

**Title:** Effects of Preweaning factors on Sow Lifetime Productivity – NPB#11-146

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### Industry summary:

The objective of the study was to associate preweaning factors in gilt multiplication with the subsequent lifetime productivity of females in commercial sow herds. Sows were farrowed at two Smithfield Hog Production multiplication farms located in North Carolina between May 2013 and December 2013. From these sows, preweaning data was collected on 12,943 individual gilts. Preweaning factors of the gilt's birth litter included total number born, number nursed, number weaned, litter sex ratio, cross-foster status (0 or 1), weaning age, birth dam parity and individual traits birth weight, weaning weight (adjusted to 21 d of age) and preweaning average daily gain. Gilts were traced from finishing facilities to commercial sow farms (n = 11) in eastern North Carolina. Of the 12,934 gilts individually tagged at birth, 10,613 (82.1%) survived to weaning and 6,249 (48.3%) eventually entered a commercial sow farm. When including all gilts tagged at birth in the analysis, a lower litter size at birth, gilts not cross-fostered and greater piglet birth weight, piglet weaning weight and preweaning average daily gain were associated with increased stayability to parity 1. Yet only a lower litter size at birth tended to increase stayability to parity 4. When including all gilts that were delivered to commercial sow farms, a greater weaning age, weaning weight and preweaning average daily gain were associated with more total pigs farrowed through 4 parities. Similarly, when including all gilts that were delivered to the commercial sow farms, a greater weaning age, weaning weight and preweaning average daily gain were associated with more total pigs produced per day of herd life through 4 parities. Results suggest gilt multiplication farms should not cross-foster gilts, increase weaning age to 25 days, increase piglet birth weight and preweaning average daily gain to enhance subsequent sow lifetime productivity.

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**Key findings:**

- Gilts that were cross-fostered were 2.45% less likely to farrow a litter. Hence multiplication farms should only cross-foster males.
- Increasing weaning age by one day increased a gilt's subsequent reproduction by 0.185 piglets per year. Hence, based on weaning ages observed in the current study, multiplication farms should increase weaning age to 25 days.
- Greater piglet birth weight increased the proportion of gilts that farrowed a litter. Hence strategies to improve piglet birth weight and/or reduce preweaning mortality will increase the efficiency of gilt production.
- Greater piglet preweaning growth improved the proportion of gilts that farrowed a litter and lifetime reproductive throughput. Hence management strategies that improve colostrum production, milk production and preweaning piglet growth should enhance subsequent lifetime productivity.

**Scientific abstract:**

The objective of the study was to associate preweaning factors in gilt multiplication with the subsequent lifetime productivity of females in commercial sow herds. Sows were farrowed at two Smithfield Hog Production multiplication farms located in North Carolina between May 2013 and December 2013. From these sows, preweaning data was collected on 12,943 individual gilts. Preweaning factors of the gilt's birth litter included total number born, number nursed, number weaned, litter sex ratio, cross-foster status (0 or 1), weaning age, birth dam parity and individual traits birth weight, weaning weight (adjusted to 21 d of age) and preweaning average daily gain. Gilts were traced from finishing facilities to commercial sow farms (n = 11) in eastern North Carolina. All analysis were conducted using SAS software. Stayability to parity 1, 2 and 4 was analyzed using PROC LOGISTIC. Stayability can be defined as whether a gilt obtained a particular parity. For stayability models including all 12,934 gilts (identified at birth) fixed effects included the farm and contemporary group (month) in which the gilt was born. For stayability models including the 6,249 gilts that arrived at commercial sow farms, fixed effects included the farm and contemporary group in which the gilt was born and the sow farm she was delivered to. Reproductive throughput traits, total number of piglets born through 4 parities and total number of piglets produced per day of herd life, were analyzed using PROC GLM. Fixed effects included the farm and contemporary group in which the gilt was born and the sow farm she was delivered to. Of the 12,934 gilts individually tagged at birth, 10,613 (82.1%) survived to weaning and 6,249 (48.3%) eventually entered a commercial sow farm. When including all gilts tagged at birth in the analysis, a lower litter size at birth, piglets not cross-fostered and greater piglet birth weight, piglet weaning weight and preweaning ADG were associated ( $P < 0.01$ ) with increased stayability to parity 1. Yet only a lower litter size at

birth tended ( $P=0.06$ ) to increase stayability to parity 4. When including all gilts that were delivered to commercial sow farms, a greater weaning age, weaning weight and preweaning ADG were associated ( $P\leq 0.01$ ) with more total pigs farrowed through 4 parities. Similarly, when including all gilts that were delivered to the commercial sow farms, a greater weaning age, weaning weight and preweaning ADG were associated ( $P<0.01$ ) with more total pigs produced per day of herd life through 4 parities. Results suggest gilt multiplication farms should not cross-foster gilts, increase weaning age to 25 days, increase piglet birth weight and preweaning ADG to enhance sow lifetime productivity.

## **Introduction:**

The importance of maternal influence on the subsequent reproduction in female swine has been known for many years (Robison, 1972). Yet the swine industry has struggled to use this knowledge in developing management strategies to maximize reproductive throughput at the commercial level. Sow lifetime productivity continues to be an important measure in maximizing the profitability of pig farmers. Hence the aim of this study was to relate preweaning factors to subsequent sow lifetime productivity.

## **Objectives**

- a. Is variation in sow lifetime productivity partially explained by birth weight, preweaning gain, and weaning weight?
- b. How does cross fostering status influence sow lifetime productivity?
- c. How does number of littermates at birth, number of littermates nursed, gender ratio of the birth litter, and gender ratio of the nurse litter impact sow lifetime productivity?
- d. How does dam parity influence sow lifetime productivity of female offspring?

## **Materials and Methods:**

### *Preweaning data*

Sows ( $n=1,927$ ) were farrowed at two Smithfield Hog Production multiplication farms located in North Carolina between May 2013 and December 2013. Females were mated using single sire matings. Pedigree data for the sows and service sires ( $n=125$ ) were obtained from Smithfield Premium Genetics (Rose Hill, NC). Birth sow identification, service sire, parity and number of teats were recorded for each litter ( $n=2,170$ ). Total number born, number born alive, stillbirths, and mummified piglets were recorded at farrowing. Each farm contained 8 farrowing rooms. Farm A had 20 farrowing stalls per room and Farm B had 24 farrowing stalls per room. Farrowing rooms were tunnel ventilated and temperature automatically controlled. Electric heating lamps were located above a rubber mat in each farrowing stall to maintain piglet comfort. Preweaning data was collected on 12,943 individual gilts. Within 24 hours of birth all piglets born alive were weighed. Group weights were recorded for boars and individual weights were recorded for all gilts. After

weighing, gilts were individually tagged. Tails were docked on all females. Cross-fostering occurred within 48 hours of birth according to the standard operating procedures of each farm. Farm A cross-fostered gilts and boars at an equal frequency. The cross-fostering protocol on Farm A was to create litters with a similar number of piglets that were uniform in weight. Farm B cross-fostered the largest piglets to create litters with a similar number of piglets. Piglet identification, birth sow, and cross-foster sow were recorded at cross-fostering for all gilts. After cross-fostering, sow identification and number nursed were recorded. When a gilt died, piglet identification, date and reason were recorded. Reasons for death included: low viability (1), crushed (2), starvation (3), scours (4), savaged (5), spraddle (6), shaker (7), deformed (8), injured (9), joint infection (10), rupture (13), greasy (14), other (17), missing or unknown (18), runt (28), quality control (33) and nursery death (44). Low viability piglets were piglets that were not thriving. Runts were piglets that were born weighing less than 0.7 kg. Quality control piglets were piglets that were too small and would not or did not meet the minimum weight (3 kg) requirement at weaning.

