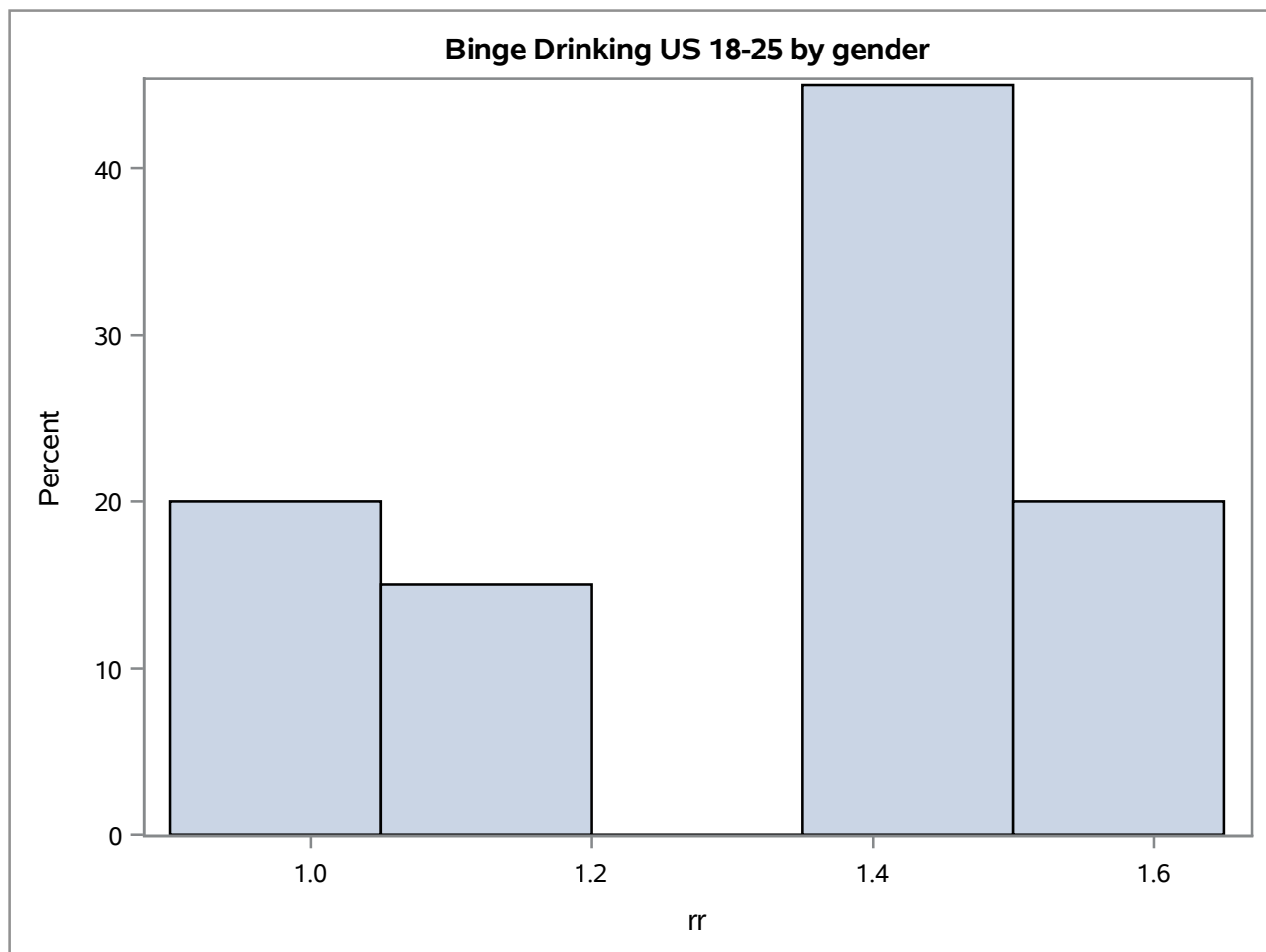
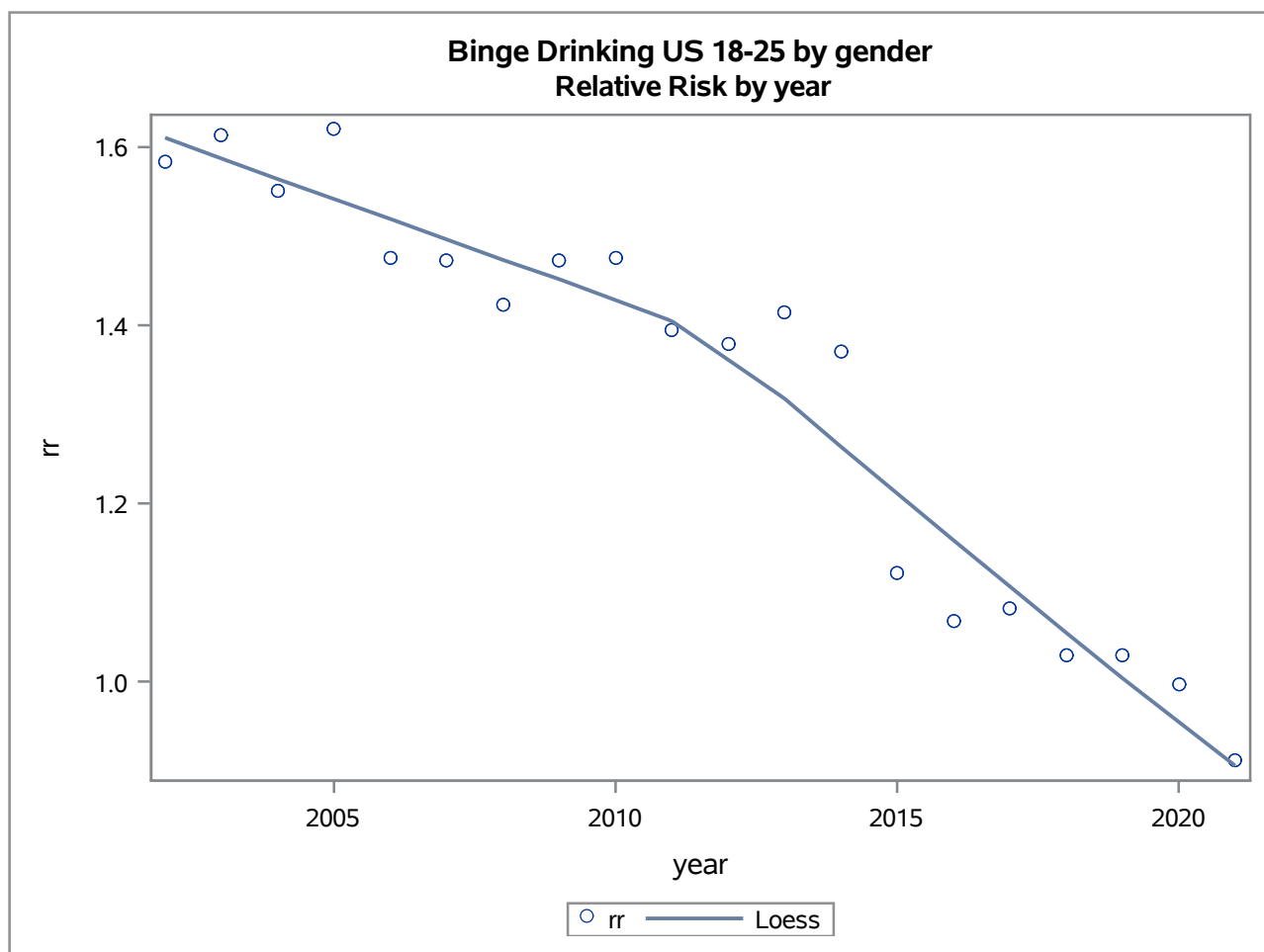


## Binge Drinking US 18-25 by gender

1

Obs	year	rr	ln_rr
1	2002	1.58360	0.45970
2	2003	1.61321	0.47822
3	2004	1.55108	0.43895
4	2005	1.62069	0.48285
5	2006	1.47507	0.38871
6	2007	1.47337	0.38755
7	2008	1.42353	0.35314
8	2009	1.47337	0.38755
9	2010	1.47546	0.38897
10	2011	1.39458	0.33259
11	2012	1.37952	0.32173
12	2013	1.41401	0.34643
13	2014	1.37107	0.31559
14	2015	1.12228	0.11536
15	2016	1.06739	0.06521
16	2017	1.08192	0.07874
17	2018	1.02907	0.02866
18	2019	1.02959	0.02916
19	2020	0.99682	-0.00319
20	2021	0.91148	-0.09269





