Analysis of suckler cow reproductive performance on 37 Irish beef farms

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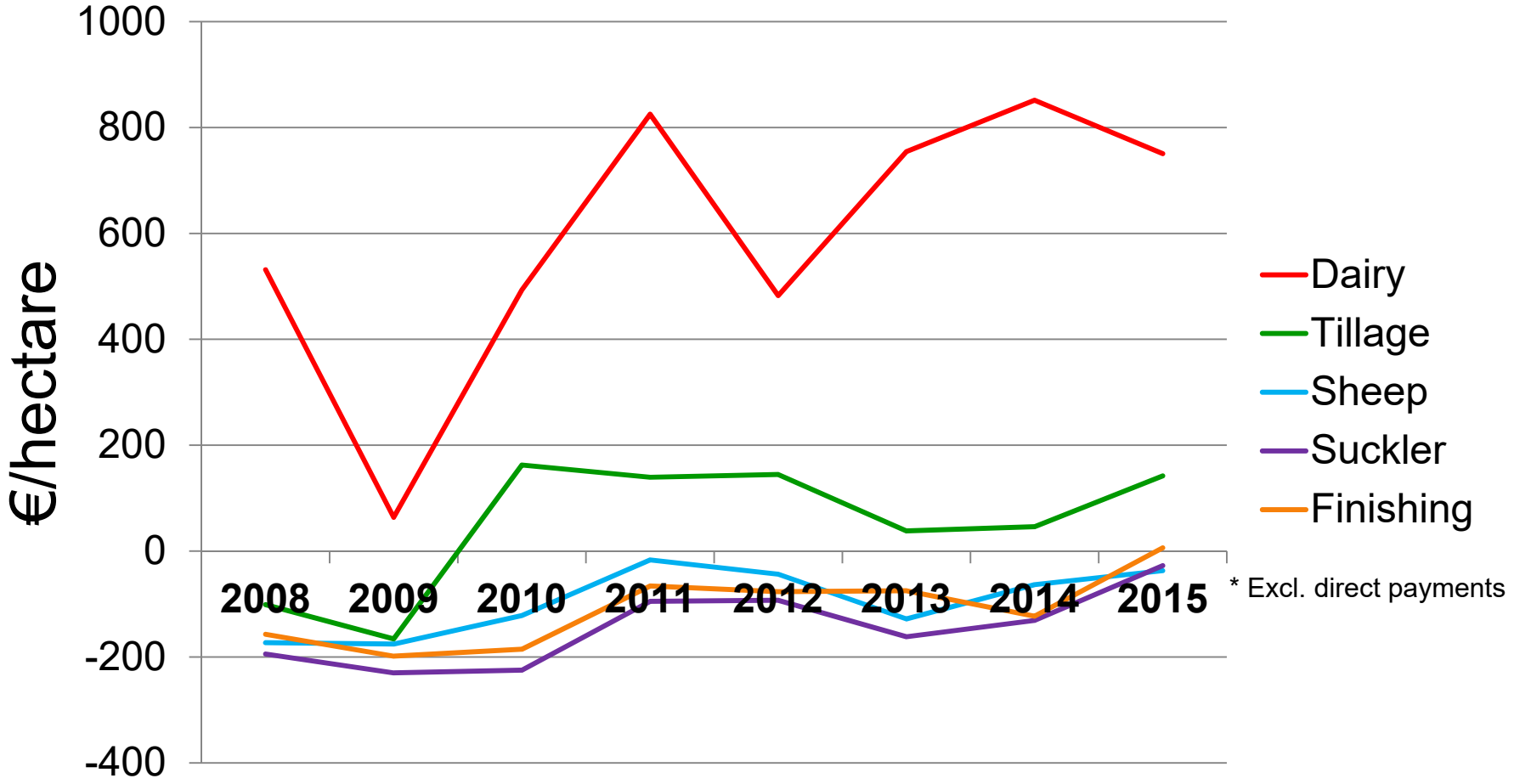
Irish beef sector

