





# Economics of Reproduction on Dairy Farms

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# Would $\uparrow$ Pregnancy Risk $\uparrow$ Net \$?

- No 

- Yes 

# Why?

1.

2.

3.

4.

How? 1.

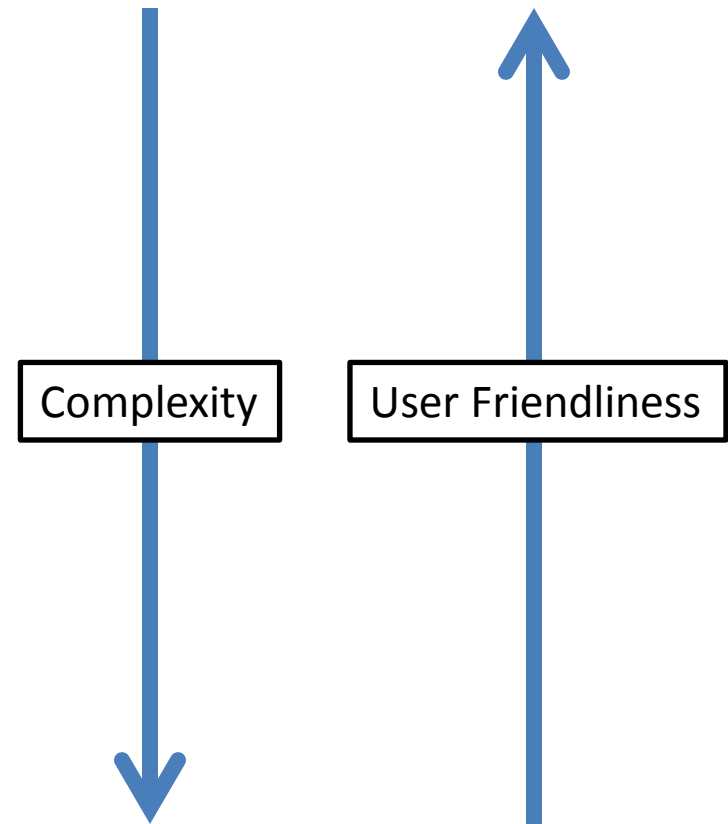
How? 2.

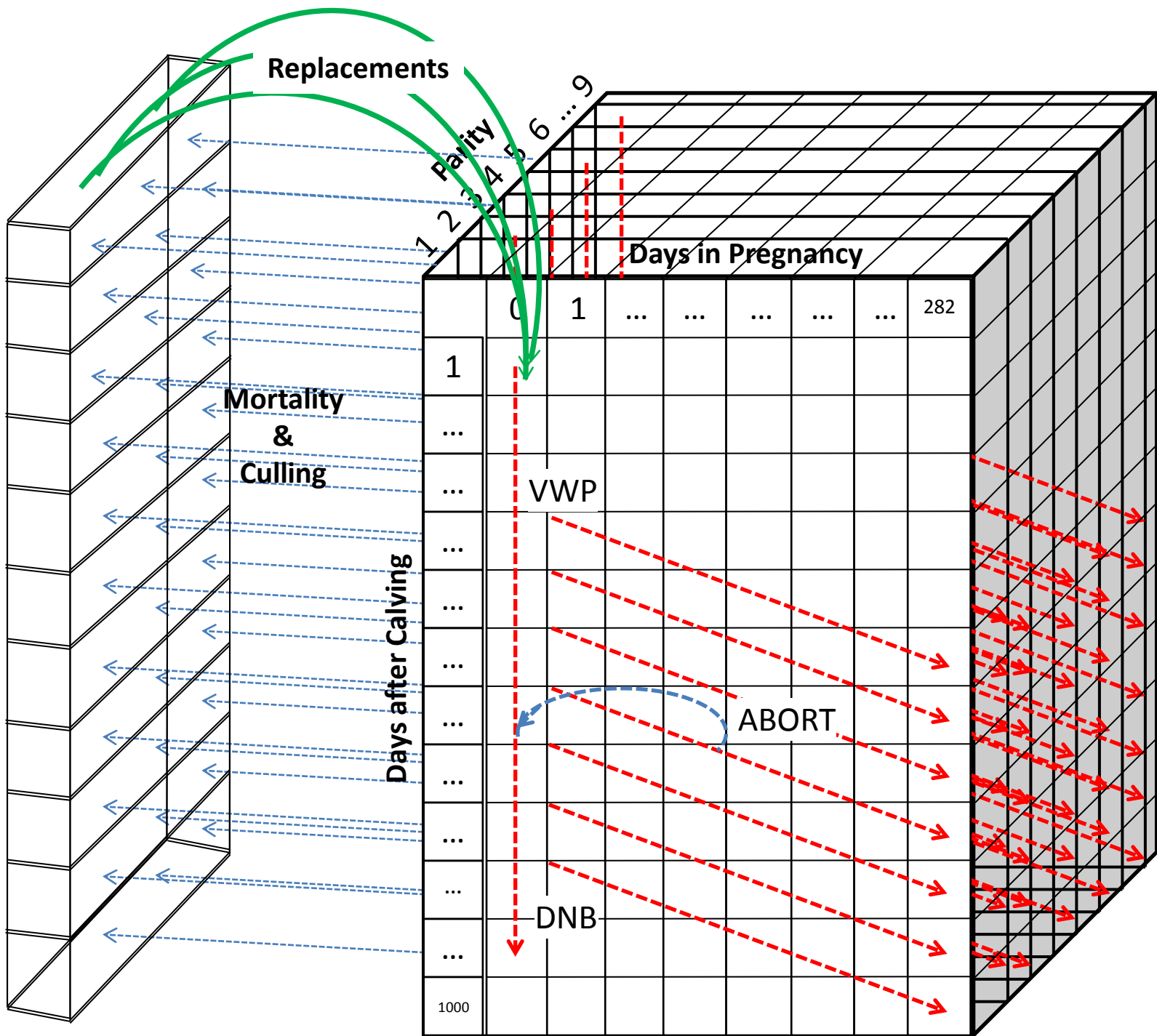
How? 3.

