

ADVENTURER EXPLORER TRAILBLAZER REBEL PIONEER CREATOR DEFENDER ADVENTURER EXPLORER TRAILBLAZER  
REBEL PIONEER CREATOR DEFENDER ADVENTURER EXPLORER TRAILBLAZER REBEL PIONEER CREATOR DEFENDER ADVENTURER EXPLORER TRAILBLAZER REBEL PIONEER CREATOR DEFENDER

# Adjusted Rates... Estimate Statement or LSMEANS?



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## What is a rate ratio?

- Like a mean difference

## What is the confidence interval of rate ratio?

- Like the confidence interval of a mean difference

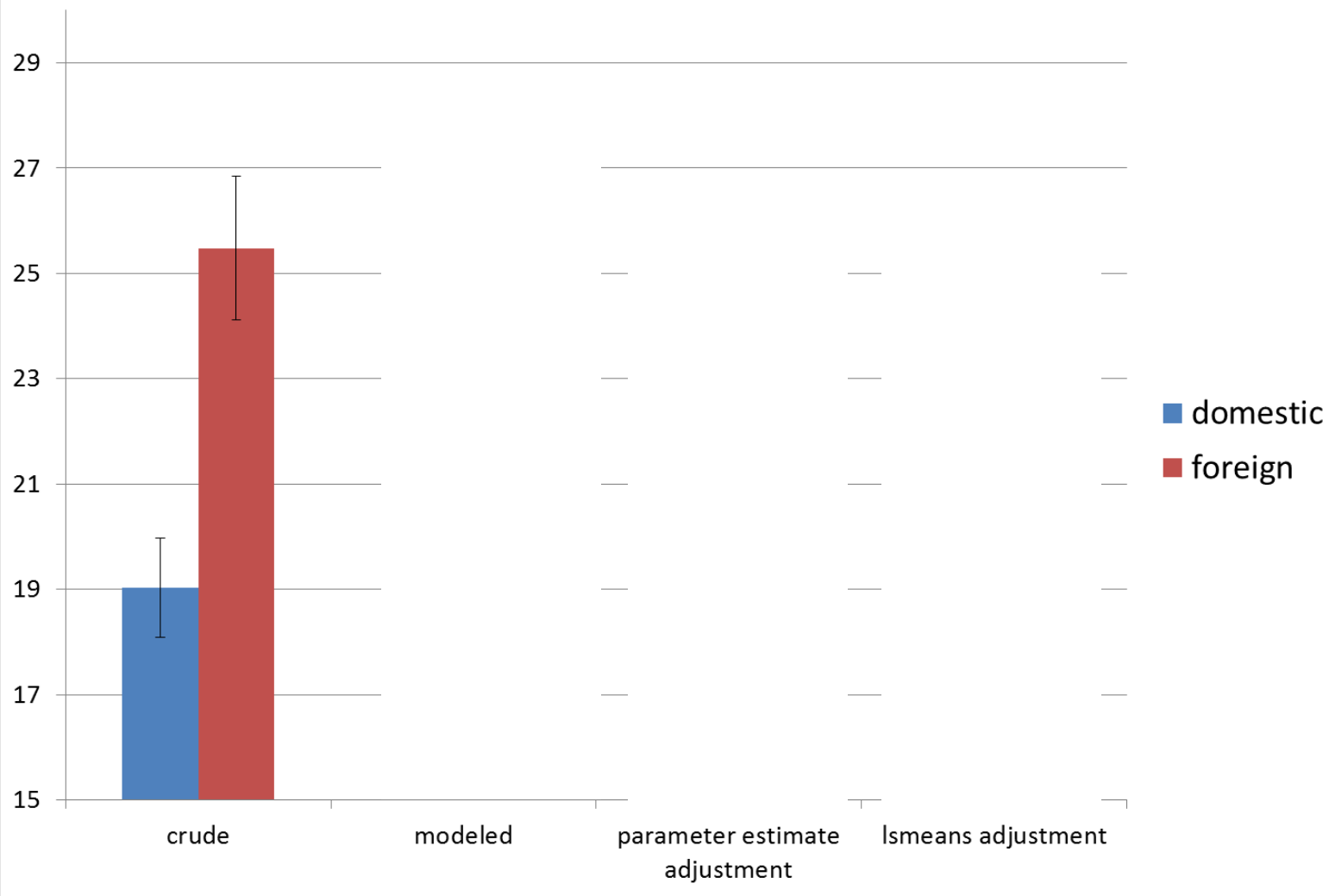