Weaning occurred at  $22 \pm 2.5$  days. Piglets were weighed 24 to 48 hours prior to weaning. Individual gilt weights were recorded and group weights were recorded for barrows. Wean sow identification and total number weaned were recorded at weaning. Gilts that died between the time weaning weights were recorded and weaning were considered quality control. Quality control gilts were considered preweaning mortality. After weaning, piglets were moved to an on-site nursery and allocated to group pens according to farm protocol. Nursery rooms utilized sidewall baffles for ventilation. Automatic controllers managed air exchange and temperature. Nursery rooms contained one water nipple drinker and one feeder per pen. The first 14 groups of gilts weaned ( $n = 2,758$ ) from Farm A were used in a stocking density study (Estienne – NPB #11-118) and were allocated to pens with a different set of criteria than the rest of the gilts. Gilts and barrows were separated before placement in the nursery. Normal farm protocol for Farm A was to sort gilts based on size and then place them in groups of 8 to 10 gilts per pen. Farm B also sorted gilts based on size, placing the smaller gilts in the center pens and the larger gilts in the outside pens. Yet Farm B placed gilts in groups of 10 to 11 per pen. Barrows were moved to the finisher every other week and gilts were moved every week. Once barrows were moved to the finisher, Farm B spread gilts out across the newly empty pens. Yet on Farm A, gilts remained in their original pens throughout the entire nursery phase. Nursery mortality was recorded. After seven weeks in the nursery gilts were moved to finishing facilities.

#### *Subsequent reproductive data*

Gilts were traced from finishing facilities to commercial sow farms ( $n = 11$ ) in eastern North Carolina. Data were collected on females throughout their reproductive life. Information obtained from the commercial sow farms included: service date, farrow date, number born alive, preweaning mortality and number weaned. Age at first service, age at first farrowing, length of productive life, and lifetime prolificacy were calculated from obtained information.

### *Statistical analysis*

All analysis were conducted using SAS software. Stayability to parity 1, 2 and 4 was analyzed using PROC LOGISTIC. Stayability can be defined as whether a gilt obtained a particular parity. For stayability models including all 12,934 gilts (identified at birth) fixed effects included the farm and contemporary group (month) in which the gilt was born. For stayability models including the 6,249 gilts that arrived at commercial sow farms, fixed effects included the farm and contemporary group in which the gilt was born and the sow farm she was delivered to. Prewaning factors of the gilt's birth litter included total number born, number nursed, number weaned, litter sex ratio, cross-foster status (0 or 1), weaning age, birth dam parity and individual traits birth weight, weaning weight (adjusted to 21 d of age) and preweaning average daily gain. Prewaning factors were added to the base model of fixed effects individually. The estimates obtained from PROC LOGISTIC can be converted to probabilities using  $p = \text{Exp}(a+bX) / [1 + \text{Exp}(a+bX)]$  where  $p$  = probability,  $\text{Exp}$  = exponent,  $a$  = the intercept,  $b$  = regression estimate and  $X$  = the trait value.

Reproductive throughput traits, total number of piglets born through 4 parities and total number of piglets produced per day of herd life, were analyzed using PROC GLM. Fixed effects included the farm and contemporary group in which the gilt was born and the sow farm she was delivered to. Again, preweaning factors were added to the base model of fixed effects individually.

### **Results**

Summary statistics for preweaning factors and subsequent reproduction from 12,943 Landrace x Large White females are shown in Table 1. Of the 12,934 gilts individually tagged at birth, 10,613 (82.1%) survived to weaning and 6,249 (48.3%) eventually entered a commercial sow farm. Since the production system produced an excess number of gilts relative to the needs of the production flow, some groups of gilts were not needed at the commercial sow farms. Of the 6,249 gilts reaching a sow farm, 5,266 (84.3%) farrowed a litter, 4,208 (67.3%) farrowed two litters and 2,705 (43.3%) farrowed four or more litters. It is important to note many of the commercial farms experienced health challenges during the project making this real world data.

#### *Stayability*

Estimates for preweaning factors in relation to subsequent stayability to parity 1 are shown in Table 2. When including all gilts tagged at birth in the analysis, a lower litter size at birth (Figure 1), piglets not cross-fostered (Figure 2) and greater piglet birth weight (Figure 3), piglet weaning weight (Figure 4) and preweaning ADG (Figure 5) were associated ( $P < 0.01$ ) with increased stayability to parity 1. Yet when only including those gilts that entered sow farms in the analysis, a lower litter size at birth (Figure 1) and greater piglet birth weight (Figure 3), piglet weaning weight (Figure 4) and preweaning ADG (Figure 5) were associated ( $P < 0.05$ ) with increased stayability to parity 1. Differences between analyses suggest that cross-fostering at birth and lower piglet birth weight reduced the percentage of gilts that made it to a sow farm.

Estimates for preweaning factors in relation to subsequent stayability to parity 2 & 4 are shown in Table 3. Gilts with a greater weaning age (Figure 6), weaning weight (Figure 7) and preweaning ADG had increased ( $P \leq 0.01$ ) stayability to parity 2. Yet only a lower litter size at birth tended ( $P = 0.06$ ) to increase stayability to parity 4 (Figure 8).

#### *Reproductive throughput*

Estimates for preweaning factors in relation to total pigs produced through 4 parities are shown in Table 4. When including all gilts that were delivered to commercial sow farms, a greater weaning age, weaning weight and preweaning ADG were associated ( $P \leq 0.01$ ) with more total pigs farrowed through 4 parities. Yet when only including gilts that farrowed a litter in the analysis, a greater weaning age and smaller piglet birth weight were correlated ( $P < 0.05$ ) with more total pigs farrowed through 4 parities.

Estimates for preweaning factors in relation to total pigs produced per day of herd life through 4 parities are shown in Table 5. When including all gilts that were delivered to the commercial sow farms, a greater weaning age, weaning weight and preweaning ADG were associated ( $P < 0.01$ ) with more total pigs produced per day of herd life through 4 parities. Yet when only including gilts that farrowed a litter in the analysis, a lower litter size at birth, greater weaning age and smaller piglet birth weight were correlated ( $P < 0.05$ ) with more total pigs produced per day of herd life through 4 parities.