How? 4.

# How we integrate all these factors?

- Cost Benefit
- Partial Budgeting
- Markov-chains
- Dynamic Programming





**Replacements**

**Parity**  
1 2 3 4 5 6 ... 9

**Days in Pregnancy**

**Mortality & Culling**

**Days after Calving**

**VWP**

**ABORT**

**DNB**

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# Markov-Chain Model

- Net Return for each “state” (each cube)
- Herd population reaches a “steady state”
- Value of a reproductive program:
  - Sumproduct of:
    - Proportion of cows in each state
    - Net Return in each state
- Value of improving reproductive performance:
  - Difference of value between 2 reproductive programs

# Data Needed

## 1. Reproductive Performance

[Parity] x [DIM]

VWP

DNB Criteria

Repro Cull Criteria

Dry-off Time

## 2. Abortion

[Parity] x [DIP]

# Data Needed

## 3. Involuntary Culling

[Parity] x [DIM] x [DIP]

## 4. Mortality

[Parity] x [DIM] x [DIP]

# Data Needed

## 5. Milk Production

[Parity] x [DIM] x [DIP]

## 6. Feed Consumption

[Parity] x [DIM] x [DIP]

# Data Needed

## 7. Economics

Repro Costs

Milk Price

Feed Price

Heifer Value

Calf Value

Salvage Value

...

# The Value of ↑ Preg. Risk

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	Before	After
21-d PR	<b>15%</b>	<b>20%</b>
Cost Repro Program (\$/cow/mo)	<b>25</b>	<b>30</b>

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Value of ↑21-d PR:  
15% → 20%

21-d PR	\$/cow/yr	
20%, \$30/mo	1706	<b>Net Gain \$/cow/yr</b>
15%, \$25/mo	1624	<b>82</b>

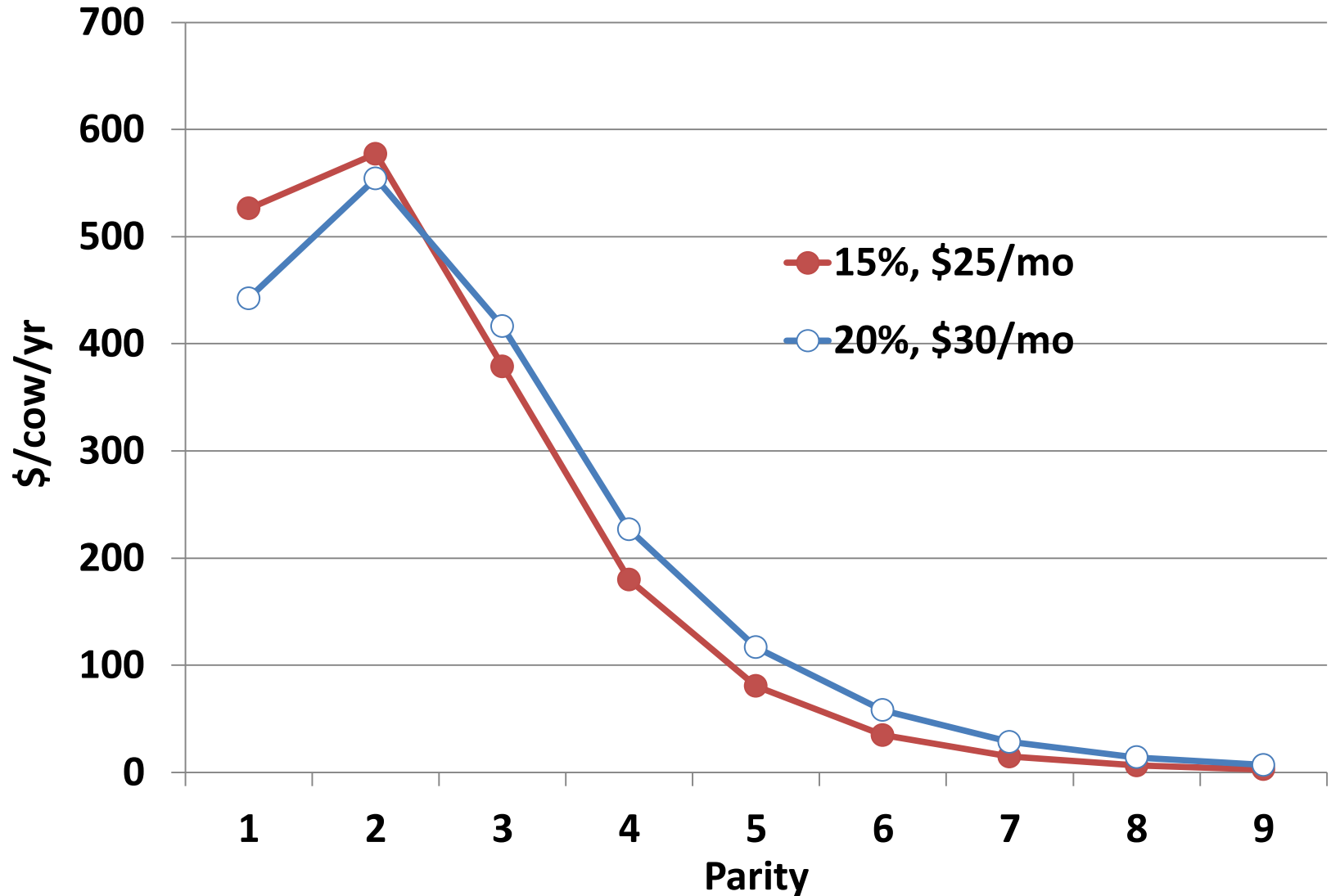
# Value Contribution (All Parities)