# Gas Mileage for Cars

The MEANS Procedure

Analysis Variable : MPG

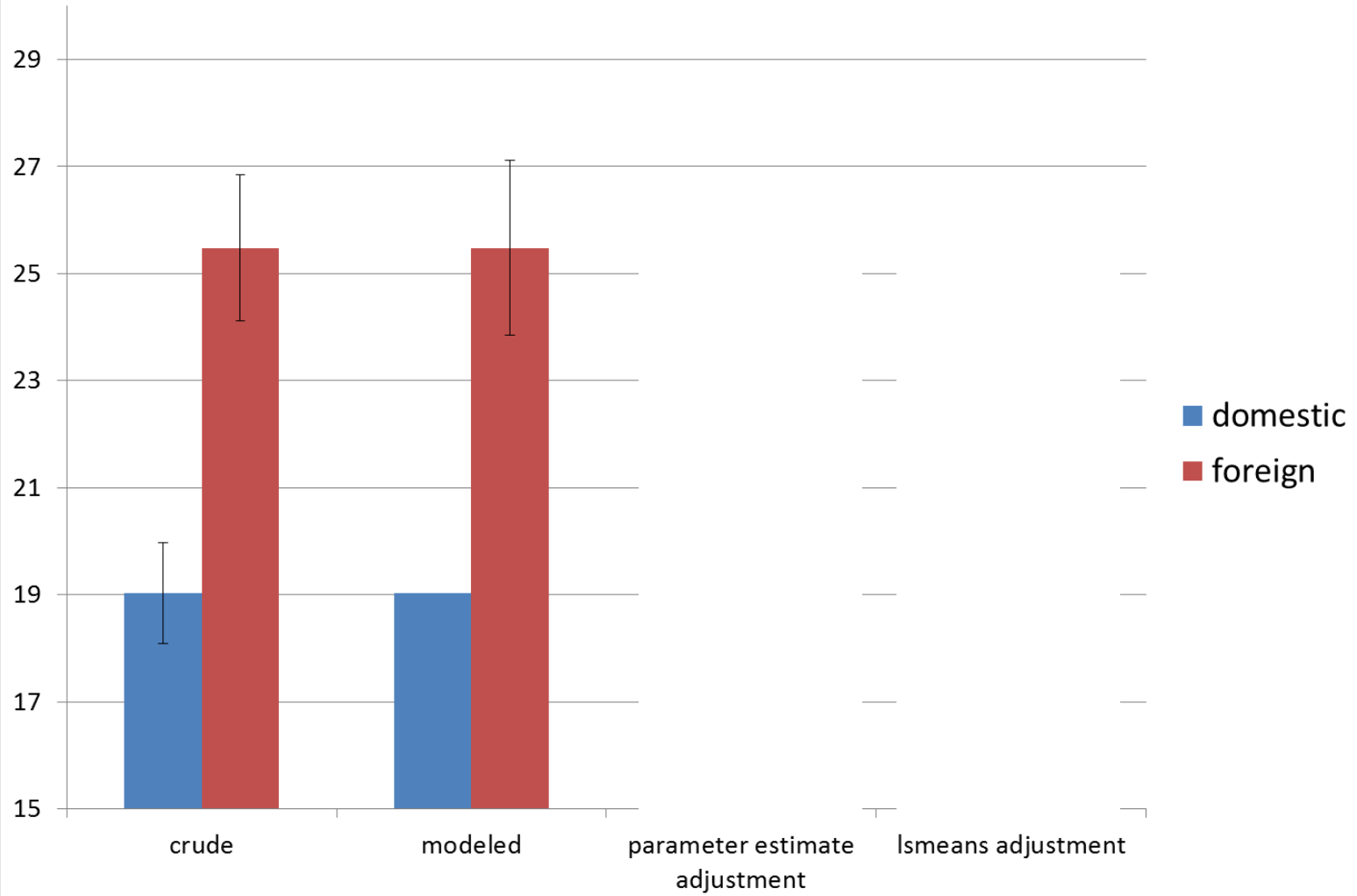
	N	Mean	Std Error	Lower 95% CL for Mean	Upper 95% CL for Mean
foreign	79	25.4810127	0.6871711	24.1129602	26.8490652
domestic	79	19.0253165	0.4721984	18.0852416	19.9653913