#### *Birth dam parity*

The impact of birth dam parity on subsequent stayability and reproductive throughput is reported in Table 6. When including all gilts tagged at birth in the analysis, birth dam parity impacted ( $P < 0.01$ ) stayability to parity 1. Fewer ( $P < 0.01$ ) gilts born to parity 1 sows farrowed a litter when compared to gilts born to parity 2 or parity 3+ sows (39.1, 44.0, 41.4%, respectively). Yet the impact of birth dam parity on stayability 1 became insignificant ( $P = 0.12$ ) when birth weight was included as a covariate. When including only gilts that farrowed a litter into the analysis, a younger birth dam parity was associated with greater reproductive throughput.

## **Discussion**

Nelson and Robison (1976) were perhaps the first to develop a preweaning management strategy to enhance subsequent sow lifetime productivity. In that study, strategic cross-fostering was used to standardize litters to 6 (small) or 14 (large) piglets nursed. Those authors reported gilts reared in small litters had greater weaning weights and corpora lutea and tended to have greater subsequent litter size when compared to gilts reared in large litters. Yet embryo survival and age at puberty did not appear different between gilts reared in small or large litters.

Flowers (2009) built off of the study by Nelson and Robison (1976). A total of 3180 gilts were randomly allocated to a factorial arrangement of treatments including season of birth (spring or fall); neonatal litter size (<7 littermates or >10 littermates); and puberty stimulation (boar exposure @ 140 days of age; boar exposure @ 140 days of age + PG600®; or boar exposure @ 170 days of age). Results showed both a smaller neonatal litter

size and early puberty stimulation improved stayability to parity 6. The author further reported sows reared with 7 or fewer littermates gave birth to an average of 11.0 pigs over six parities compared with 10.5 pigs for sows raised in litters of 10 or more piglets.

Perhaps the current study helps explain the results of Nelson and Robison (1976) and Flowers (2009). In the current study, the number of piglets nursed did not impact subsequent female reproduction yet preweaning average daily gain enhanced subsequent sow lifetime productivity. This suggests results from Nelson and Robison (1976) and Flowers (2009) were driven by differences in weaning weight more so than a specific nurse litter size. Yet the authors achieved differences in weaning weight by differentiating nurse litter size.

Collectively, results suggest research and extension efforts are needed to identify and implement strategies to increase gilt weaning weights in gilt multiplication herds. Perhaps strategies to increase colostrum production, colostrum intake per pig, milk production and milk intake per pig should be explored.

### **Key findings:**

- Gilts that were cross-fostered were 2.45% less likely to farrow a litter. Hence multiplication farms should only cross-foster males.
- Increasing weaning age by one day increased a gilt's subsequent reproduction by 0.185 piglets per year. Hence, based on weaning ages observed in the current study, multiplication farms should increase weaning age to 25 days.
- Greater piglet birth weight increased the proportion of gilts that farrowed a litter. Hence strategies to improve piglet birth weight and/or reduce preweaning mortality will increase the efficiency of gilt production.
- Greater piglet preweaning growth improved the proportion of gilts that farrowed a litter and lifetime reproductive throughput. Hence management strategies that improve colostrum production, milk production and preweaning piglet growth should enhance subsequent lifetime productivity.

Table 1. Summary statistics for preweaning factors and subsequent reproduction from 12,943 Landrace x Large White females.

Preweaning factors						
<i>Litter traits</i>	No.	Mean	SD	Min	Max	
Total number born	2,124	13.87	3.6	5	20	
Number nursed	2,124	12.20	1.3	9	15	
Number weaned	2,081	10.43	1.7	3	16	
Sex ratio, % of females	2,124	48.8	14.8	6.3	100	
Cross-fostered, %	2,170	7.3	0.25	0	100	
Weaning age, days	2,081	22.1	2.5	15	27	
Birth dam parity	2,170	2.8	1.5	1	8	
<i>Individual piglet traits</i>						
Piglet birth weight, kg	12,934	1.25	0.32	0.30	2.44	
Piglet weaning weight, kg	10,612	5.23	1.17	1.58	9.82	
Preweaning ADG, kg	10,724	0.185	0.05	0.250	0.410	
Subsequent reproduction						
<i>Stayability</i>	Yes	No				
Gilts entering sow farms	6,249	6,685		0	1	
Gilts farrowing a first parity litter	5,266	983		0	1	
Gilts farrowing a second parity litter	4,208	2,041		0	1	
Gilts farrowing a fourth parity litter	2,705	3,544		0	1	
<i>Throughput</i>	No.	Mean	SD			
Total pigs farrowed through fourth parity	5,265	41.0	18.2	2	80	
Total pigs produced per day of herd life	5,266	0.071	0.018	0.007	0.158	



Table 2. Estimates<sup>†</sup> for preweaning factors in relation to subsequent stayability to parity 1 for 12,943 Landrace x Large White commercial females.

Preweaning factors	Stayability from birth to parity 1					Stayability from sow farm entry to parity 1				
	No.	Intercept	Estimate	P-value	R <sup>2</sup>	No.	Intercept	Estimate	P-value	R <sup>2</sup>
Total number born	12,939	0.2276	-0.0387	<0.01	0.022	6,249	2.1278	-0.0229	0.04	0.034
Number nursed	12,939	-0.1547	-0.0151	0.29	0.017	6,249	1.6330	0.0132	0.68	0.033
Number weaned	10,612	-0.0110	0.0043	0.72	0.026	6,249	1.6202	0.0164	0.45	0.033
Sex ratio, % of females	12,939	-0.3183	-0.0413	0.91	0.017	6,249	1.8798	-0.1606	0.53	0.033
Cross-fostered, no vs. yes	12,939	-0.4283	0.1016	<0.01	0.018	6,249	1.7539	0.0464	0.52	0.033
Weaning age, days	10,612	-0.2855	0.0146	0.08	0.026	6,249	1.2642	0.0242	0.11	0.034
Piglet birth weight, kg	12,934	-2.0869	1.3854	<0.01	0.073	6,248	1.4331	0.2746	0.03	0.034
Piglet weaning weight, kg	10,612	-0.8134	0.1615	<0.01	0.037	6,249	0.8477	0.1803	<0.01	0.042
Preweaning ADG, kg	10,724	-0.8035	4.3804	<0.01	0.039	6,249	0.9947	4.2723	<0.01	0.042

<sup>†</sup>Estimates from logistic regression. Estimates can be converted to probabilities using  $p = \text{Exp}(a+bX) / [1 + \text{Exp}(a+bX)]$  where  $p$  = probability,  $\text{Exp}$  = exponent,  $a$  = the intercept,  $b$  = regression estimate and  $X$  = the trait value.

Table 3. Estimates<sup>†</sup> for preweaning factors in relation to subsequent stayability to parity 2 & 4 for 12,943 Landrace x Large White commercial females.