<b>21-d PR</b>	<b>IOFC</b>	<b>Cull</b>	<b>Repro</b>	<b>Calves</b>
	<b>\$/cow/yr</b>			
20%, \$30/mo	1863	-162	-128	133
15%, \$25/mo	1801	-169	-125	117
<b>Difference</b>	<b>+62</b>	<b>+7</b>	<b>-3</b>	<b>+16</b>

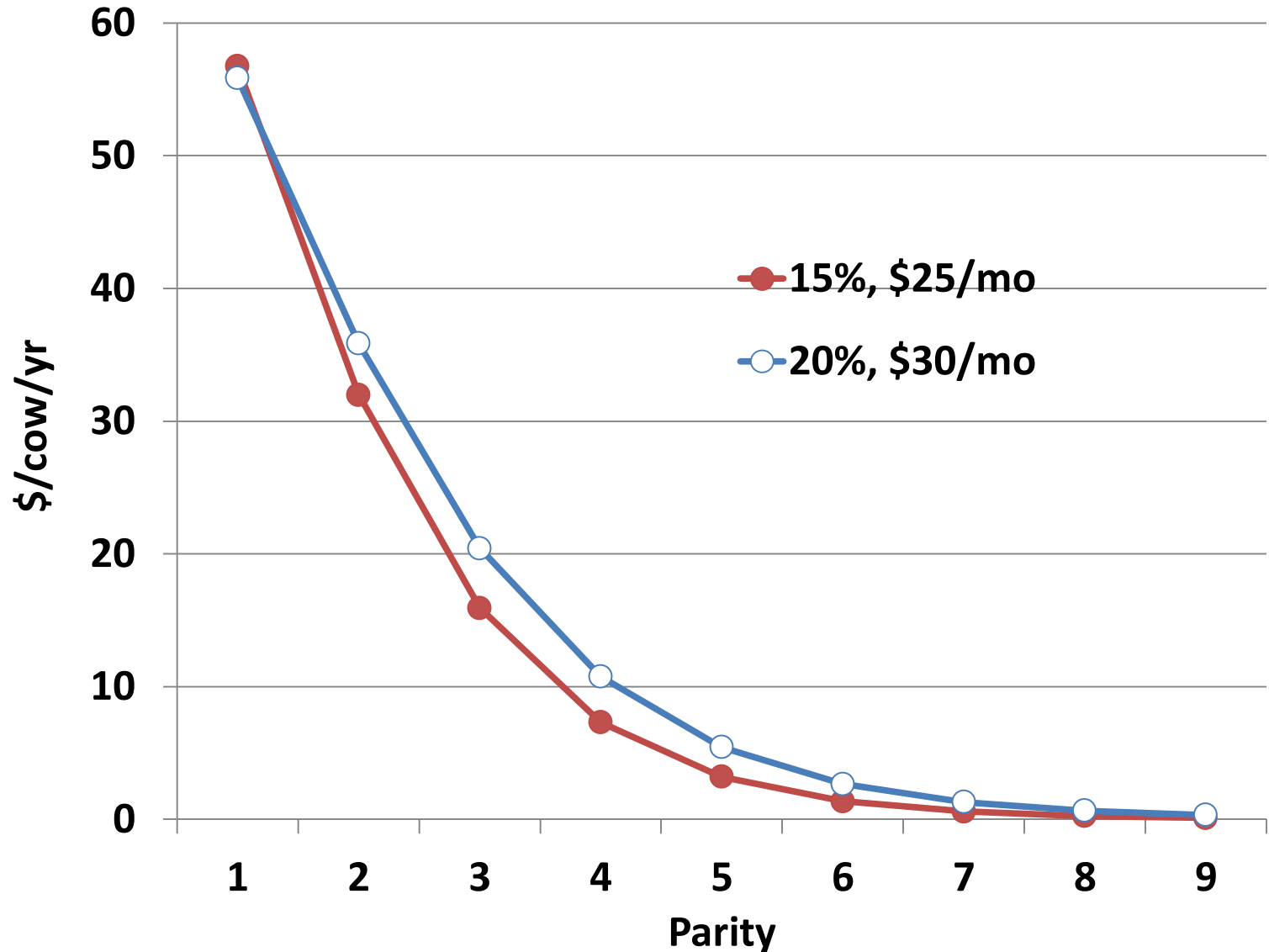
# Herd Population (By Parity)