- 140,000 farms in Ireland – specialist beef production 78,000 (CSO,2016)
- Average suckler herd size is 26 breeding females and farm size 35.4 hectares (NFS, 2016)
- Beef sector accounted for 34% of gross agricultural output in 2015 (DAFM, 2016)
- >50% of output generated from the suckler herd (DAFM, 2016)
- Approx. 1.1 million suckler cows in Ireland (CSO, 2016)
- Suckler farms are one of the least profitable agricultural enterprises (NFS, 2016)

Net Margin



Source: Teagasc National Farm Survey

What drives profitability?

			Farm Size (ha)	Stocking rate (LU/ha)	Beef live weight output (kg)		Gross output (€)	
					LU	ha	LU	ha
Suckler to finishing	Net Margin	€/LU	-0.05 (NS)	0.02 (NS)	0.09 (NS)	0.12 (NS)	0.81 ***	0.44 **
		€/ha	0.23 (NS)	0.46 ***	0.17 (NS)	0.41 **	0.42 **	0.61 ***
Suckler to live sale	Net Margin	€/LU	-0.06 (NS)	-0.15 (NS)	0.53 ***	0.26 *	0.80 ***	0.49 ***
		€/ha	0.25 *	0.01 (NS)	0.43 ***	0.30 **	0.42 ***	0.53 ***

* P<0.05, ** P<0.01, *** P<0.001,
Source: Taylor *et al.*, 2016

National herd reproductive data

- Reproductive performance of the national herd is below target

	2015	Target
Calving interval (days)	407	365
Calving rate	0.82	1.00
Heifers calving at 22-26 months	18%	100%
Calf mortality rate (at 28 days)	6%	<5%

- Research models have shown that poor reproductive performance has a negative effect on farm profitability (Crosson and McGee, 2012; Kenny and Diskin, 2014)

Study objectives

- Determine which herd level reproductive measures are the main drivers of gross output

- Assess the impact of suckler herd reproductive performance on farm gross output

Materials and Methods

Sample set

- 37 farms
- 7 years data (2008-2014)
- Nationally distributed
- 3 systems
  - Suckler to finishing
  - Suckler to live sale
  - Suckler to finishing/live combination
- All participated in a knowledge transfer programme for minimum of three years

BETTER Farm Beef Program

- BETTER – Business, Environment and Technology through Teaching, Extension and Research

- Aims:
  - Increase technical efficiency
  - Identify KPIs in a range of beef systems
  - Demonstrate merits of record keeping

- Areas of focus:
  - Reproductive performance
  - Physical performance
  - Grassland management
  - Financial performance

Data collection

- Reproductive data: - Irish Cattle Breeding Federation (ICBF)
- Collected on animal level basis-aggregated to herd level
- Variables measured (annual basis):
  - Empty rate
  - Calving rate
  - Weaning rate
  - Average age at first calving
  - Average age at calving
  - Average calving interval
  - Number of months with calvings
  - Calf mortality