# Binge Drinking US 18-25 by gender Relative Risk by year

4

## The GLM Procedure

Number of Observations Read	20
Number of Observations Used	20

# Binge Drinking US 18-25 by gender Relative Risk by year

5

## The GLM Procedure

Dependent Variable: rr

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.92340713	0.92340713	163.08	<.0001
Error	18	0.10192166	0.00566231		
Corrected Total	19	1.02532878			

R-Square	Coeff Var	Root MSE	rr Mean
0.900596	5.681887	0.075248	1.324355

Source	DF	Type I SS	Mean Square	F Value	Pr > F
year	1	0.92340713	0.92340713	163.08	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
year	1	0.92340713	0.92340713	163.08	<.0001

Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	76.28025527	5.86959292	13.00	<.0001
year	-0.03726368	0.00291801	-12.77	<.0001

# Binge Drinking US 18-25 by gender Relative Risk by year

6

## The GLM Procedure

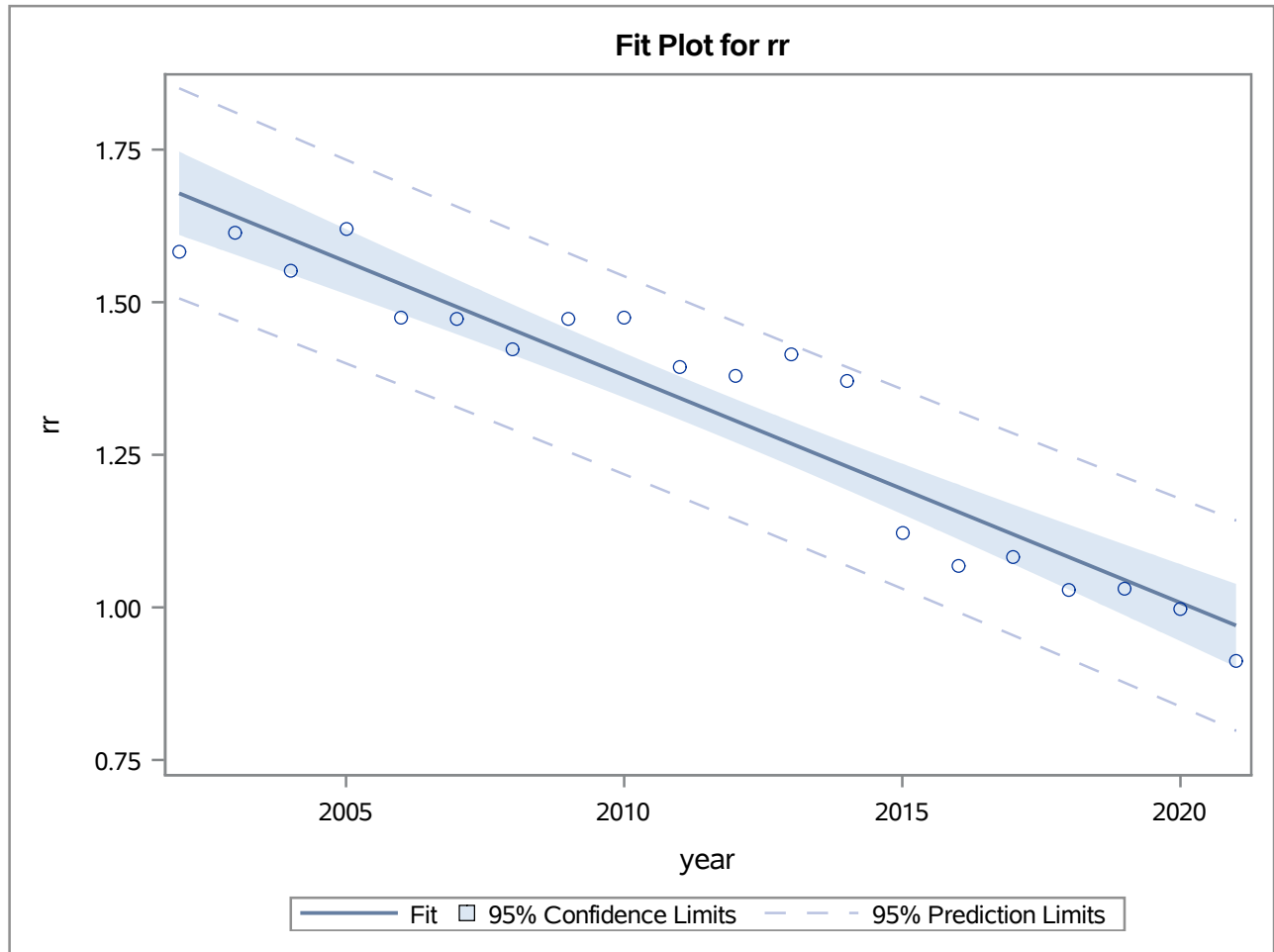
Observation	Observed	Predicted	Residual	95% Confidence Limits for Mean Predicted Value	
1	1.58359621	1.67835995	-0.09476373	1.61023133	1.74648856
2	1.61320755	1.64109626	-0.02788871	1.57812791	1.70406461
3	1.55108359	1.60383258	-0.05274899	1.54583530	1.66182986
4	1.62068966	1.56656889	0.05412076	1.51330050	1.61983728
5	1.47507331	1.52930521	-0.05423190	1.48045314	1.57815728
6	1.47337278	1.49204153	-0.01866874	1.44720076	1.53688229
7	1.42352941	1.45477784	-0.03124843	1.41342534	1.49613034
8	1.47337278	1.41751416	0.05585862	1.37898454	1.45604377
9	1.47546012	1.38025047	0.09520965	1.34372379	1.41677716
10	1.39457831	1.34298679	0.05159152	1.30750394	1.37846964
11	1.37951807	1.30572311	0.07379497	1.27024025	1.34120596
12	1.41401274	1.26845942	0.14555332	1.23193274	1.30498611
13	1.37106918	1.23119574	0.13987345	1.19266612	1.26972535
14	1.12228261	1.19393205	-0.07164944	1.15257955	1.23528456
15	1.06738544	1.15666837	-0.08928292	1.11182761	1.20150913
16	1.08192090	1.11940469	-0.03748378	1.07055262	1.16825675
17	1.02906977	1.08214100	-0.05307123	1.02887261	1.13540939
18	1.02958580	1.04487732	-0.01529152	0.98688004	1.10287460
19	0.99681529	1.00761363	-0.01079835	0.94464528	1.07058199
20	0.91147541	0.97034995	-0.05887454	0.90222133	1.03847857

Sum of Residuals	-0.00000000
Sum of Squared Residuals	0.10192166
Sum of Squared Residuals - Error SS	-0.00000000
PRESS Statistic	0.12195524
First Order Autocorrelation	0.45756322
Durbin-Watson D	0.96275647