	<b>Proportion of Animals/Parity</b>			
<b>21-d PR</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>&gt;3<sup>rd</sup></b>
20%, \$30/mo	39.36	27.26	16.15	17.23
15%, \$25/mo	45.42	28.00	14.53	12.04
Difference	<b>-6.06</b>	<b>-0.74</b>	<b>+1.62</b>	<b>+5.19</b>

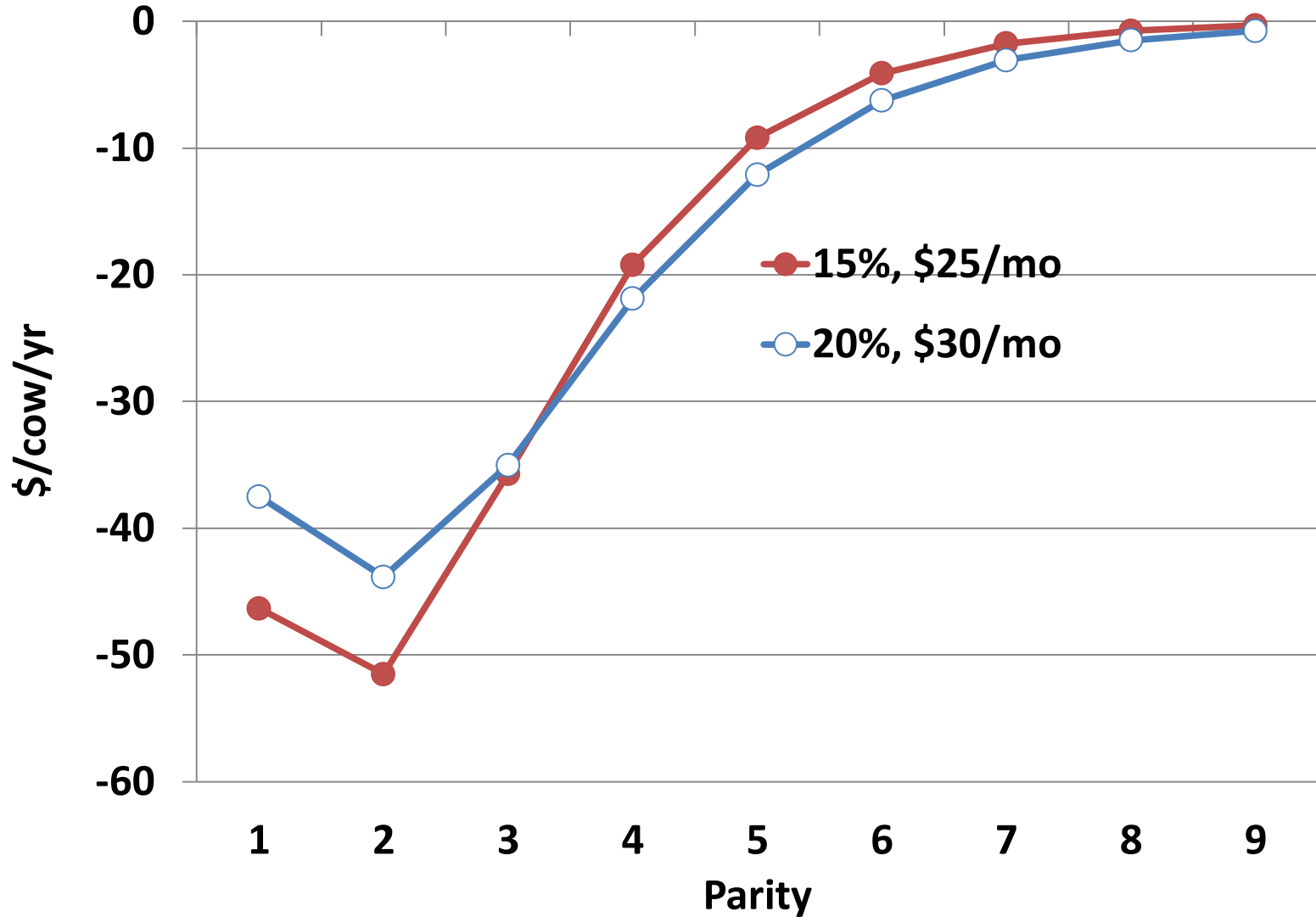
# Value Contribution (IOFC by Parity)