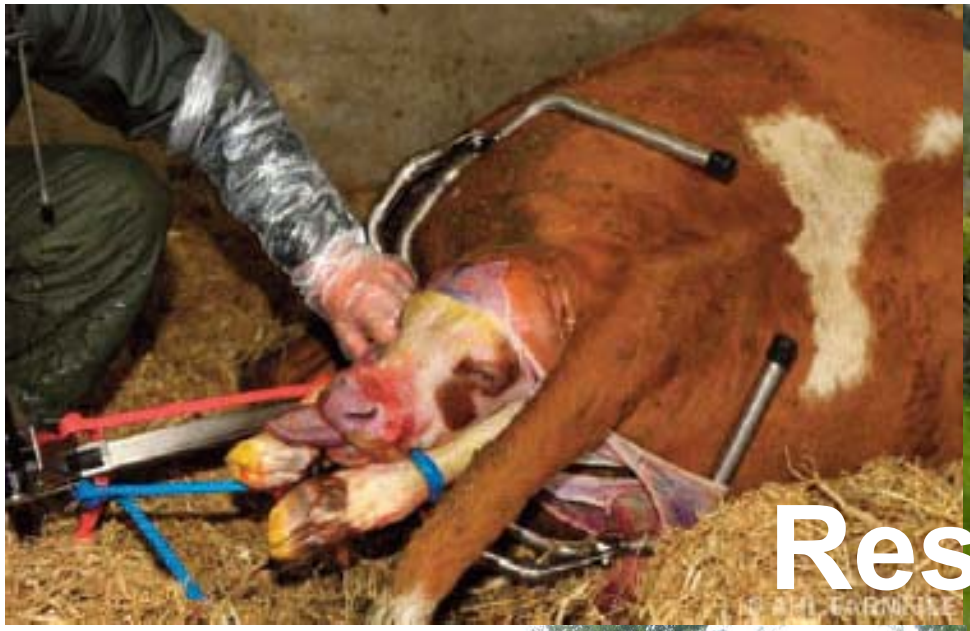
Data collection cont'd.

- Financial data: – Teagasc eProfit Monitor software
- Recorded by farmer in conjunction with farm advisor
- Information from sales, purchases and inventory changes used to calculate gross output value
- Prices corrected for inflation over the 7-year period
  - CSO price index

	2008	2009	2010	2011	2012	2013	2014
Cattle	0.87	0.78	0.79	0.96	1.08	1.1	1

Statistical Analysis

- Proc Univariate (SAS 9.4)- check for normality and identify outliers
- Proc Corr (SAS 9.4)- Spearman partial correlation analysis correcting for year variation
- Proc GLMSELECT (SAS 9.4) – stepwise regression identifying main drivers of gross output
- Proc Reg (SAS 9.4) – quantifying the effect each variable in the model had on the model selected



Results

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Descriptive Data Analysis

	National	Average	Std. Dev	Minimum	Maximum
Herd size (no. cows)	26†	57.94	24.412	15	136