# Binge Drinking US 18-25 by gender Relative Risk by year

7

The GLM Procedure



**The LOESS Procedure**

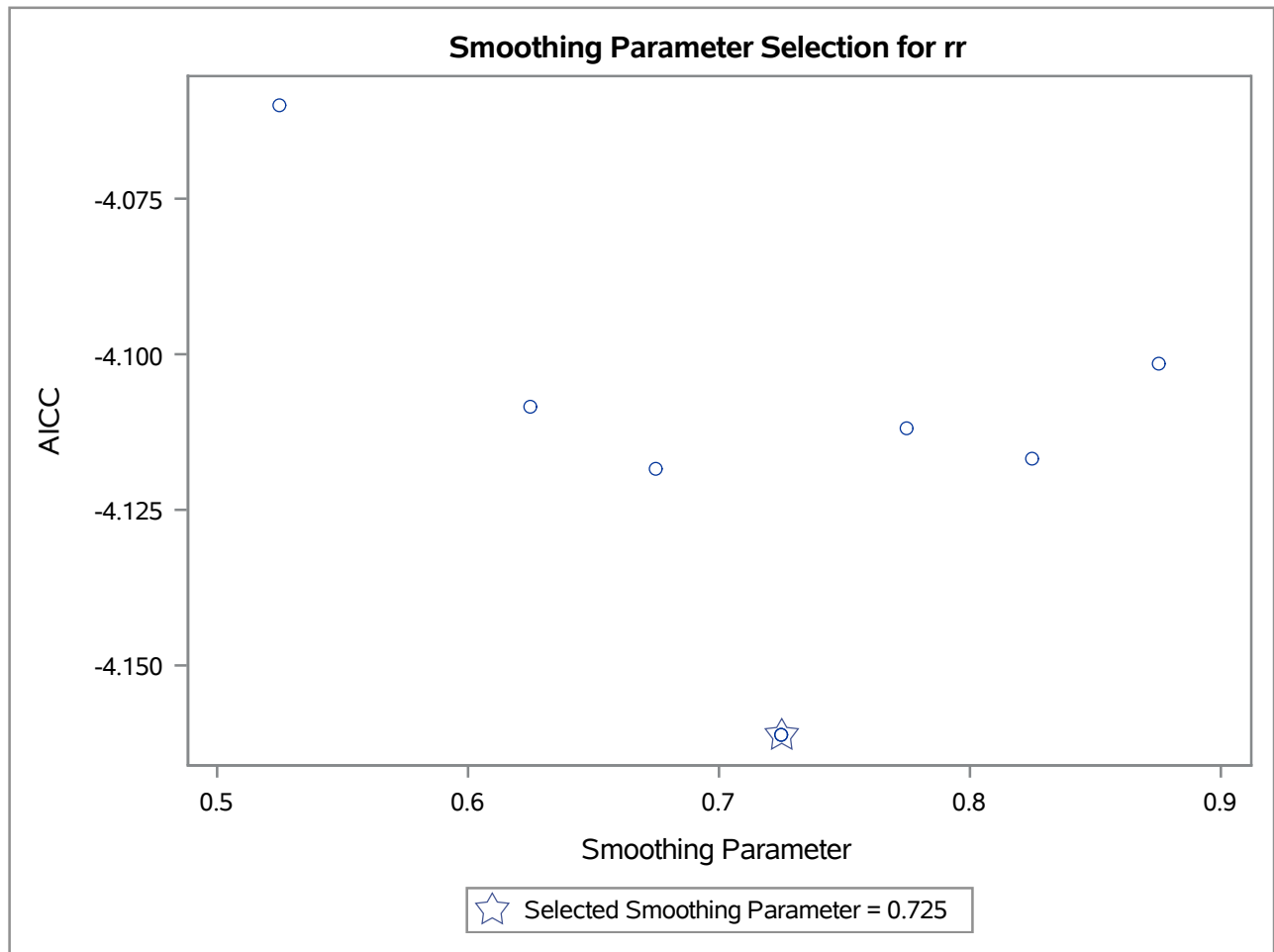
Independent Variable Scaling	
Scaling applied: None	
Statistic	year
Minimum Value	2002
Maximum Value	2021



**Binge Drinking US 18-25 by gender  
Relative Risk by year**

9

**The LOESS Procedure**  
**Dependent Variable: rr**



Optimal Smoothing Criterion	
AICC	Smoothing Parameter
-4.16120	0.72500

**Binge Drinking US 18-25 by gender**  
**Relative Risk by year**

10

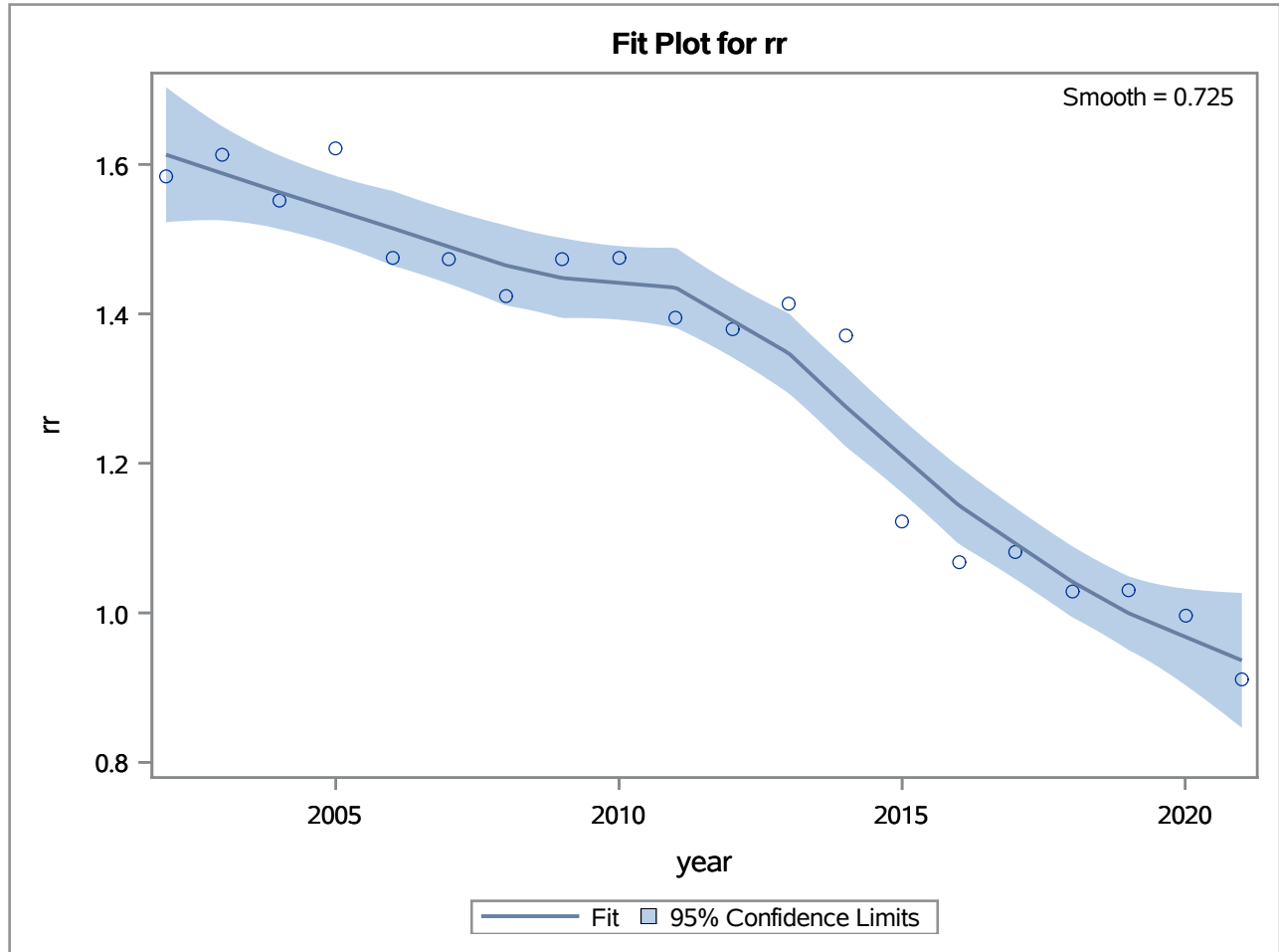
**The LOESS Procedure**  
**Selected Smoothing Parameter: 0.725**  
**Dependent Variable: rr**

Fit Summary	
Fit Method	kd Tree
Blending	Linear
Number of Observations	20
Number of Fitting Points	13
kd Tree Bucket Size	2
Degree of Local Polynomials	2
Smoothing Parameter	0.72500
Points in Local Neighborhood	14
Residual Sum of Squares	0.04514
Trace[L]	5.04145
GCV	0.00020175
AICC	-4.16120
AICC1	-82.72021
Delta1	14.52998
Delta2	14.21814
Equivalent Number of Parameters	4.61289
Lookup Degrees of Freedom	14.84867
Residual Standard Error	0.05574