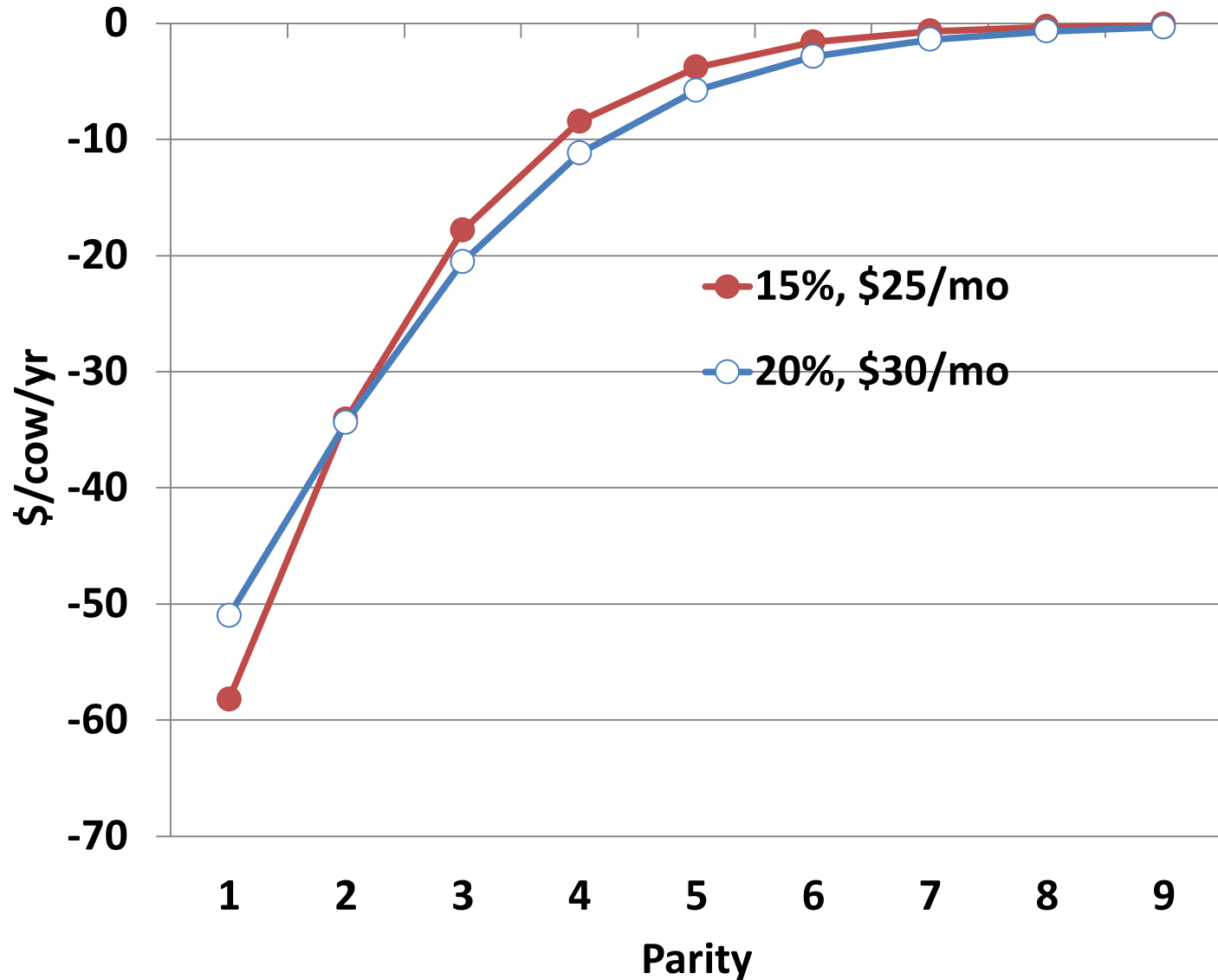
# Value Contribution (Calves by Parity)



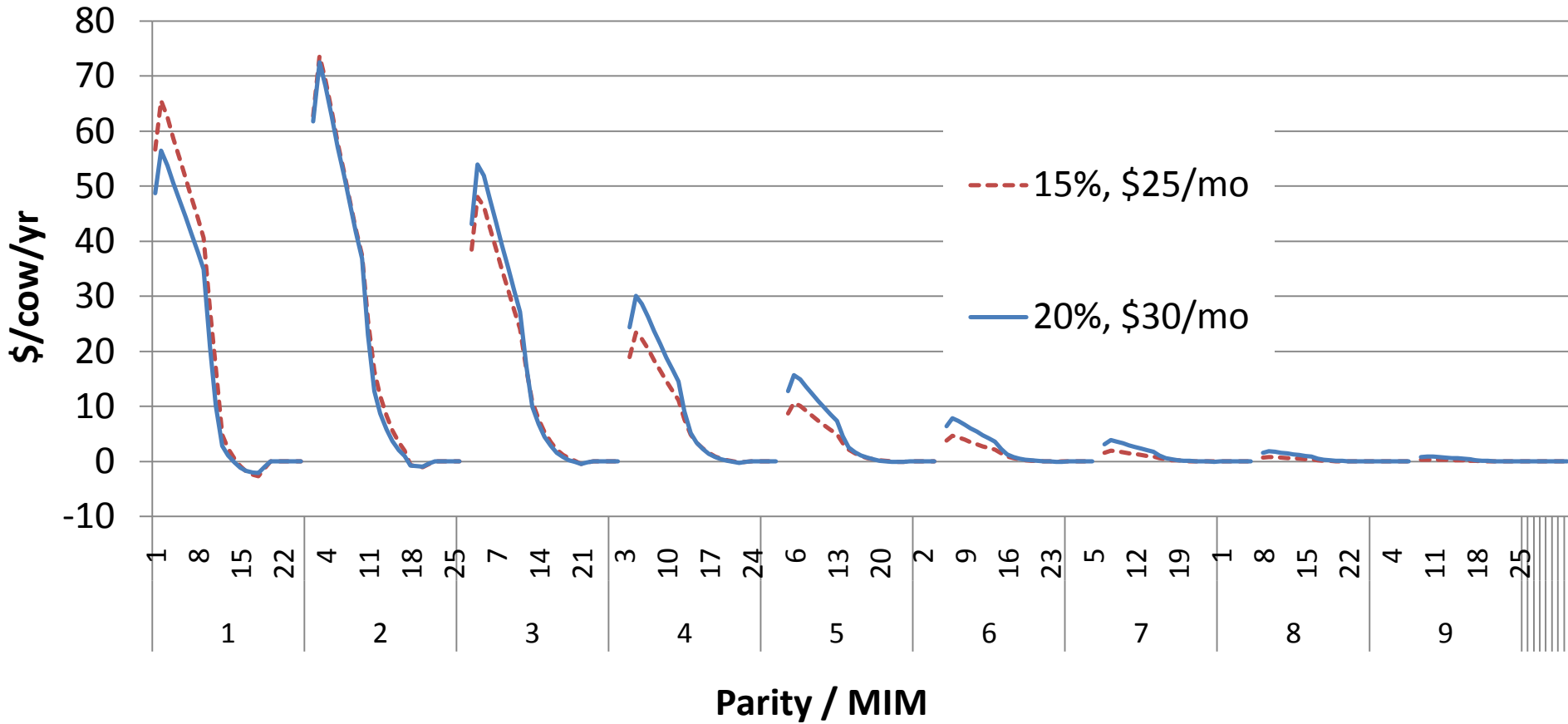
# Value Contribution (Cull by Parity)