### Miles/Gallon for Automobiles



Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	19.02531646 B	0.5895	32.27	<.0001
foreign	6.45569620 B	0.8337	7.74	<.0001

### Miles/Gallon for Automobiles



## Adjusted Model

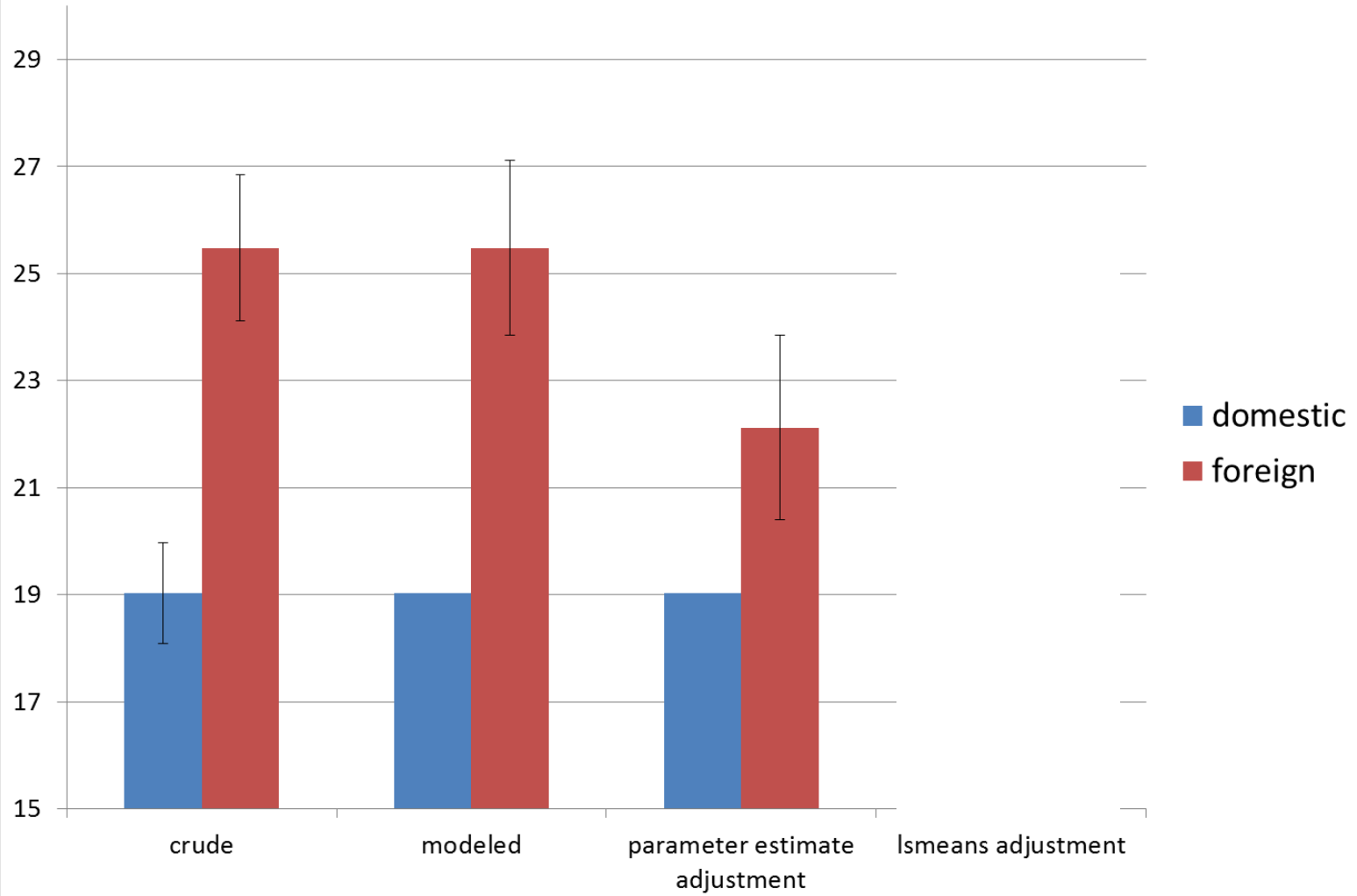
Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	14.46710577 B	0.5237	27.62	<.0001
foreign	3.09736490 B	0.6188	5.01	<.0001
commuter	22.81804948	1.6883	13.52	<.0001

Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	14.46710577 B	0.5237	27.62	<.0001
foreign	<b>3.09736490 B</b>	0.6188	5.01	<.0001
commuter	22.81804948	1.6883	13.52	<.0001

We usually use this number for adjusted values, and add it to some anchor value (i.e., the Manitoba rate or average)



### Miles/Gallon for Automobiles



## Adjusted Model

Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	14.46710577 B	0.5237	27.62	<.0001
foreign	3.09736490 B	0.6188	5.01	<.0001
commuter	22.81804948	1.6883	13.52	<.0001

Use mean commuter value of .27335

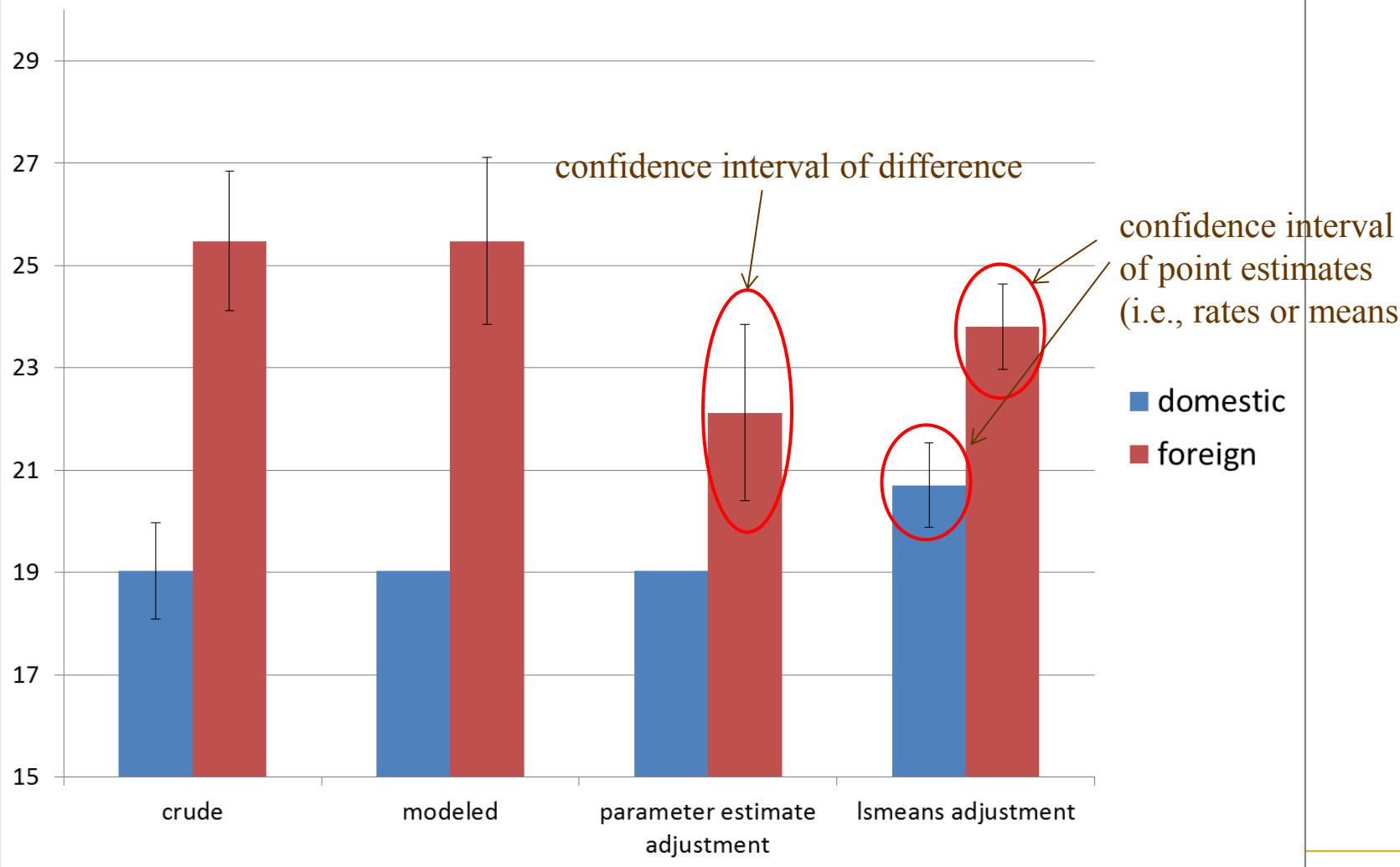
$$\text{Domestic} = 14.467 + (22.818 * .27335) = 20.70$$

$$\text{Foreign} = 14.467 + 3.097 + (22.818 * .27335) = 23.80$$

lsmeans foreign/cl;

	MPG LSMEAN	95% Confidence Limits	
domestic	20.70	19.875	21.533
foreign	23.80	22.973	24.630