**Binge Drinking US 18-25 by gender  
Relative Risk by year**

11

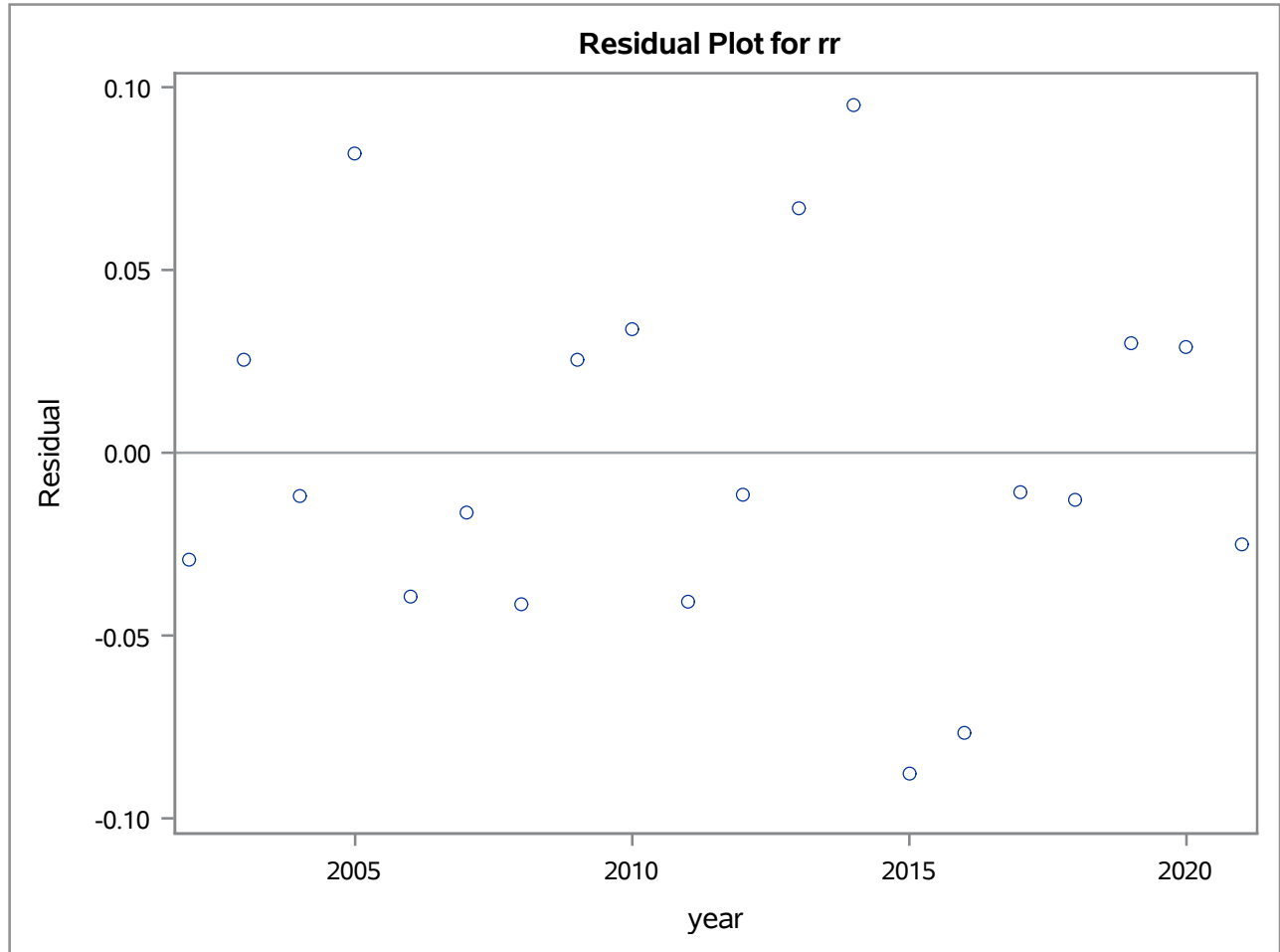
**The LOESS Procedure**  
**Selected Smoothing Parameter: 0.725**  
**Dependent Variable: rr**



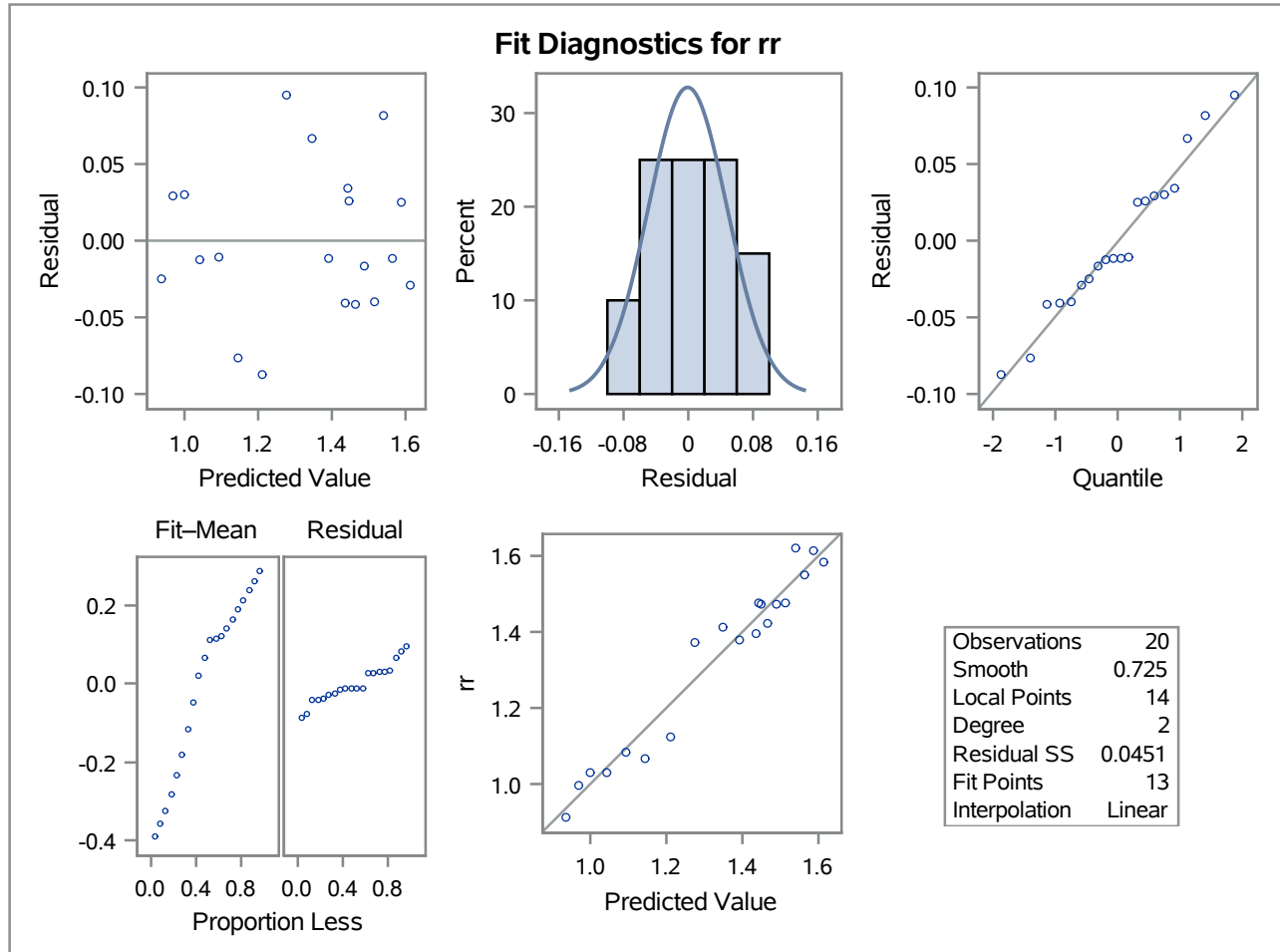
**Binge Drinking US 18-25 by gender  
Relative Risk by year**