Preweaning factors	Stayability from sow farm entry to parity 2					Stayability from sow farm entry to parity 4				
	No.	Intercept	Estimate	P-value	R <sup>2</sup>	No.	Intercept	Estimate	P-value	R <sup>2</sup>
Total number born	6,249	0.9505	-0.0117	0.17	0.025	6,249	-0.1087	-0.0149	0.06	0.041
Number nursed	6,249	0.4967	0.0232	0.29	0.025	6,249	-0.5242	0.0162	0.44	0.040
Number weaned	6,249	0.4790	0.0284	0.09	0.025	6,249	-0.4426	0.0110	0.49	0.040
Sex ratio, % of females	6,249	0.9322	-0.2858	0.15	0.025	6,249	-0.3000	-0.0474	0.80	0.040
Cross-fostered	6,249	0.7194	0.0697	0.22	0.025	6,249	-0.3462	0.0239	0.66	0.040
Weaning age, days	6,249	0.0780	0.0320	0.01	0.026	6,249	-0.6822	0.0162	0.14	0.040
Piglet birth weight, kg	6,248	0.8603	-0.0603	0.55	0.024	6,248	-0.2360	-0.0675	0.48	0.040
Piglet weaning weight, kg	6,249	0.4124	0.0693	<0.01	0.026	6,249	-0.4877	0.0305	0.19	0.040
Preweaning ADG, kg	6,249	0.4238	1.8795	<0.01	0.027	6,249	-0.4952	0.8911	0.11	0.040

<sup>†</sup>Estimates from logistic regression. Estimates can be converted to probabilities using  $p = \text{Exp}(a+bX) / [1 + \text{Exp}(a+bX)]$  where  $p$  = probability,  $\text{Exp}$  = exponent,  $a$  = the intercept,  $b$  = regression estimate and  $X$  = the trait value.

Table 4. Estimates<sup>†</sup> for preweaning factors in relation to total pigs produced through 4 parities for 6,249 Landrace x Large White commercial females.

Preweaning factors	No.	Estimate	P-value	R <sup>2</sup>	No.	Estimate	P-value	R <sup>2</sup>
Total number born	6,249	-0.037	0.68	0.017	5,265	0.095	0.22	0.012
Number nursed	6,249	0.359	0.12	0.017	5,265	0.296	0.15	0.012
Number weaned	6,249	0.172	0.34	0.017	5,265	0.135	0.40	0.012
Sex ratio, % of females	6,249	-1.552	0.45	0.017	5,265	-0.718	0.70	0.012
Cross-fostered	6,249	0.337	0.78	0.017	5,265	-0.278	0.80	0.012
Weaning age, days	6,249	0.319	0.01	0.018	5,265	0.242	0.03	0.013
Piglet birth weight, kg	6,249	-0.893	0.39	0.017	5,265	-2.652	<0.01	0.014
Piglet weaning weight, kg	6,249	0.834	<0.01	0.018	5,265	-0.139	0.55	0.012
Preweaning ADG, kg	6,249	23.057	<0.01	0.019	5,265	0.389	0.94	0.012

<sup>†</sup>Estimates from linear regression.

Table 5. Estimates<sup>†</sup> for preweaning factors in relation to total pigs produced per day of herd life through 4 parities for 12,943 Landrace x Large White commercial females.

Preweaning factors	No.	Estimate	P-value	R <sup>2</sup>	No.	Estimate	P-value	R <sup>2</sup>
Total number born	6,249	-0.000021	0.86	0.036	5,265	0.000226	<0.01	0.083
Number nursed	6,249	0.000220	0.49	0.036	5,265	0.000068	0.73	0.081
Number weaned	6,249	0.000077	0.75	0.036	5,265	-0.000011	0.94	0.081
Sex ratio, % of females	6,249	-0.003005	0.29	0.036	5,265	-0.001458	0.41	0.081
Cross-fostered	6,249	0.000851	0.60	0.036	5,265	-0.000069	0.95	0.081
Weaning age, days	6,249	0.000509	<0.01	0.037	5,265	0.000349	<0.01	0.083
Piglet birth weight, kg	6,249	0.000200	0.89	0.036	5,265	-0.002392	<0.01	0.082
Piglet weaning weight, kg	6,249	0.001597	<0.01	0.039	5,265	-0.000068	0.76	0.081
Preweaning ADG, kg	6,249	0.041228	<0.01	0.040	5,265	0.001732	0.74	0.081

<sup>†</sup>Estimates from linear regression.

Table 7. Estimates for birth dam parity in relation to subsequent stayability and reproductive throughput for 12,943 Landrace x Large White commercial females.

Reproductive trait	No.	Birth dam parity				P-value
		Intercept	1	2	3	
Stayability from birth to parity 1 <sup>†</sup>	12,934	-0.3491	-0.0961	0.0535	0.00	<0.01
Stayability from sow farm entry to parity 1 <sup>†</sup>	6,249	1.7918	-0.1285	0.0925	0.00	0.06
Stayability from sow farm entry to parity 2 <sup>†</sup>	6,249	0.7914	-0.0441	0.0615	0.00	0.42
Stayability from sow farm entry to parity 4 <sup>†</sup>	6,249	-0.3230	-0.0358	0.0268	0.00	0.68
	No.	SE	1	2	3	P-value
Total pigs produced through 4 parities <sup>‡</sup>	6,249	0.7638	0.0965	1.3806	0.00	0.18
Total pigs produced through 4 parities (only gilts farrowing a litter) <sup>‡</sup>	5,265	0.6749	1.2597	1.2227	0.00	0.05
Total pigs produced per day of herd life through 4 parities <sup>‡</sup>	6,249	0.00103	-0.00001	0.00166	0.00	0.24
Total pigs produced per day of herd life through 4 parities (only gilts farrowing a litter) <sup>‡</sup>	5,265	0.00065	0.00196	0.00133	0.00	<0.01

<sup>†</sup>Estimates from logistic regression. Estimates can be converted to probabilities using  $p = \text{Exp}(a+bX) / [1 + \text{Exp}(a+bX)]$  where  $p$  = probability,  $\text{Exp}$  = exponent,  $a$  = the intercept,  $b$  = regression estimate and  $X$  = the trait value. <sup>‡</sup>Estimates from linear regression.