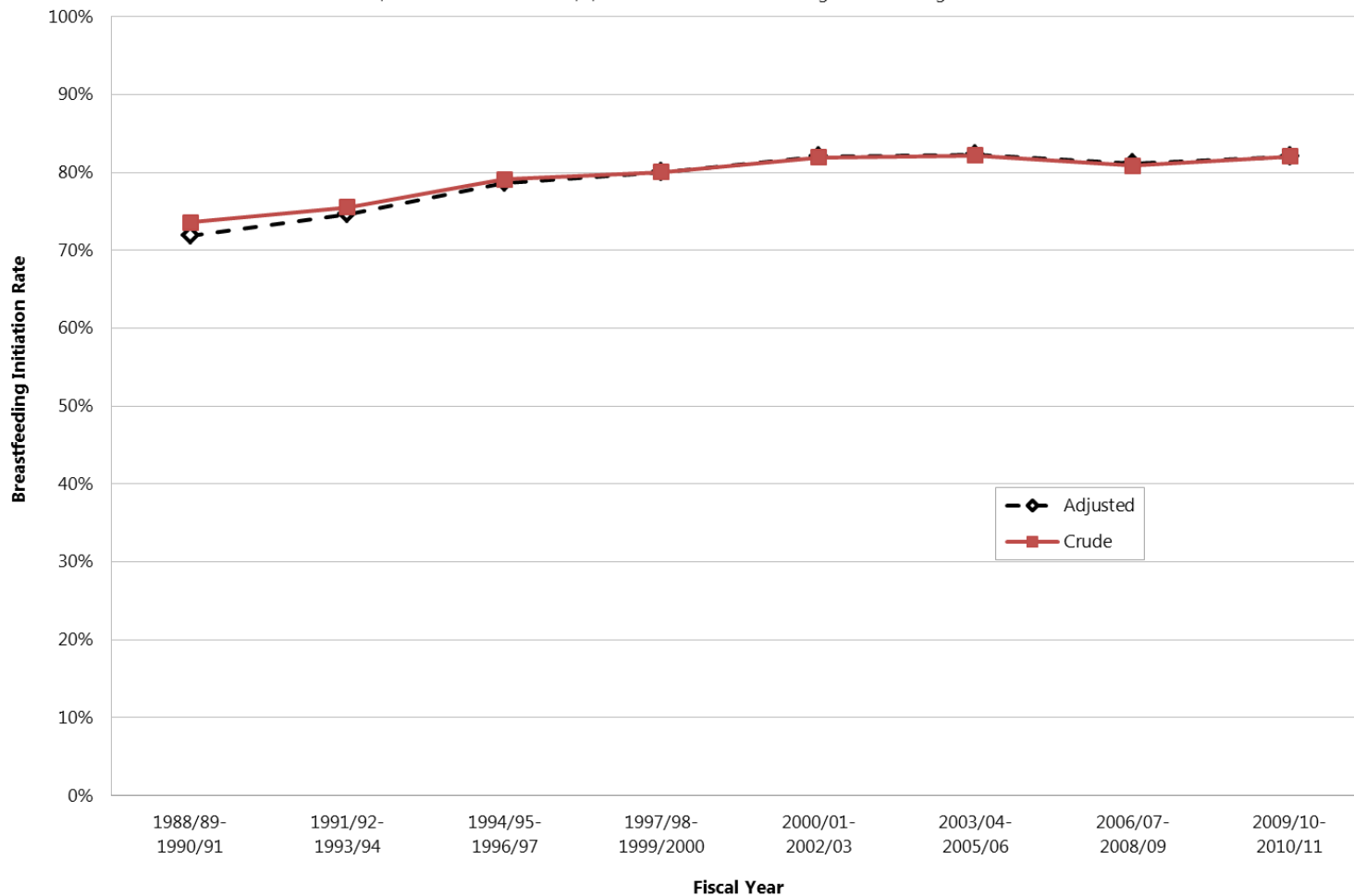
### Miles/Gallon for Automobiles



### Breastfeeding Initiation Rate in Manitoba Hospitals, 1988/89 - 2010/11

Adjusted (by maternal age at first birth), live newborns aged 37+ weeks

N = 316,027 newborns included, 3,839 excluded due to missing breastfeeding initiation data