12

**The LOESS Procedure**  
**Selected Smoothing Parameter: 0.725**  
**Dependent Variable: rr**



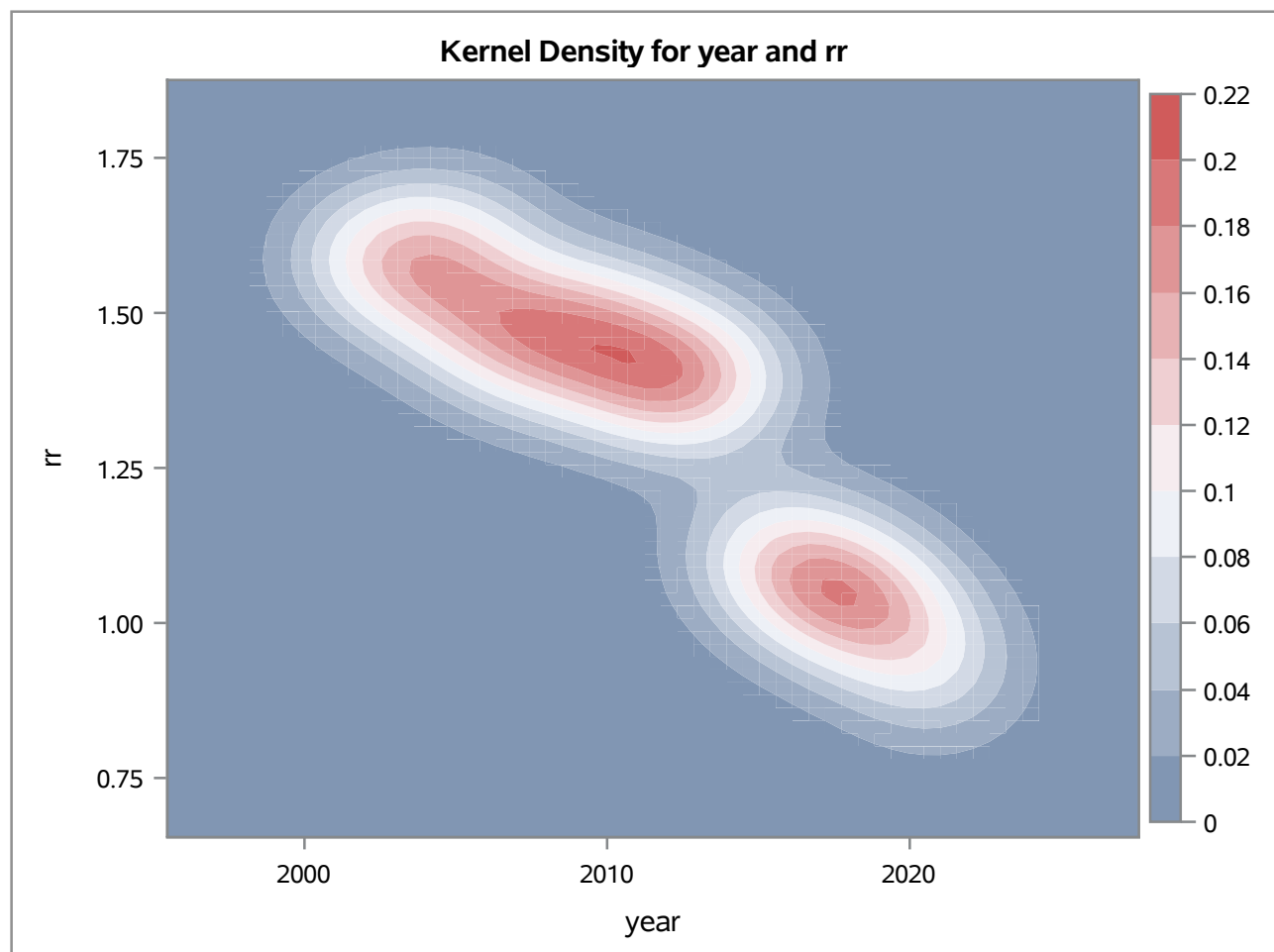
The LOESS Procedure  
Selected Smoothing Parameter: 0.725  
Dependent Variable: rr