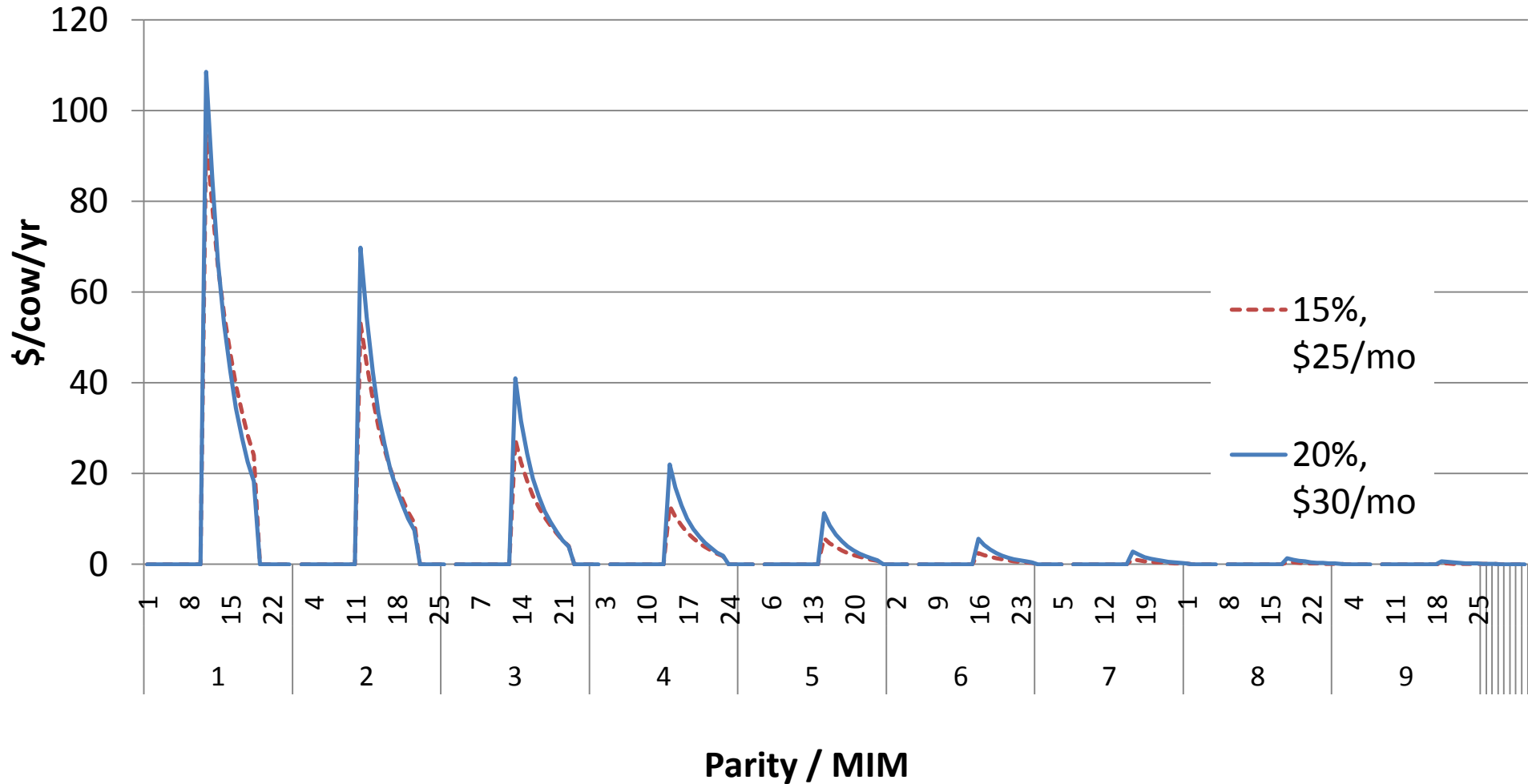
# Value Contribution (Repro by Parity)