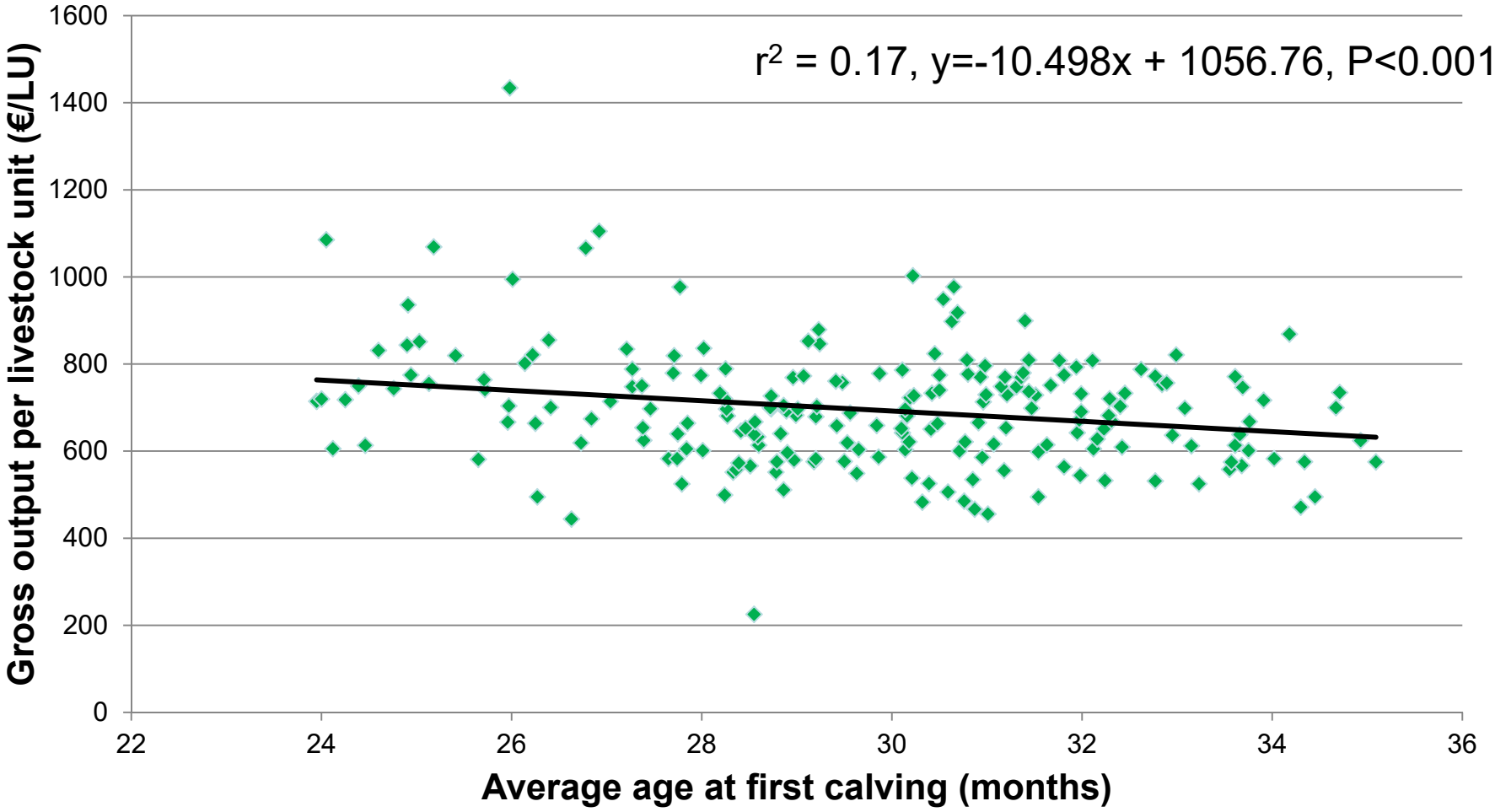
† ICBF, 2008-2014, * National Farm Survey 2008-2014

Correlation Analysis

	Average herd age	Average age at first calving	No. mts with calving	Calving with assistance	Average calving interval	Calf mortality	Gross output per LU
Calving rate	-0.07 (ns)	-0.20 **	0.14 (ns)	0.11 (ns)	-0.07 (ns)	-0.3 *	0.21 (P=0.07)
Weaning rate	-0.05 (ns)	-0.18 *	0.13 (ns)	0.04 (ns)	-0.09 (ns)	-0.66 ***	0.23 *
Empty rate	0.17 *	0.25 ***	-0.11 (ns)	-0.19 (ns)	0.07 (ns)	0.35 *	-0.30 **
Gross output/LU	-0.15 *	-0.17 *	-0.11 (ns)	0.09 (ns)	-0.00 (ns)	0.06 (ns)	-