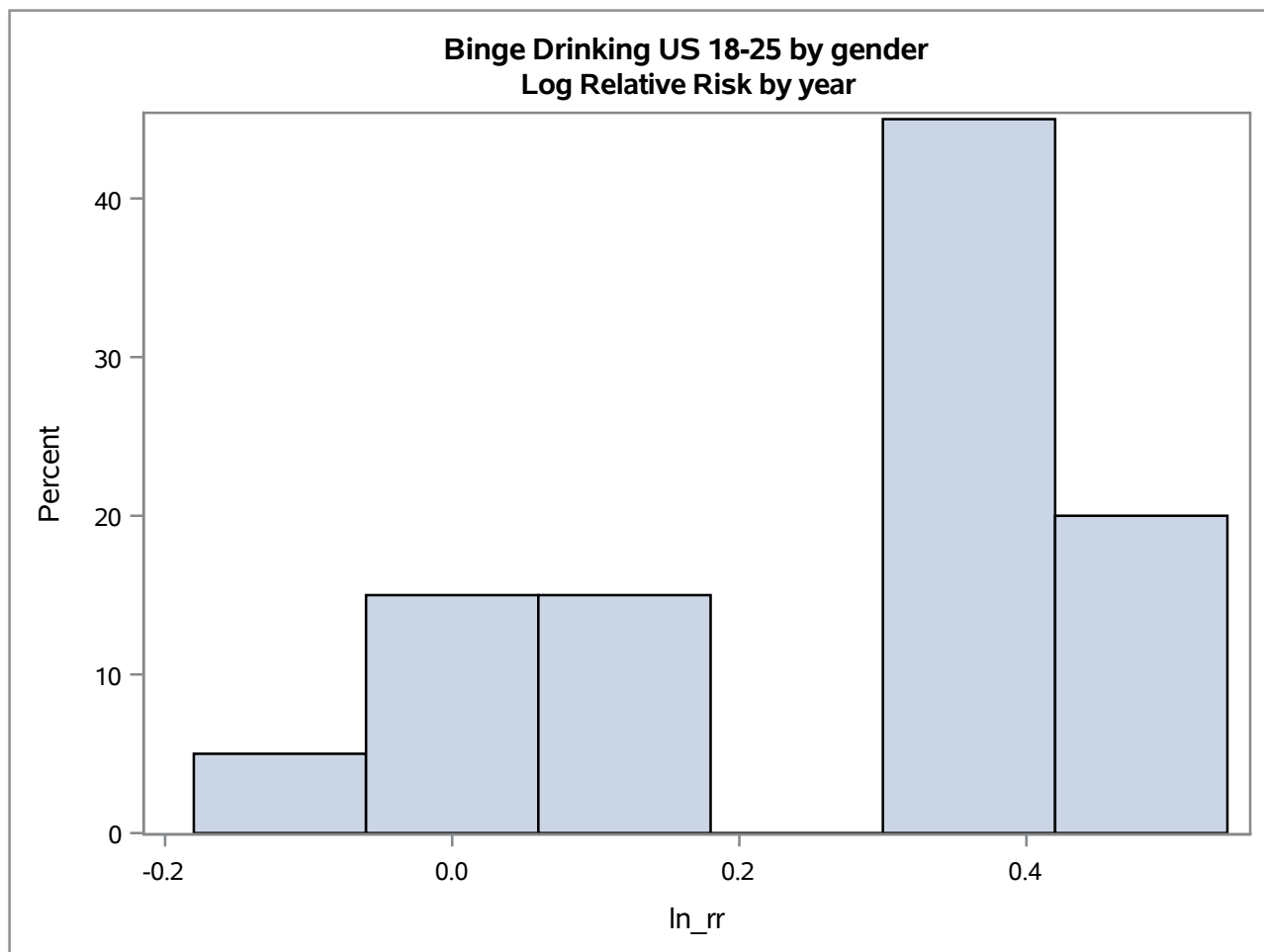


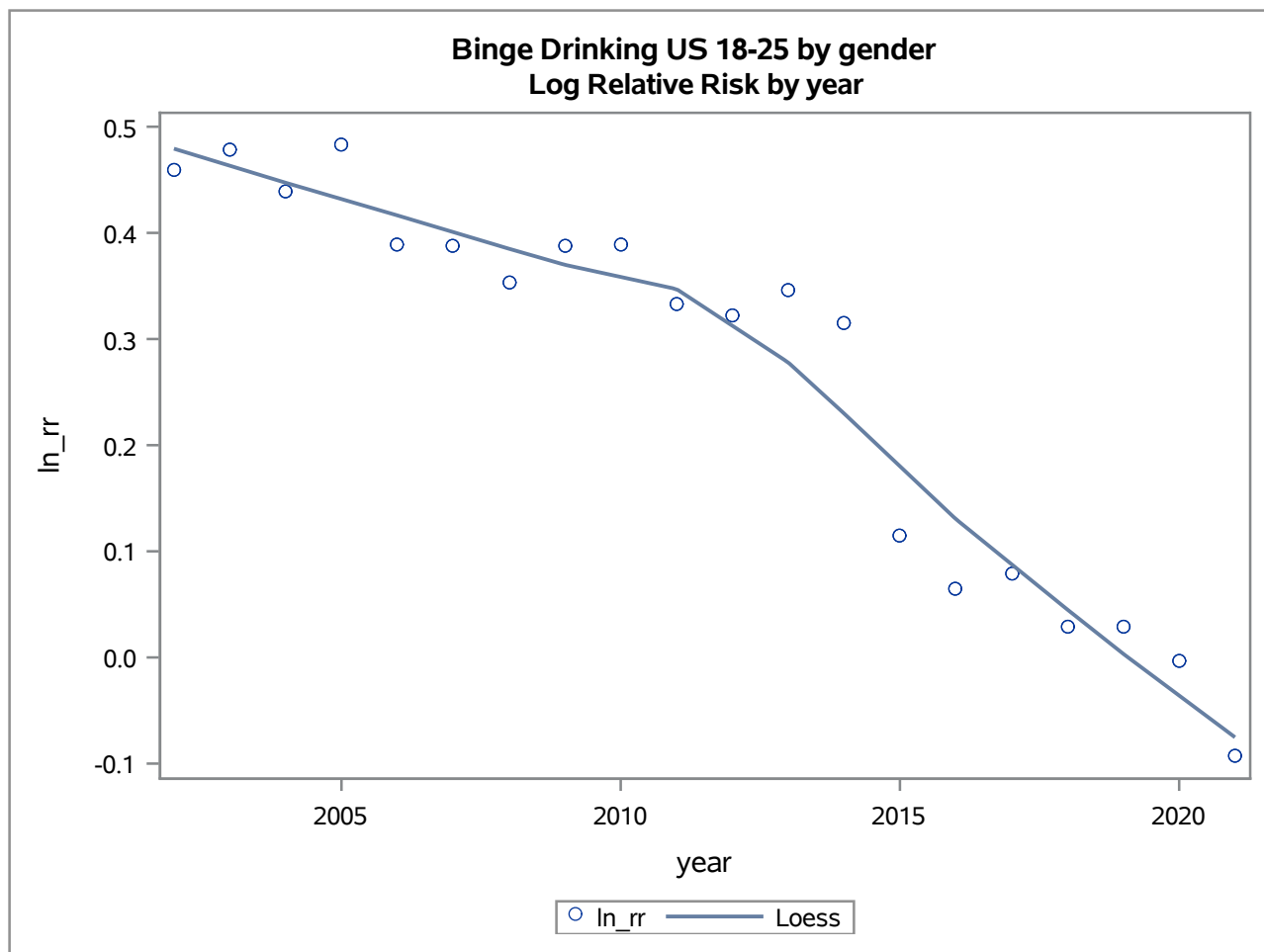
The KDE Procedure

Inputs	
Data Set	WORK.BINGE
Number of Observations Used	20
Variable 1	year
Variable 2	rr
Bandwidth Method	Simple Normal Reference

Controls		
	year	rr
Grid Points	60	60
Lower Grid Limit	1995.5	0.6566
Upper Grid Limit	2027.5	1.8756
Bandwidth Multiplier	0.6	0.6









**The GLM Procedure**

Number of Observations Read	20
Number of Observations Used	20

# Binge Drinking US 18-25 by gender Log Relative Risk by year

18

## The GLM Procedure

Dependent Variable: ln\_rr

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.57781396	0.57781396	134.93	<.0001
Error	18	0.07708341	0.00428241		
Corrected Total	19	0.65489737			

R-Square	Coeff Var	Root MSE	ln_rr Mean
0.882297	24.67926	0.065440	0.265162

Source	DF	Type I SS	Mean Square	F Value	Pr > F
year	1	0.57781396	0.57781396	134.93	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
year	1	0.57781396	0.57781396	134.93	<.0001

Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	59.55813597	5.10452344	11.67	<.0001
year	-0.02947699	0.00253766	-11.62	<.0001

# Binge Drinking US 18-25 by gender Log Relative Risk by year

19

## The GLM Procedure

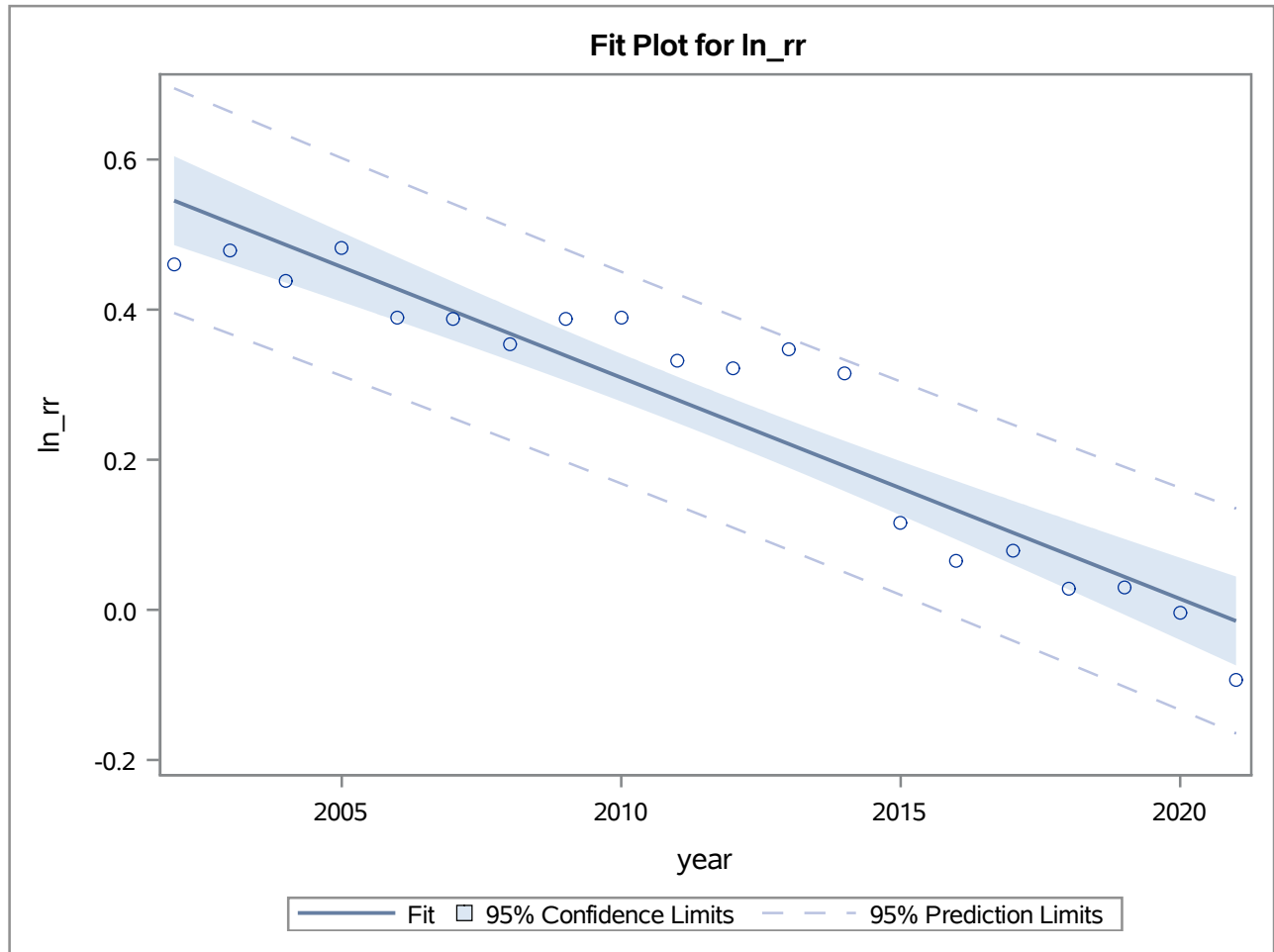
Observation	Observed	Predicted	Residual	95% Confidence Limits for Mean Predicted Value	
1	0.45969835	0.54519387	-0.08549553	0.48594545	0.60444230
2	0.47822446	0.51571688	-0.03749242	0.46095611	0.57047765
3	0.43895378	0.48623988	-0.04728611	0.43580224	0.53667753
4	0.48285177	0.45676289	0.02608888	0.41043775	0.50308804
5	0.38870769	0.42728590	-0.03857820	0.38480143	0.46977036
6	0.38755418	0.39780890	-0.01025472	0.35881289	0.43680492
7	0.35313929	0.36833191	-0.01519262	0.33236948	0.40429434
8	0.38755418	0.33885491	0.04869927	0.30534743	0.37236240
9	0.38896989	0.30937792	0.07959197	0.27761229	0.34114355
10	0.33259209	0.27990093	0.05269116	0.24904307	0.31075878
11	0.32173422	0.25042393	0.07131028	0.21956608	0.28128179
12	0.34643158	0.22094694	0.12548464	0.18918131	0.25271257
13	0.31559086	0.19146994	0.12412092	0.15796246	0.22497743
14	0.11536465	0.16199295	-0.04662830	0.12603052	0.19795538
15	0.06521215	0.13251596	-0.06730381	0.09351994	0.17151197
16	0.07873808	0.10303896	-0.02430089	0.06055449	0.14552343
17	0.02865526	0.07356197	-0.04490671	0.02723682	0.11988711
18	0.02915658	0.04408497	-0.01492839	-0.00635267	0.09452262
19	-0.00318980	0.01460798	-0.01779778	-0.04015279	0.06936875
20	-0.09269066	-0.01486901	-0.07782165	-0.07411744	0.04437941

Sum of Residuals	-0.00000000
Sum of Squared Residuals	0.07708341
Sum of Squared Residuals - Error SS	0.00000000
PRESS Statistic	0.09355343
First Order Autocorrelation	0.53577409
Durbin-Watson D	0.75505919