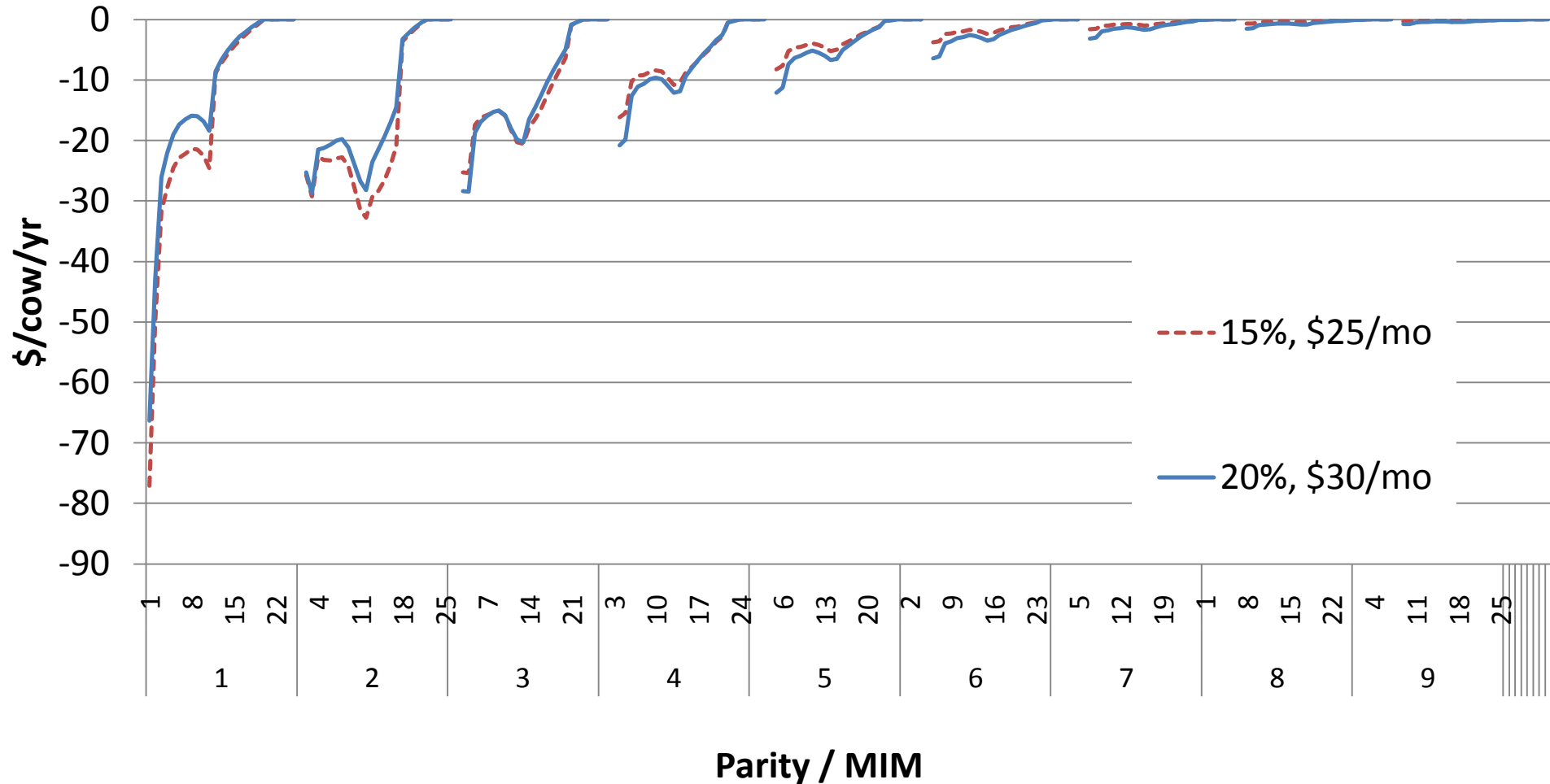
# Value Contribution (IOFC x MIM)