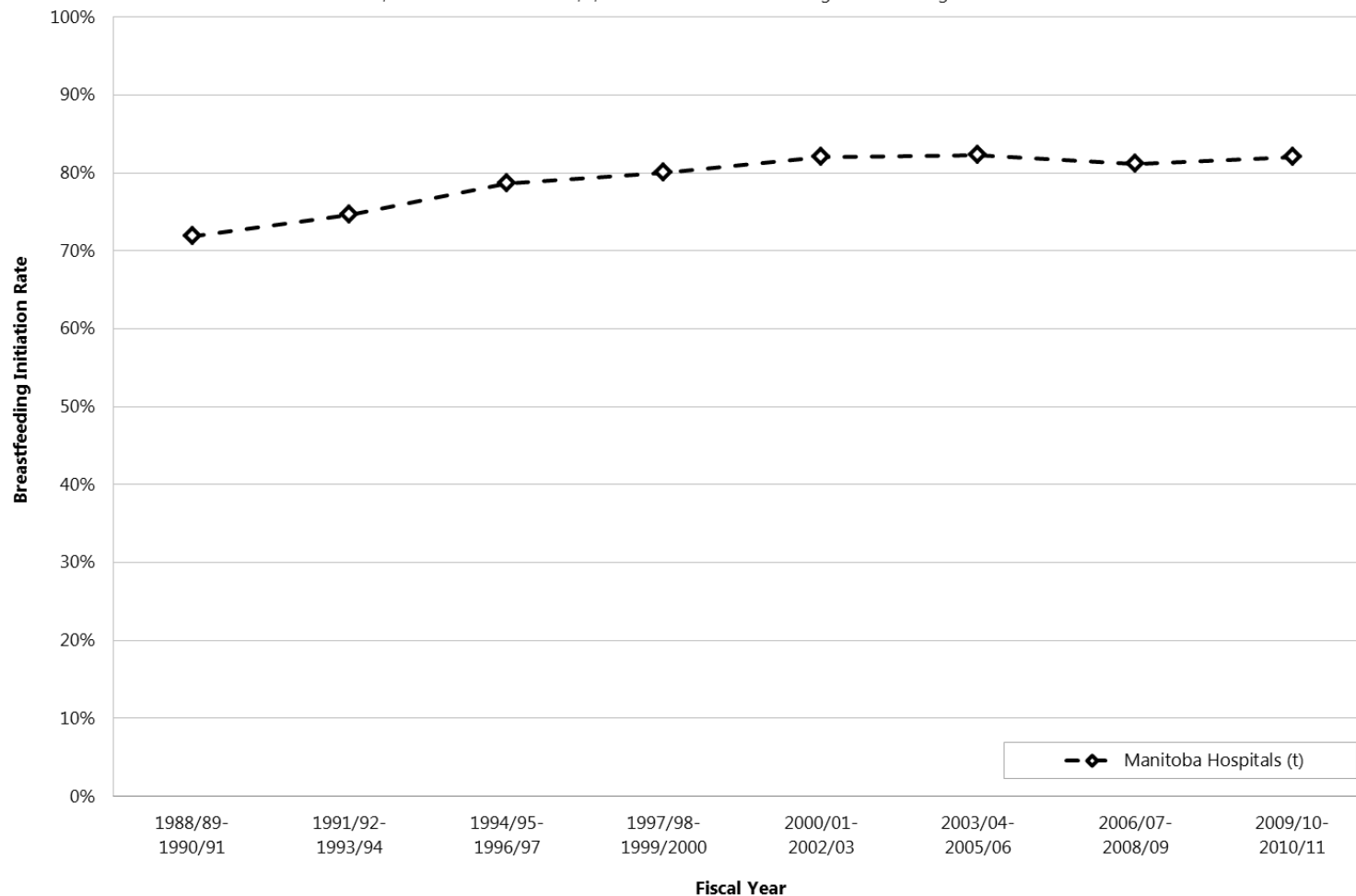


t indicates change over time was statistically significant at p < 0.05

**Breastfeeding Initiation Rate in Manitoba Hospitals, 1988/89 - 2010/11**

Adjusted (by maternal age at first birth), live newborns aged 37+ weeks

N = 316,027 newborns included, 3,839 excluded due to missing breastfeeding initiation data