Binge Drinking US 18-25 by gender  
Log Relative Risk by year

20

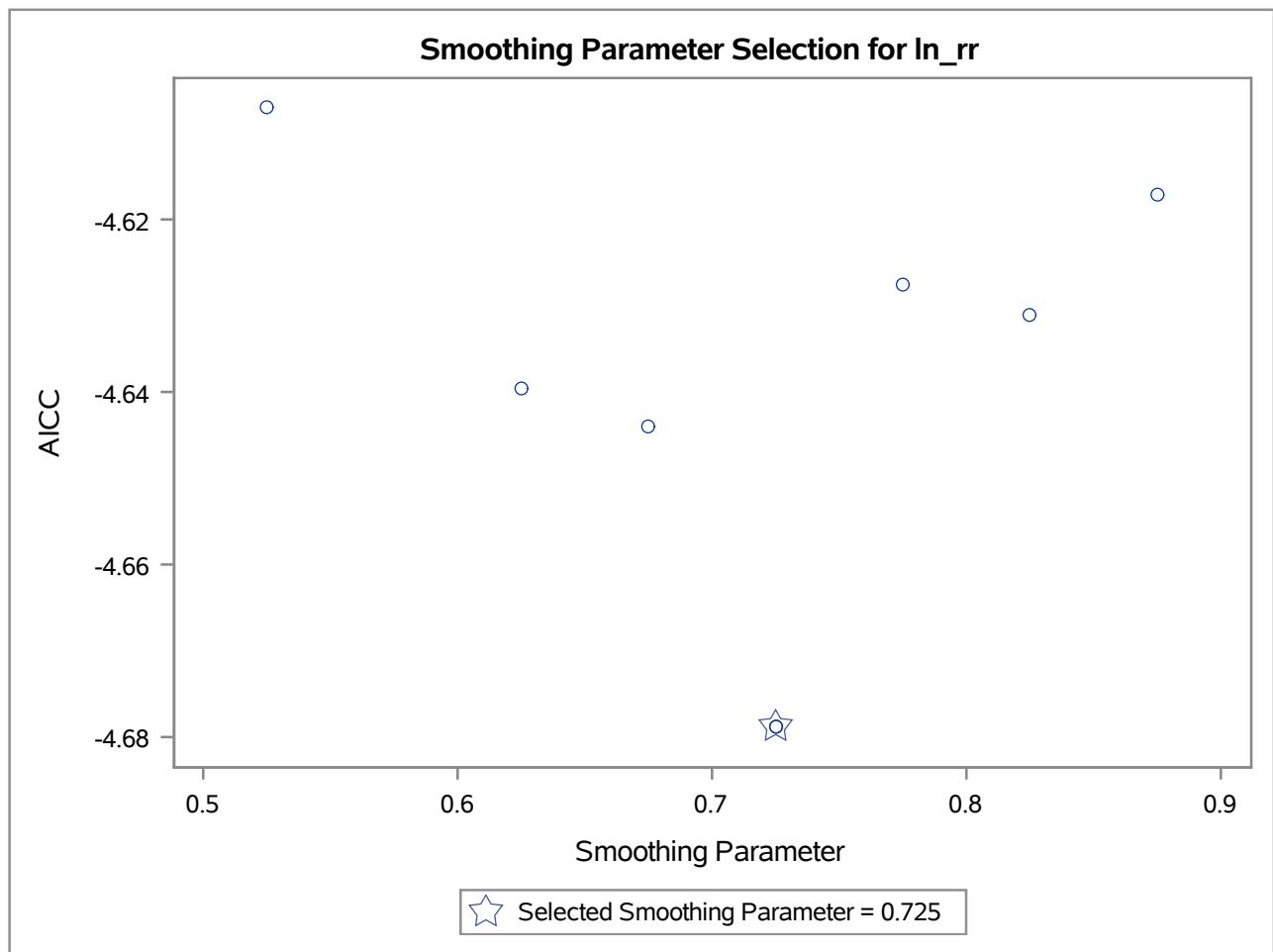
The GLM Procedure



**The LOESS Procedure**

Independent Variable Scaling	
Scaling applied: None	
Statistic	year
Minimum Value	2002
Maximum Value	2021

The LOESS Procedure  
Dependent Variable: ln\_rr



Optimal Smoothing Criterion	
AICC	Smoothing Parameter
-4.67874	0.72500

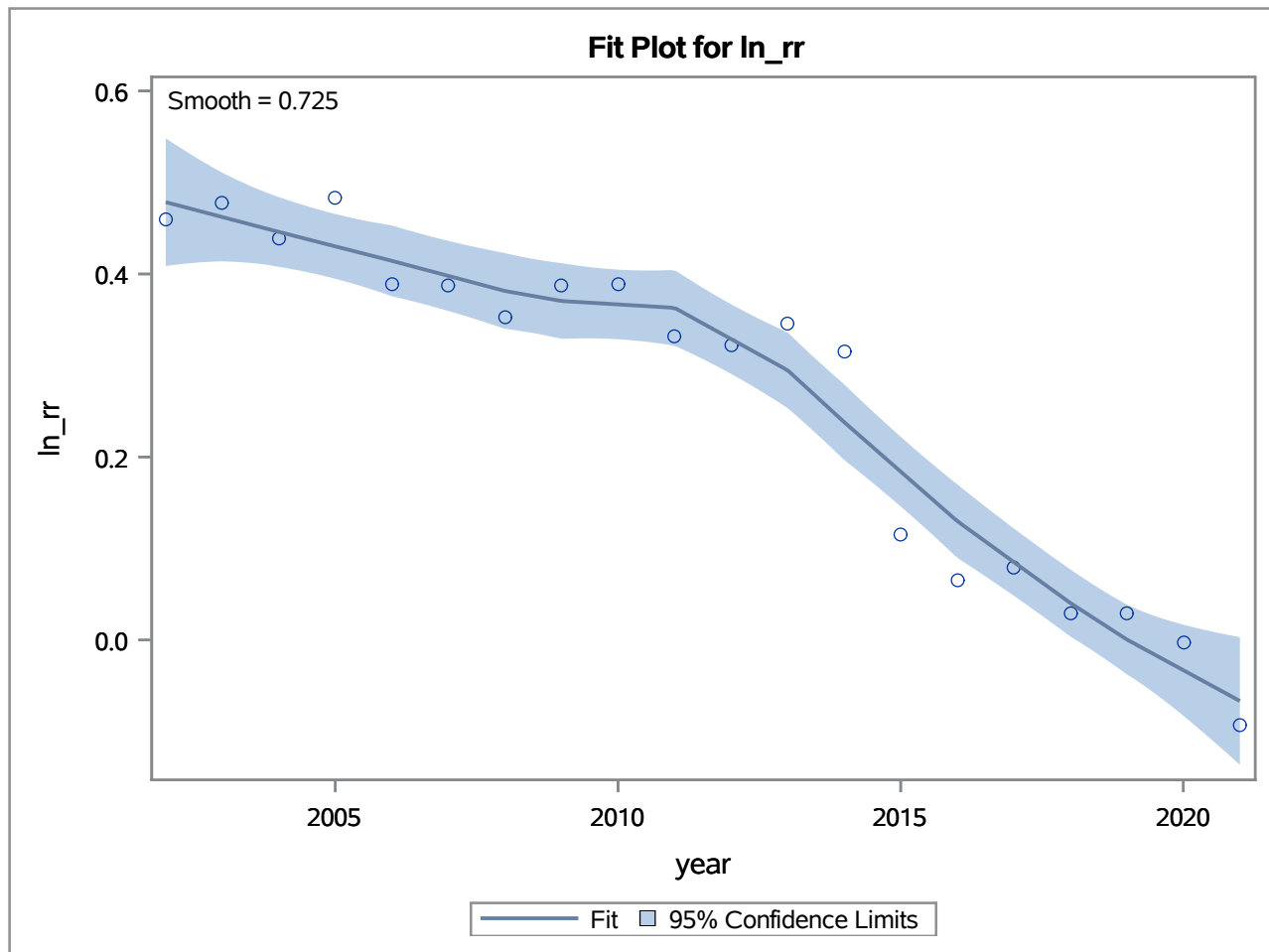
The LOESS Procedure  
Selected Smoothing Parameter: 0.725  
Dependent Variable: ln\_rr