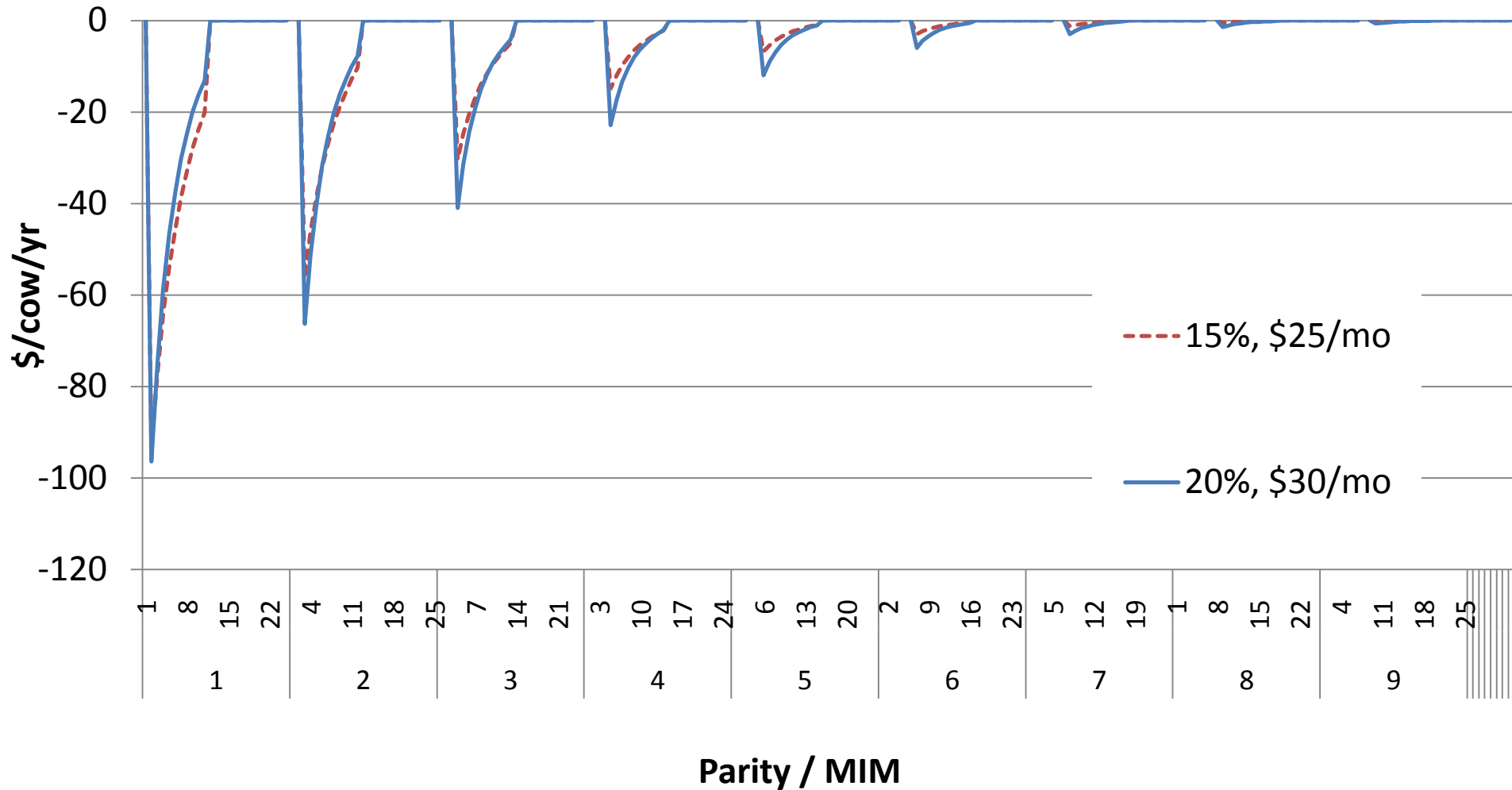
# Value Contribution (CALVES x MIM)



# Value Contribution (CULL x MIM)



# Value Contribution (REPRO x MIM)



# DairyMGT.info → Tools

- Video
- Demonstration

## Dairy Reproductive Economic Analysis

V.E. Cabrera



Overview	Upload	Repro	Abort	Cull	Milk	Economics	Run Model	Results	Evaluation
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Total Number of Cows	100
Iterations Performed	699
Reached Steady State	YES

	Total Revenues & Costs				
	IOFC	Cull	Repro	Calves	Net Return
\$/herd/month	15313.62	-1330.85	-1053.77	1095.03	14024.02
\$/herd/day	510.45	-44.36	-35.13	36.5	467.47
\$/cow/year	1863.16	-161.92	-128.21	133.23	1706.26

Month in Milk	Month in Pregnancy										Revenues & Costs (\$)				
	0	1	2	3	4	5	6	7	8	9	Cull Cows	IOFC	Cull	Repro	Calves
	Lactation 1														
1	3.35										0.14	400.46	-66.29	0.00	0.00
2	3.22										0.09	463.81	-43.07	96.46	0.00
3	2.50	0.63									0.05	441.97	-26.05	75.04	0.00
4	1.96	0.49	0.62								0.05	415.34	-22.10	58.83	0.00
5	1.56	0.38	0.49	0.60							0.04	389.69	-18.97	46.76	0.00
6	1.25	0.31	0.38	0.47	0.58						0.04	365.82	-17.31	37.62	0.00
7	1.02	0.25	0.30	0.37	0.45	0.57					0.03	340.08	-16.53	30.48	0.00
8	0.82	0.20	0.24	0.29	0.36	0.44	0.56				0.03	313.43	-15.89	24.72	0.00
9	0.67	0.16	0.20	0.23	0.28	0.35	0.44	0.56			0.03	286.69	-15.94	20.04	0.00
10	0.54	0.13	0.16	0.19	0.23	0.28	0.34	0.44	0.55		0.03	170.65	-16.84	16.23	0.00
11	0.44	0.10	0.13	0.15	0.18	0.22	0.27	0.34	0.43	0.54	0.46	82.50	-18.41	13.10	108.52
12	0.01		0.10	0.12	0.15	0.18	0.22	0.27	0.34	0.43	0.03	23.36	-8.59	0.00	85.07
13	0.01			0.10	0.12	0.15	0.18	0.22	0.27	0.33	0.02	8.95	-6.67	0.00	66.68
14	0.01				0.10	0.12	0.14	0.18	0.22	0.27	0.02	-1.71	-5.11	0.00	53.01
15	0.00					0.10	0.12	0.14	0.17	0.21	0.01	-9.12	-3.84	0.00	42.62
16	0.00						0.09	0.12	0.14	0.17	0.01	-13.72	-2.82	0.00	34.47
17	0.00							0.09	0.11	0.14	0.00	-16.22	-1.99	0.00	27.91
18	0.00								0.09	0.11	0.00	-17.22	-1.27	0.00	22.58
19	0.00									0.09	0.00	-7.65	-0.61	0.00	18.21
20											0.00	0.00	0.00	0.00	0.00

**Questions,  
Comments,  
Discussion!**

