	1.086	1.019	

Table 4 Returns, costs, profits and incomes of pig farming (breeding and fattening) according to the total production per sow per year.

Returns, costs, profits and incomes	$\bar{X}-2S$	\bar{X}	$\bar{X}+2S$	
I. Gross return per sow per year				
1. Total production (kgs. of l.w.)	1,500	1,750	2,000	
2. Price (E.C.U. per kgs l.w.)	1.409	1.409	1.409	
Total in E.C.U.	2,113.5	2,465.8	2,818.0	
II. Production costs per sow per year				
1. Labour costs	%	6.8	6.8	6.9
2. Feed	"	58.0	59.8	61.1
3. Depreciation, maintenance, insurance of buildings and machinery	"	7.3	6.8	6.4
4. Depreciation and mortality of sow and boar	"	3.6	3.3	3.1
5. Miscellaneous costs	"	8.7	8.5	8.4
6. Interest of buildings, machinery, livestock and current assets	"	15.6	14.8	14.1
Total in E.C.U.	2,310.7	2,468.0	2,612.9	
II.1 Costs of production (E.C.U./kgs l.w.)	1.540	1.410	1.306	
III.2 Costs of production (E.C.U./kgs carcass)	2.000	1.831	1.696	
IV. Profit or loss (E.C.U./sow/year)	-197.2	-2.2	205.1	
V. Farm family income (" ")	65.0	272.2	491.6	
VI. Return to capital	%	6.4	14.0	21.9

least 20 pigs fattened or a total production of 2,000 kgs l.w. per year.

Returns, costs, profits and incomes per finishing pig per year according to the number of pigs fattened per sow and rounds performed per year

Table 5 presents the gross return and the production costs per fattening pig per year, which includes the number of rounds performed per year. The calculation of rounds per year is based on the weight gain per pig, on the weight gain per day and the capacity utilization as follows:

Rounds/year = $365 / [\text{weight gain per pig} / \text{weight gain per day} / (\text{capacity utilization})]$. The gross return of a fattening pig per year depends on the rounds performed per year

since the final l.w. of each fattening pig and the price are the same. On the other hand, the total production costs are mainly based on the costs of pigs of 25 kgs l.w. produced and on the feed costs since the remainder expenses do not differ considerably. Although the gross return increases from 395.9 to 425.5 ECU per fattening pig per year (e.g. 18.2%), the production costs decrease from 438.6 to 404.0 ECU (e.g. 7.9%).

This decrease is mainly due to the low costs of producing piglets of 25 kgs l.w. because of the larger number of piglets produced per sow per year. So the cost of production per kgs l.w. decreases from 1.561 to 1.338 ECU as the number of piglets per sow and the number of rounds performed increases from 15.0 to 20.0 and from 2.81 to 3.02 per year respectively. The above increase of piglets and rounds leads to the increase of profit from -42.7 to 21.5 ECU and farm family income from -20.8 to 40.5 ECU per fattening pig per year. In other words the profitability of a fattening pig per year depends on the cost of producing a piglet of 25 kgs l.w. and the number of rounds performed per year.

CONCLUSION

The economics of pig farming in Greece is not satisfactory when the number of piglets produced and fattened per sow per year is 15 and lower, since gross return is smaller than production costs.

On the other hand, a pig farm which produces and fattens 18 piglets per sow per year is viable but not competitive. On the contrary, pig farms which produce and fatten 20 piglets per sow per year are not only viable but also competitive.

This is true taking into account the cost of production per kgs l.w. in relation to price, the profit per sow per year and per pig fattening per year, the farm family in-

Table 5 Returns, costs, profits and incomes per finishing pig per year according to the number of pigs fattened per sow and rounds performed per year.

Returns, costs, profits and incomes fattening pig year	$\bar{X}-2S$	\bar{X}	$\bar{X}+2S$
I. Number of rounds per year	2.81	2.91	3.02
II. Gross return (E.C.U. finishing pig year)			
1. Total production (kgs of l.w. year)	281.0	291.0	302.0
2. Price (E.C.U. per kgs l.w.)	1.409	1.409	1.409
Total in E.C.U.	395.9	410.0	425.5
III. Production costs (E.C.U. finishing pig year)			
1. Costs of piglets of 25 kgs l.w. produced	% 41.7	40.5	39.6
2. Labour costs	" 1.7	1.7	1.7
3. Feed "	" 37.4	38.8	40.0
4. Depreciation, maintenance and insurance of buildings and machinery	" 2.8	2.7	2.5
5. Miscellaneous costs	" 8.8	9.0	9.2
6. Interest of buildings, machinery, fattening pigs and current assets	" 7.6	7.3	7.0
Total in E.C.U.	438.6	419.4	404.0
IV. Costs of production (E.C.U. per kgs l.w.)	1.561	1.441	1.338
V. Profit or loss (E.C.U. finished pig year)	-42.7	-9.4	21.5
VI. Farm family income (" " ")	-20.8	11.0	40.5

come per sow per year and per pig fattening per year, and the return to capital compared to interest rate for long and short term investments.

It is believed that the viability and the competitiveness of greek pig farming must be based on the increase of the productivity of sows (at least 20 pigs fattened per sow per year), the decrease of the feed required per piglet of 25 kgs l.w. (less than 90 kgs) and its price (about 25 ECU/100 kgs), the increase of the average daily gain (more than 700 grams), the decrease of the feed conversion rate (less than 2.80) and the decrease of the interest rate of short and long term loans (under 10%). ●

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