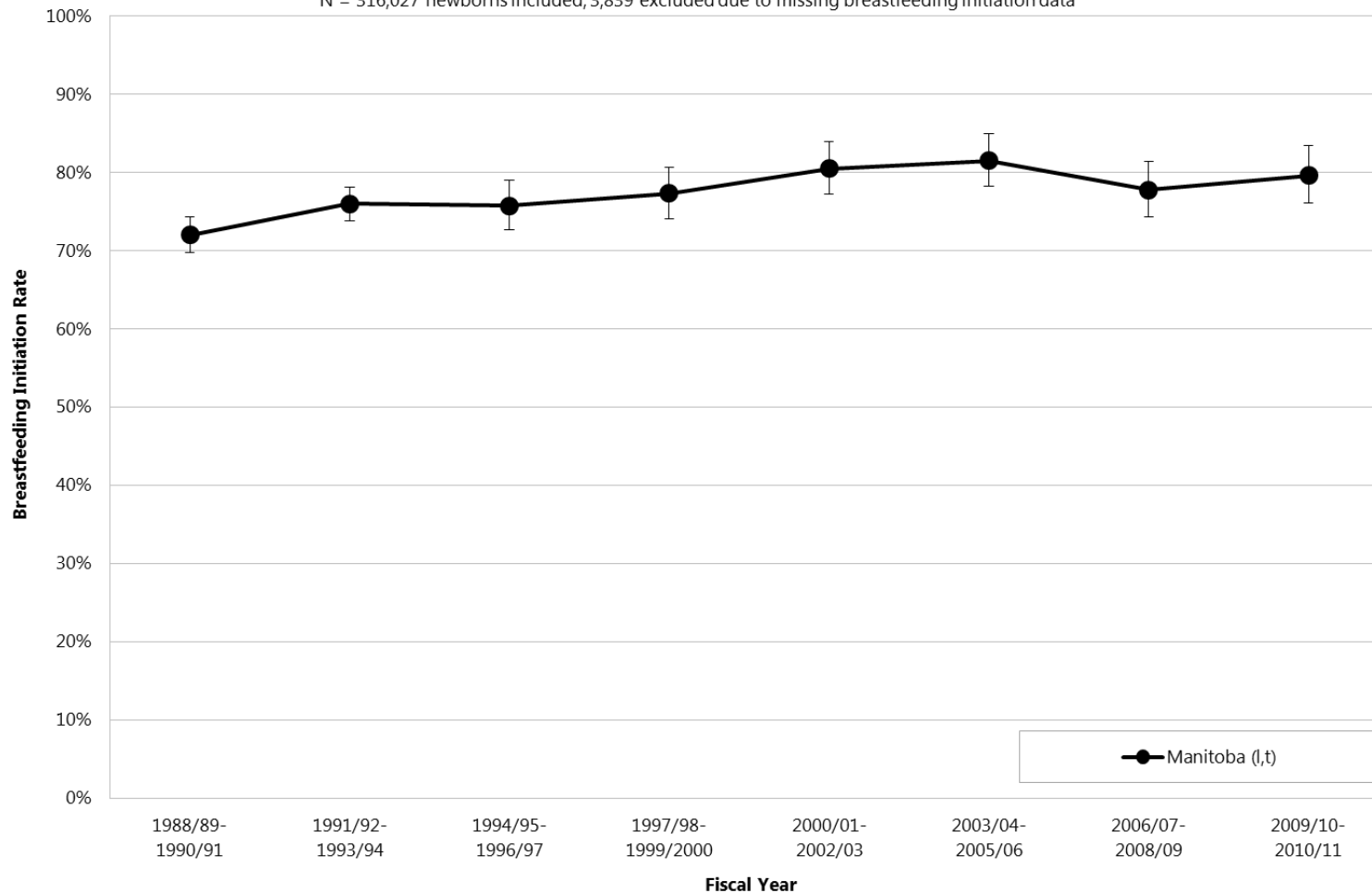


t indicates change over time was statistically significant at p<0.05

### Breastfeeding Initiation Rate in All Hospitals, 1988/89 - 2010/11

Adjusted (by maternal age at first birth), live newborns aged 37+ weeks

N = 316,027 newborns included, 3,839 excluded due to missing breastfeeding initiation data



l indicates rate was statistically different from Manitoba in the last time period at  $p < 0.05$

t indicates change over time was statistically significant at  $p < 0.05$

## Short story...

### Deliverables –

use the regular method, since error bars are not included and adjusting rates to Manitoba average is desired

### Journal Articles –

regular method may not be good enough  
May need to present confidence intervals of point estimates



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INNOVATOR CHALLENGER REBEL VISIONARY

REBEL PIONEER CREATOR EXPLORER TRAILBLAZER INNOVATOR

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