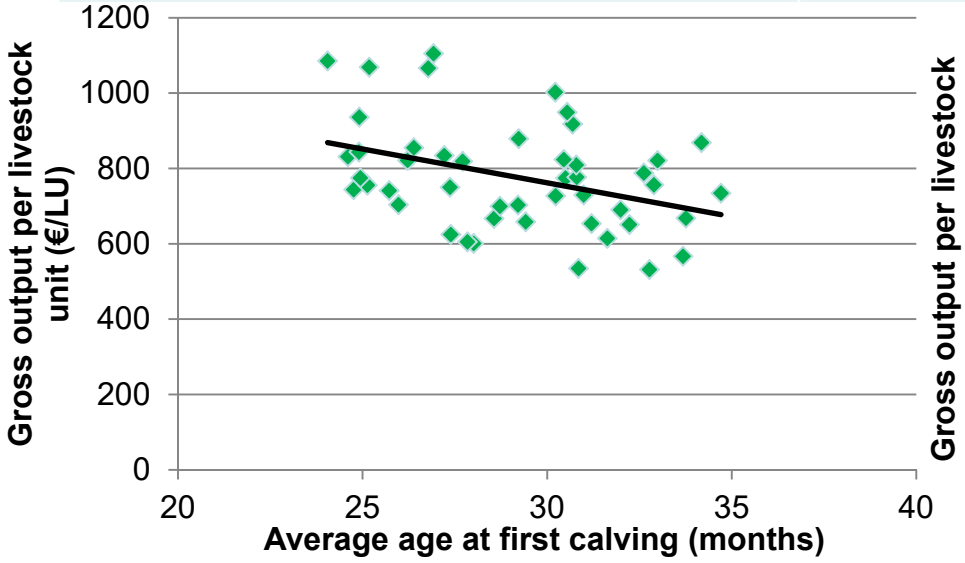
* P<0.05, ** P<0.01, *** P<0.001

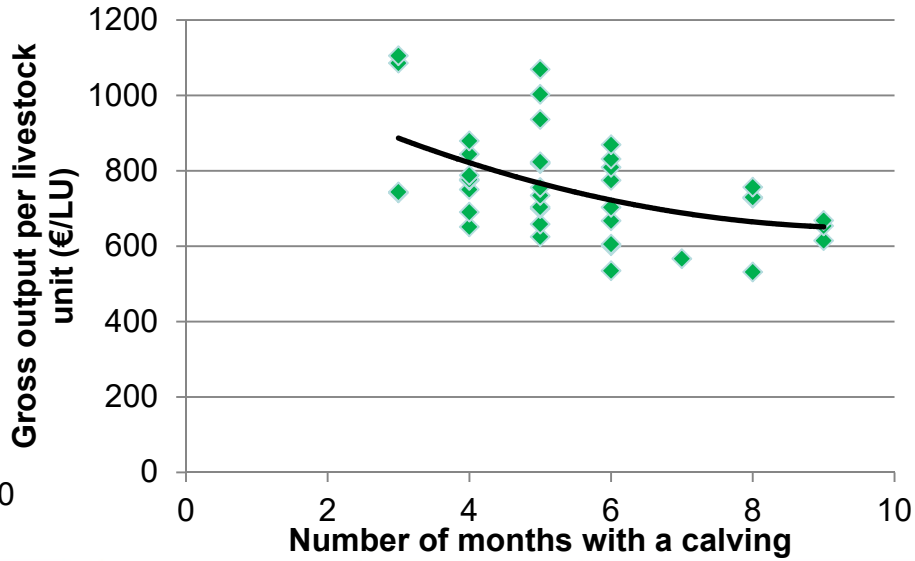
All farms


r^2 = 0.17, y=-10.498x + 1056.76, P<0.001
Gross output per livestock unit (€/LU)
1600
1400
1200
1000
800
600
400
200
0
22
24
26
28
30
32
34
36
Average age at first calving (months)