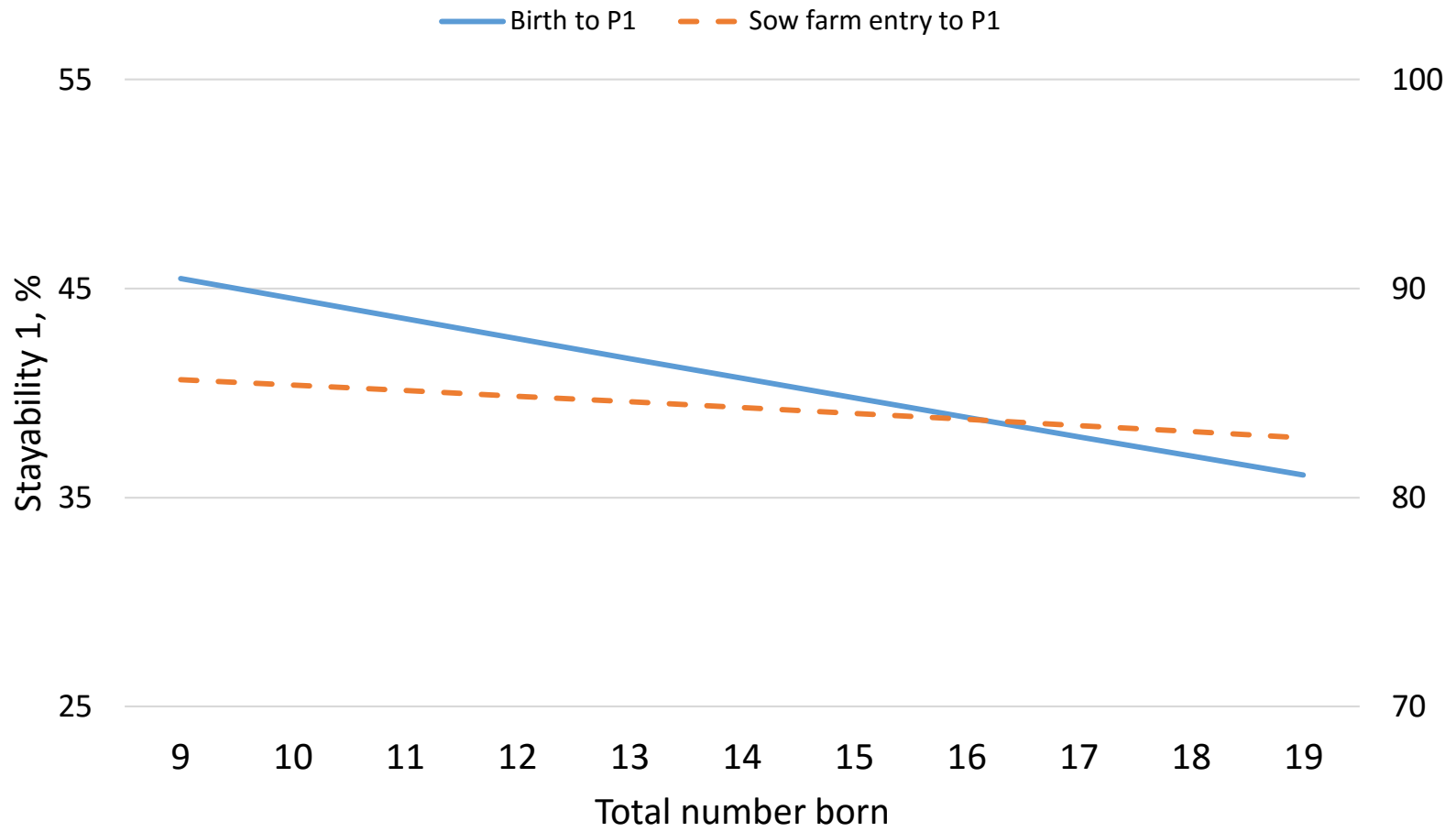


Figure 1. The impact of dam total number born on gilt stayability from birth to parity 1 (blue line) and sow farm entry to parity 1 (dashed orange line).

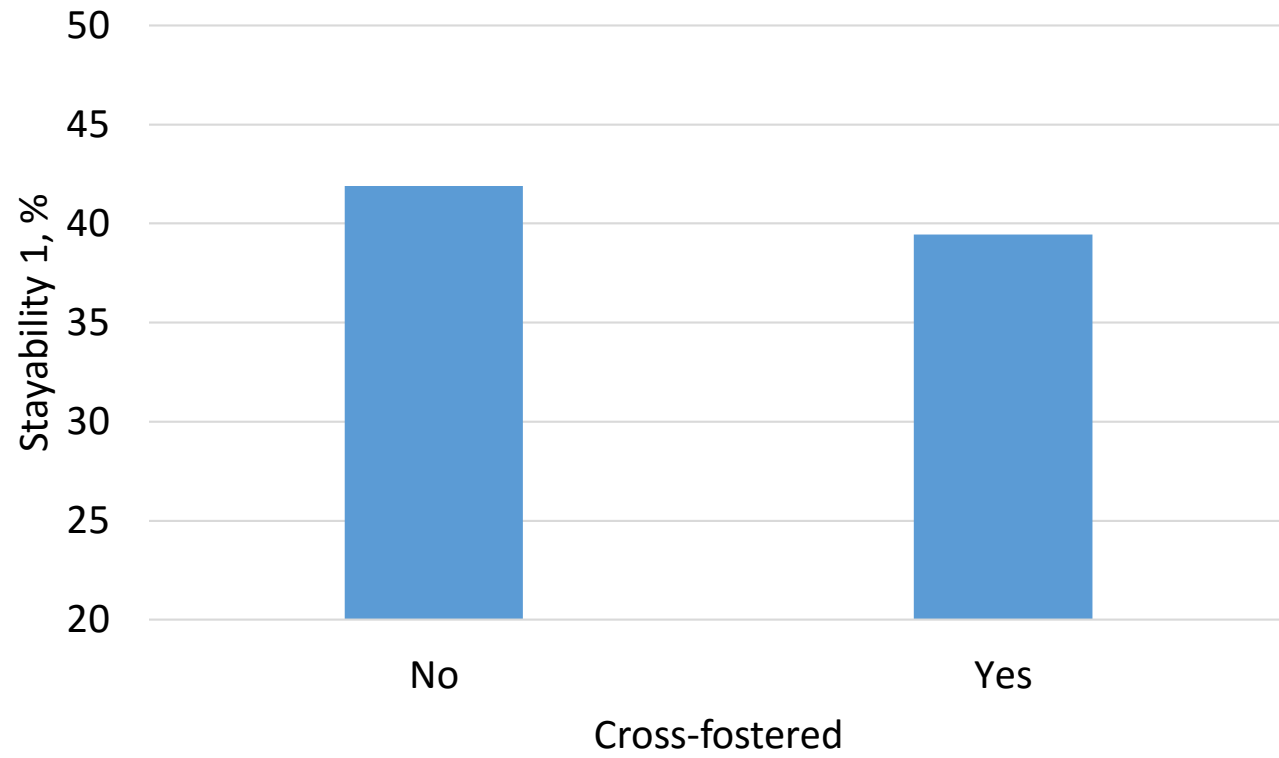


Figure 2. The impact of cross-fostering on gilt stayability from birth to parity 1.