System Analysis

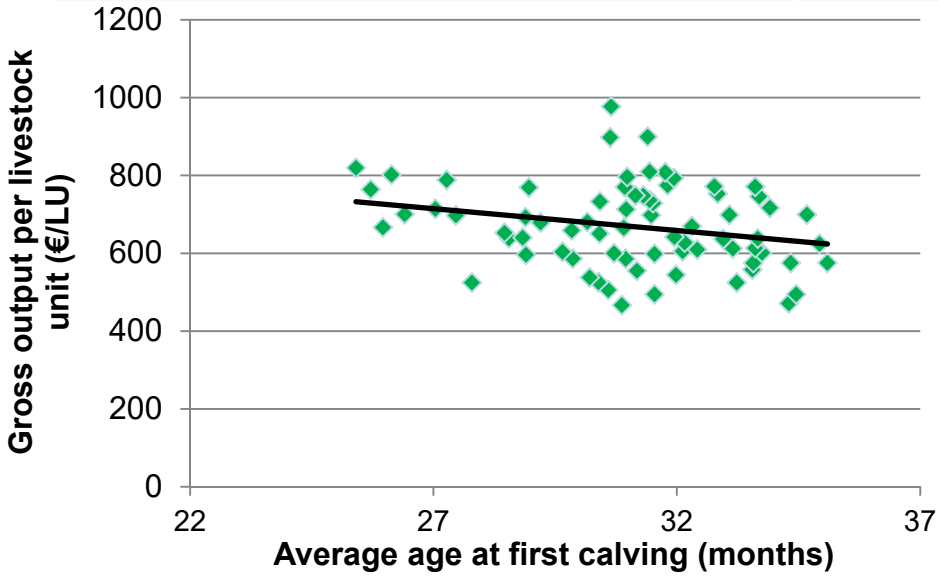
	Slope	R-squared	P-value
Suckler to finishing (∑r-sq=0.29)			
Intercept	**1686.15**	**0.000**	
Average age at first calving	**-14.80**	**0.144**	**<0.05**
Number months with calving	**-165.98**	**0.136**	**<0.01**
Number months with calving²	**12.92**	**0.016**	**<0.01**

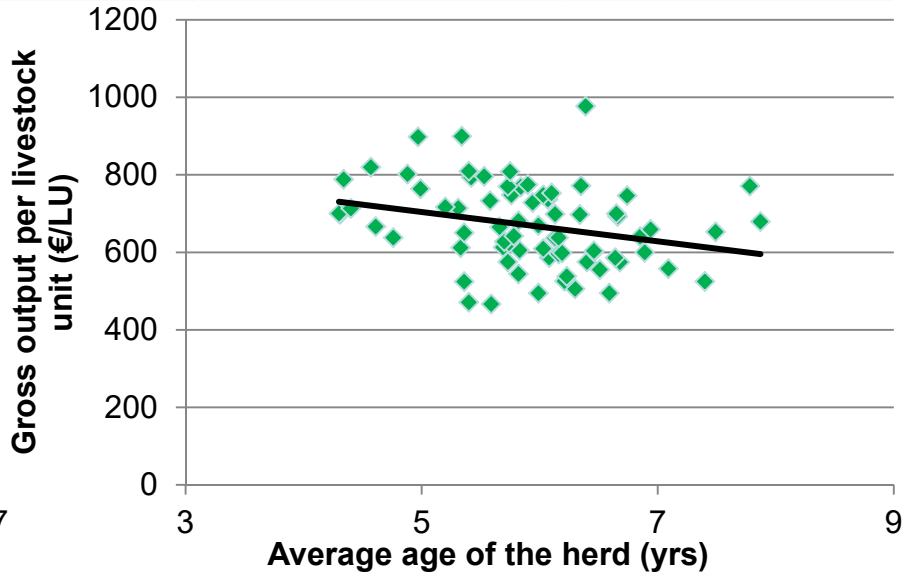




System Analysis

	Slope	R-squared	P-value
Suckler to live sale (∑r-sq=0.191)			
Intercept	499.84	0.000	
Average age at first calving	-13.19	0.1058	0.1
Average age of herd	-46.92	0.0458	0.07





Conclusion

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- Calving rate and weaning rate are found to be positively associated with gross output
- Average age at first calving is negatively related with calving rate, weaning rate and gross output
- Calf mortality negatively impacts on calving rate, weaning rate and gross output
- Average age at first calving and number of months with a calving were the main variables effecting gross output on suckler to finishing farms
- Average age at first calving and average age of the herd were the main reproductive factors contributing to gross output on suckler to live sale farms
- Analysis at animal level will be carried out to elucidate these results further

Thank You

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