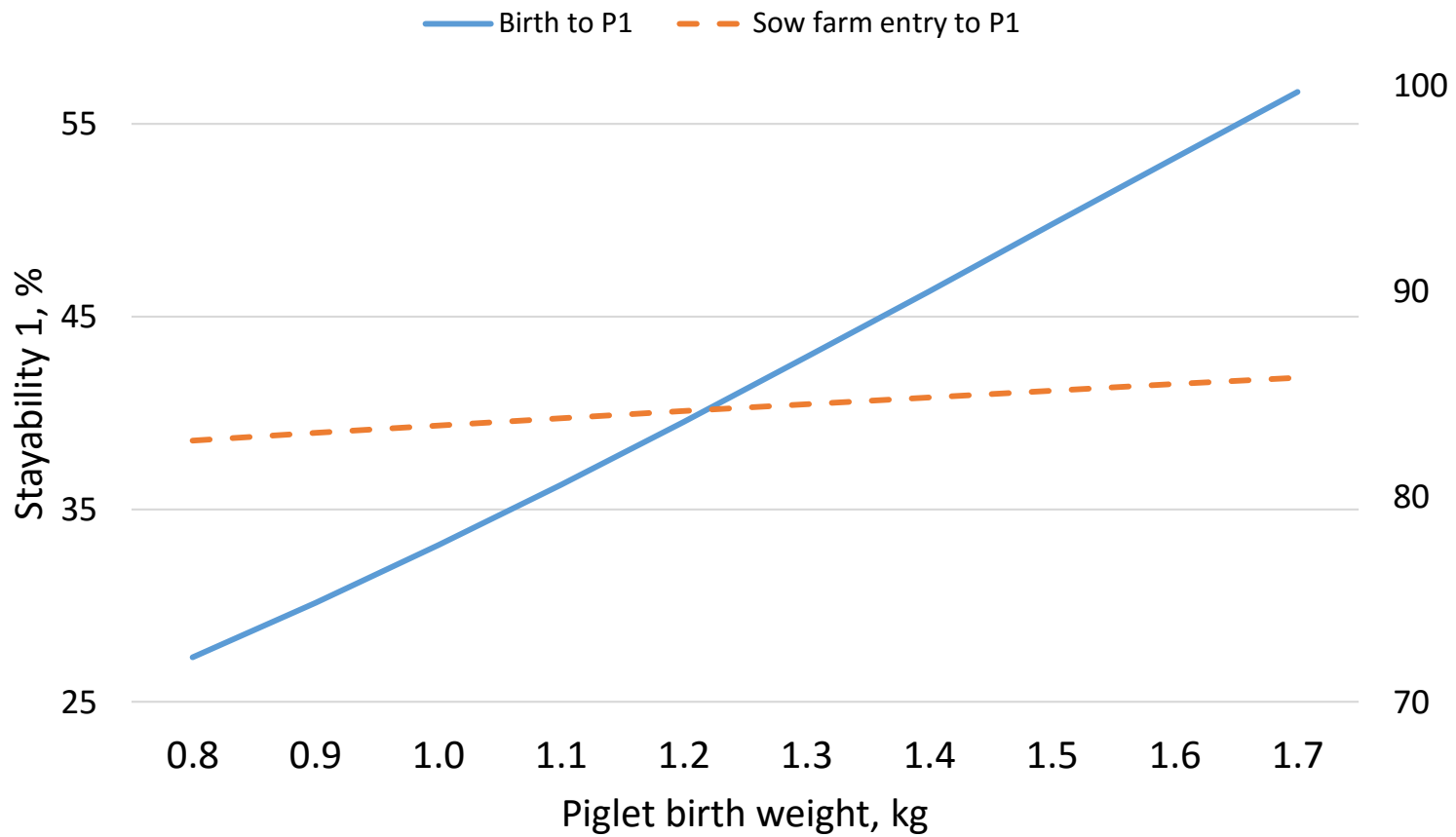


Figure 3. The impact of gilt birth weight on gilt stayability from birth to parity 1 (blue line) and sow farm entry to parity 1 (dashed orange line).



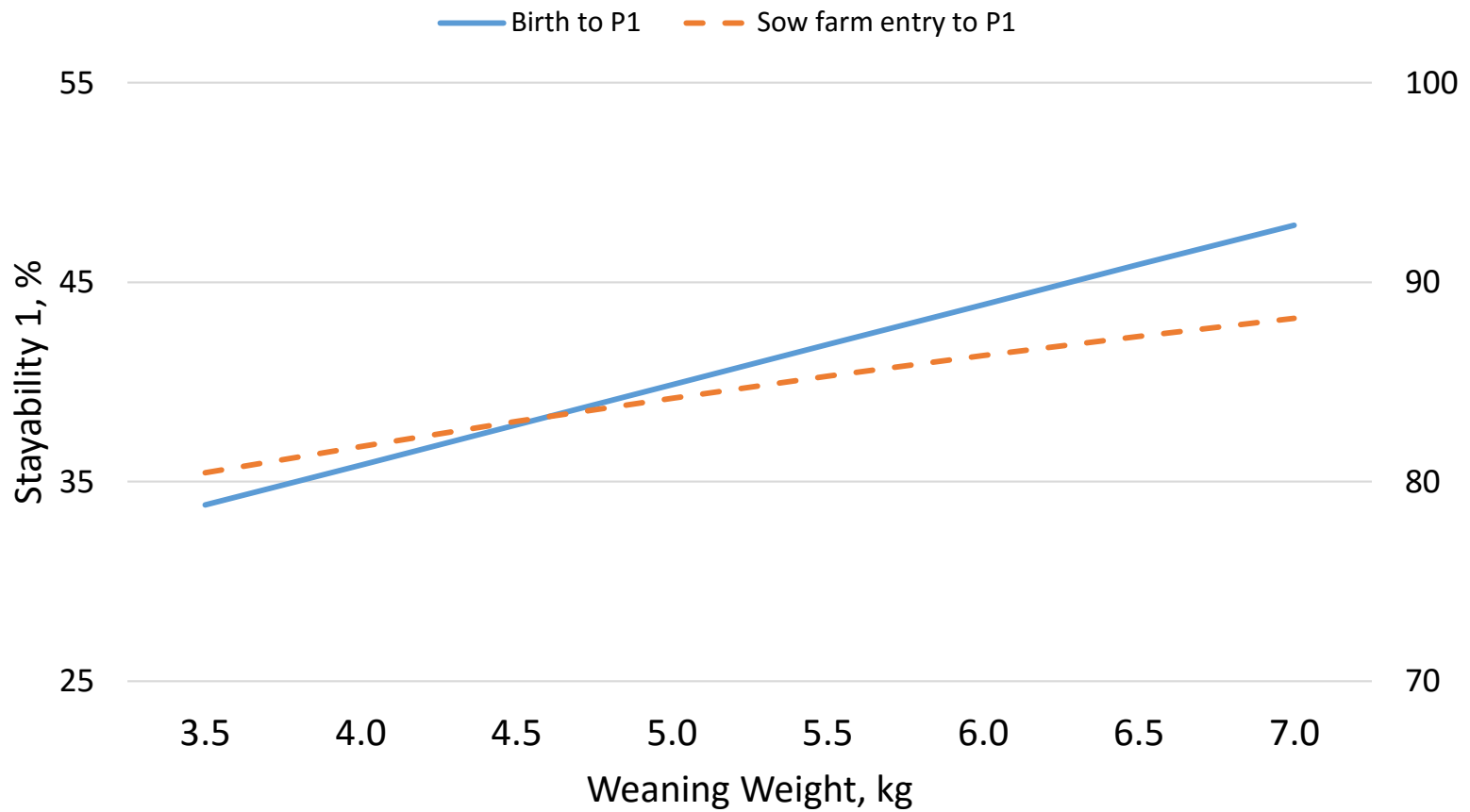


Figure 4. The impact of gilt weaning weight on gilt stayability from birth to parity 1 (blue line) and sow farm entry to parity 1 (dashed orange line).

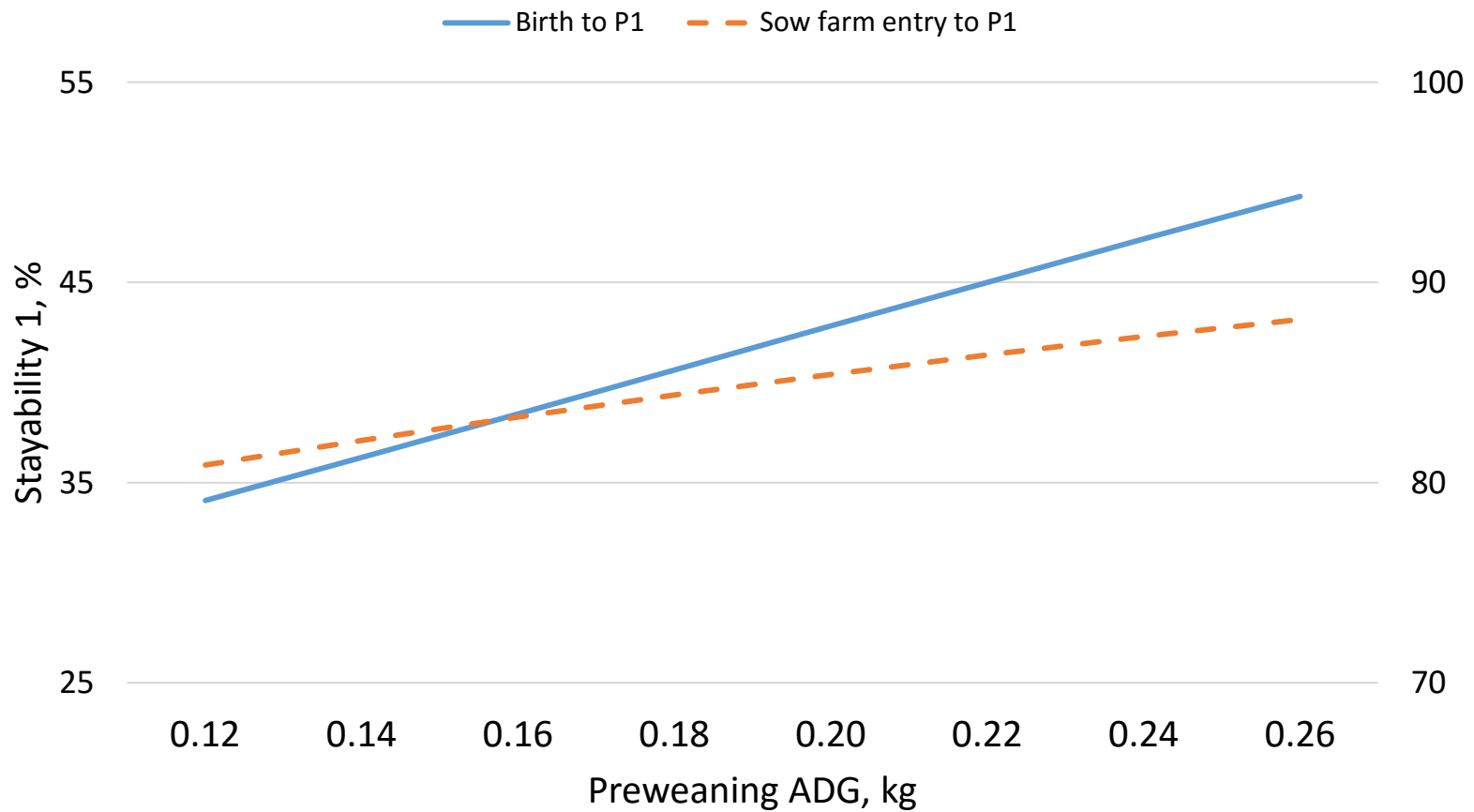


Figure 5. The impact of gilt preweaning ADG on gilt stayability from birth to parity 1 (blue line) and sow farm entry to parity 1 (dashed orange line).

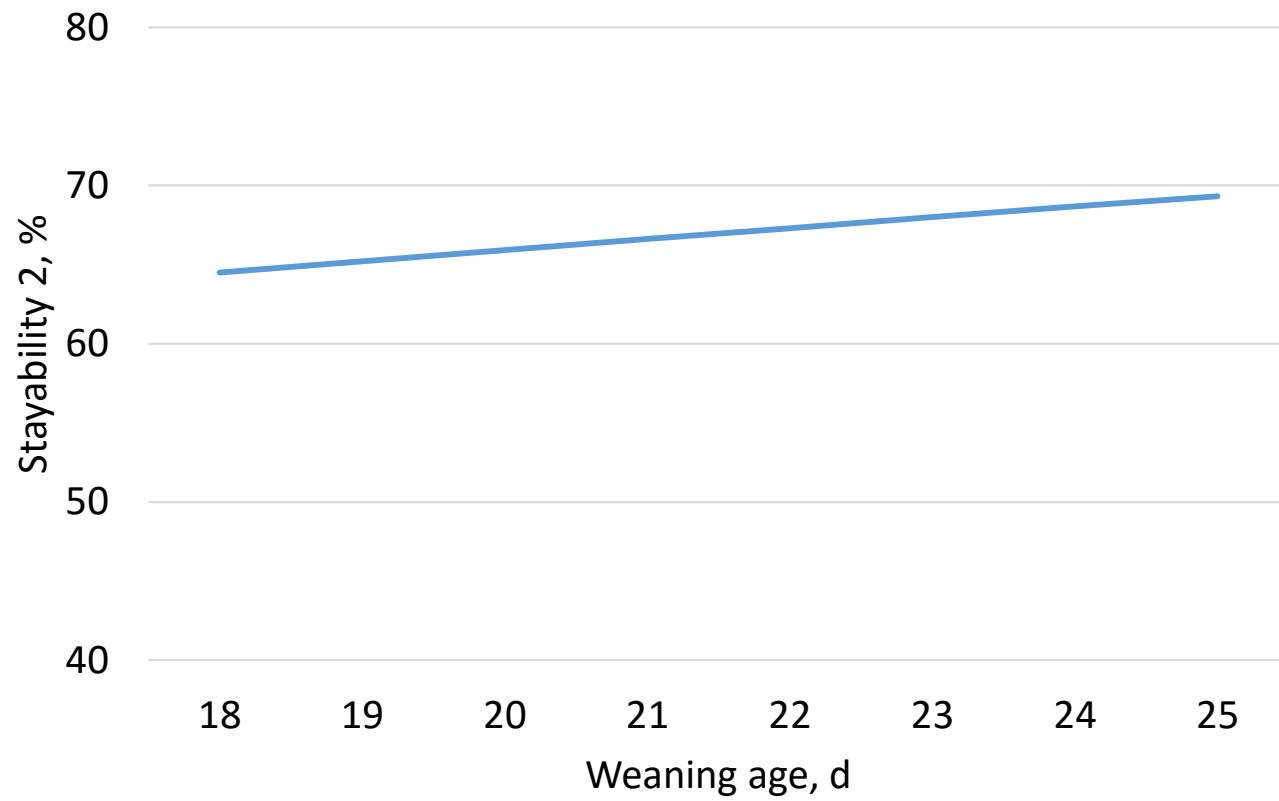


Figure 6. The impact of weaning age on gilt stayability from sow farm entry to parity 2.

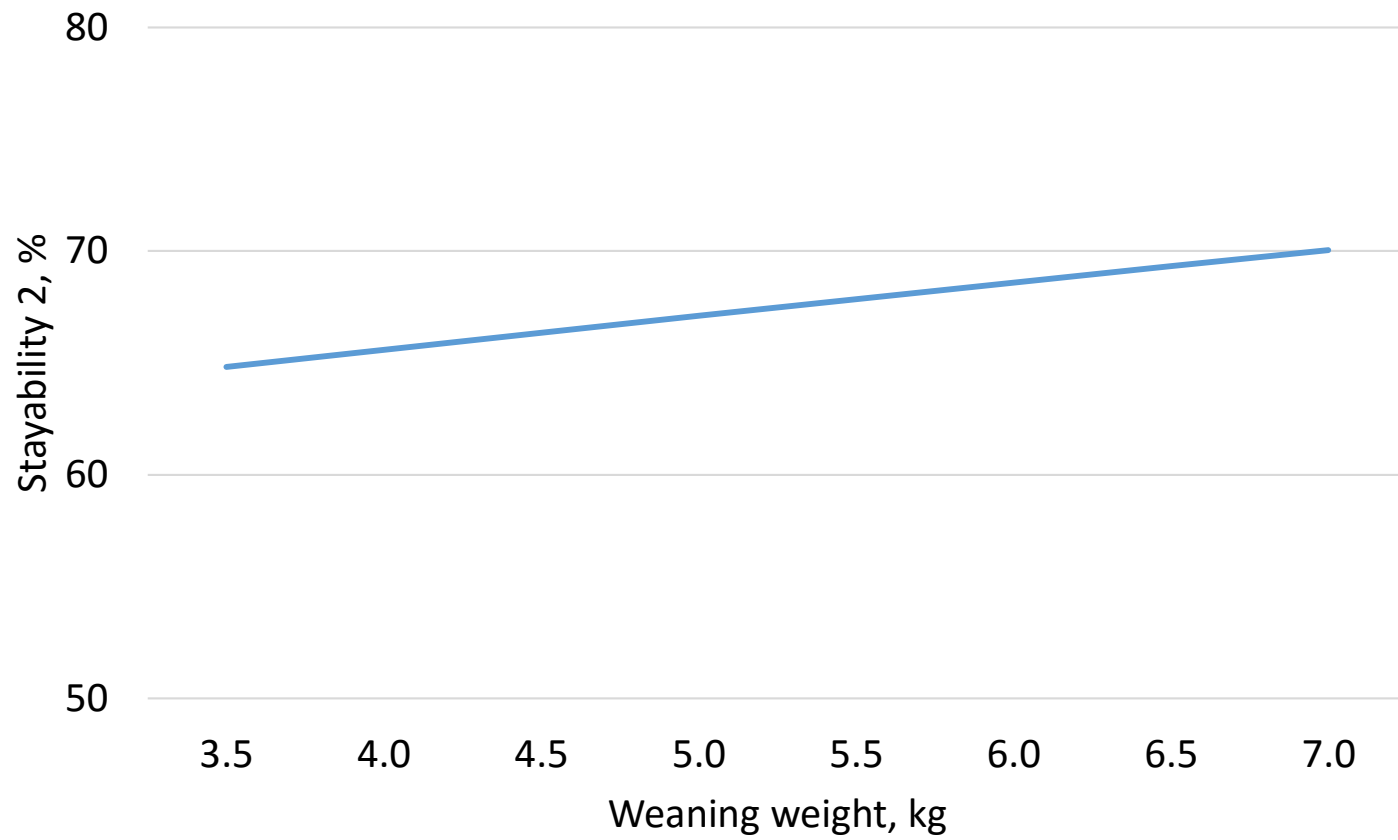


Figure 7. The impact of gilt weaning weight on gilt stayability from sow farm entry to parity 2.

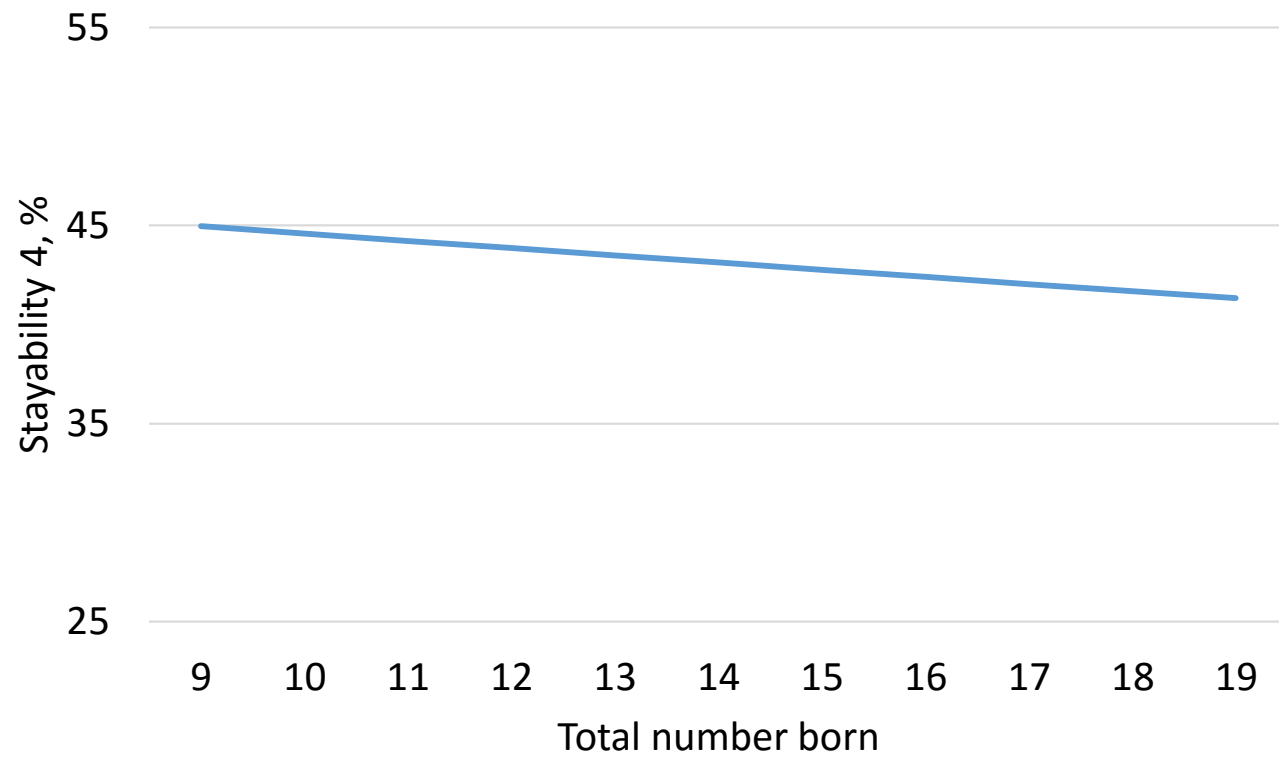


Figure 8. The impact of dam total number born on gilt stayability from sow farm entry to parity 4.

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