Fit Summary	
Fit Method	kd Tree
Blending	Linear
Number of Observations	20
Number of Fitting Points	13
kd Tree Bucket Size	2
Degree of Local Polynomials	2
Smoothing Parameter	0.72500
Points in Local Neighborhood	14
Residual Sum of Squares	0.02691
Trace[L]	5.04145
GCV	0.00012024
AICC	-4.67874
AICC1	-93.07114
Delta1	14.52998
Delta2	14.21814
Equivalent Number of Parameters	4.61289
Lookup Degrees of Freedom	14.84867
Residual Standard Error	0.04303

Binge Drinking US 18-25 by gender  
Log Relative Risk by year

24

The LOESS Procedure  
Selected Smoothing Parameter: 0.725  
Dependent Variable: ln\_rr

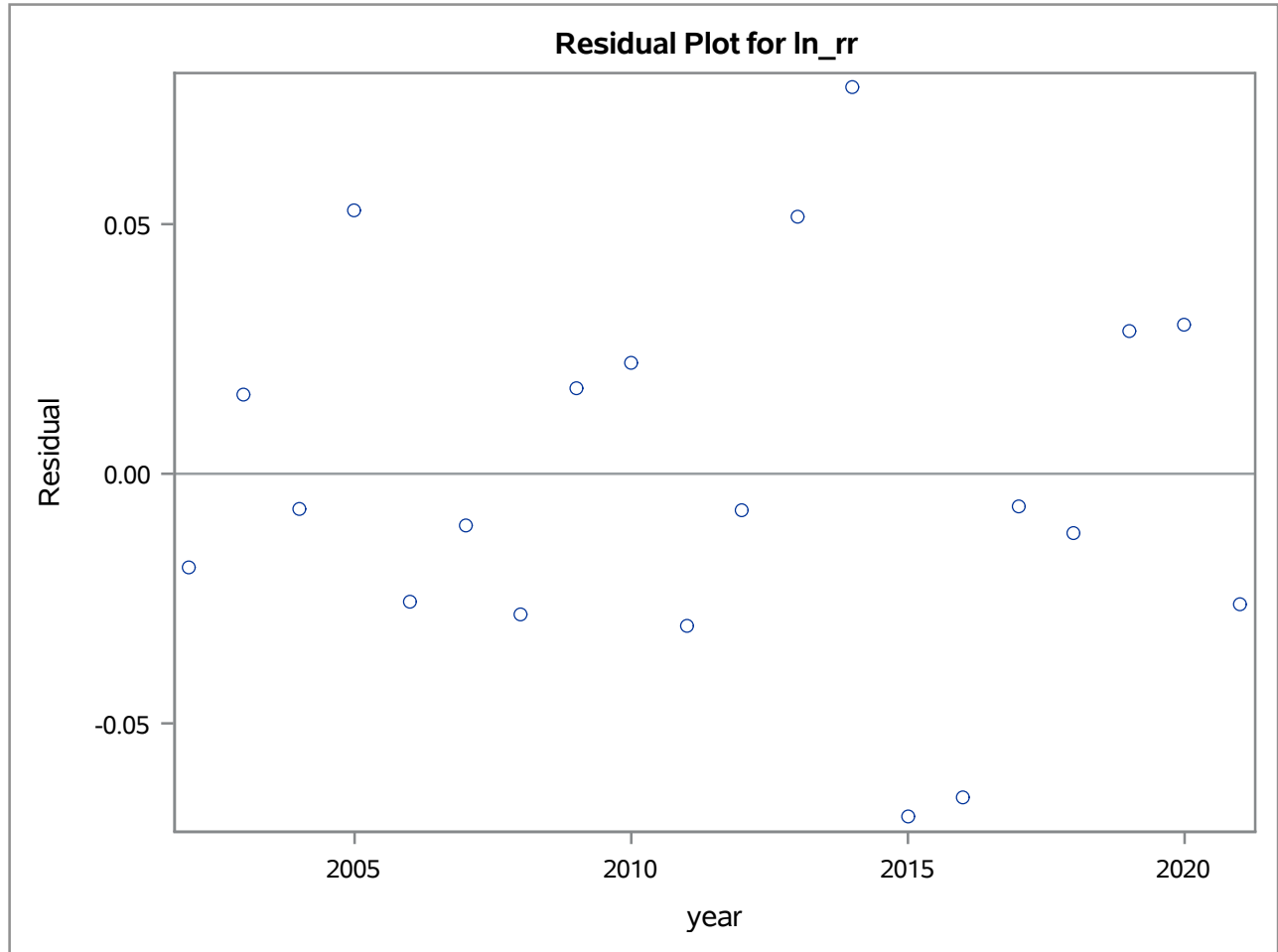




**Binge Drinking US 18-25 by gender  
Log Relative Risk by year**

25

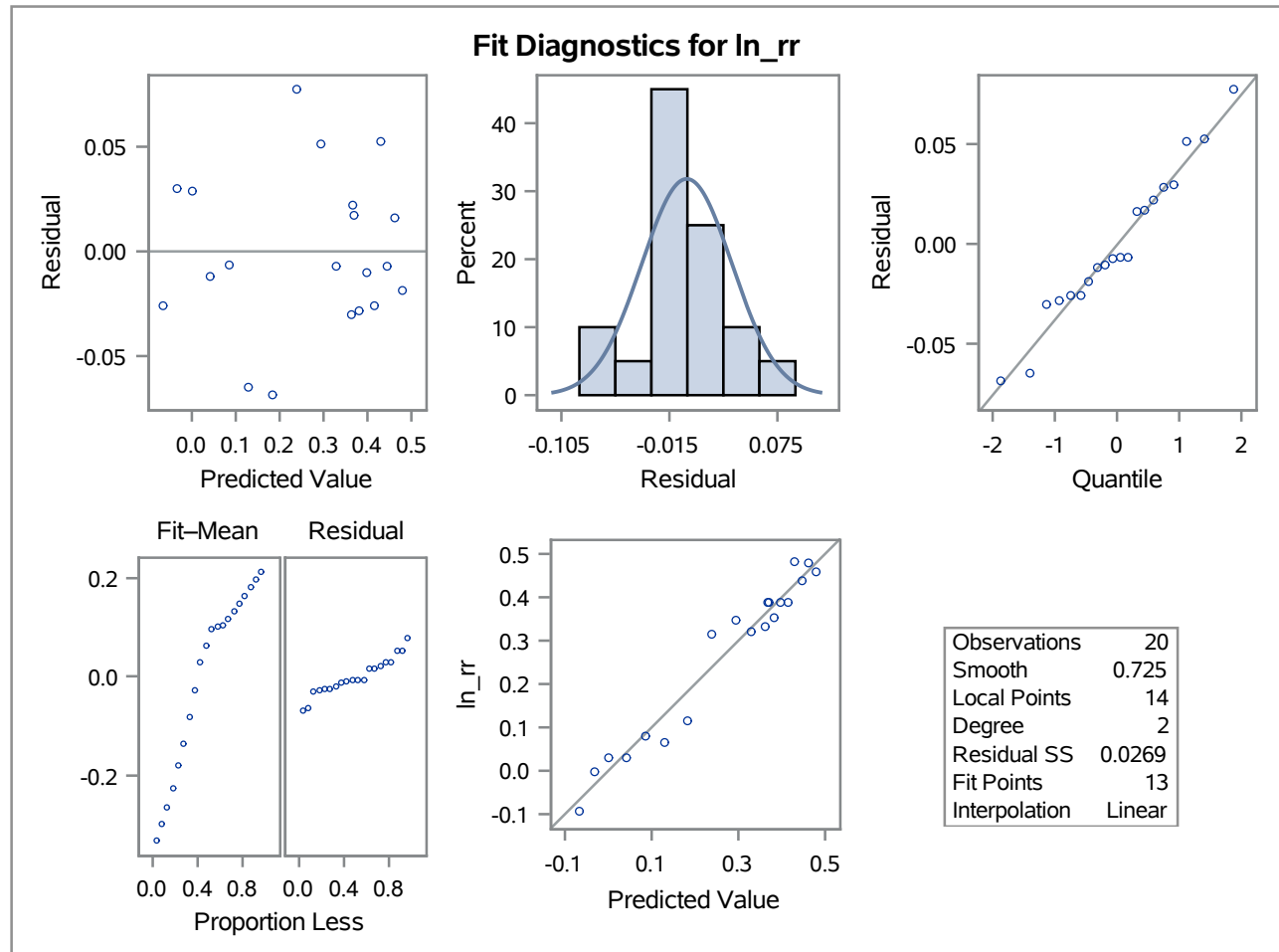
**The LOESS Procedure**  
**Selected Smoothing Parameter: 0.725**  
**Dependent Variable: ln\_rr**



# Binge Drinking US 18-25 by gender Log Relative Risk by year

26

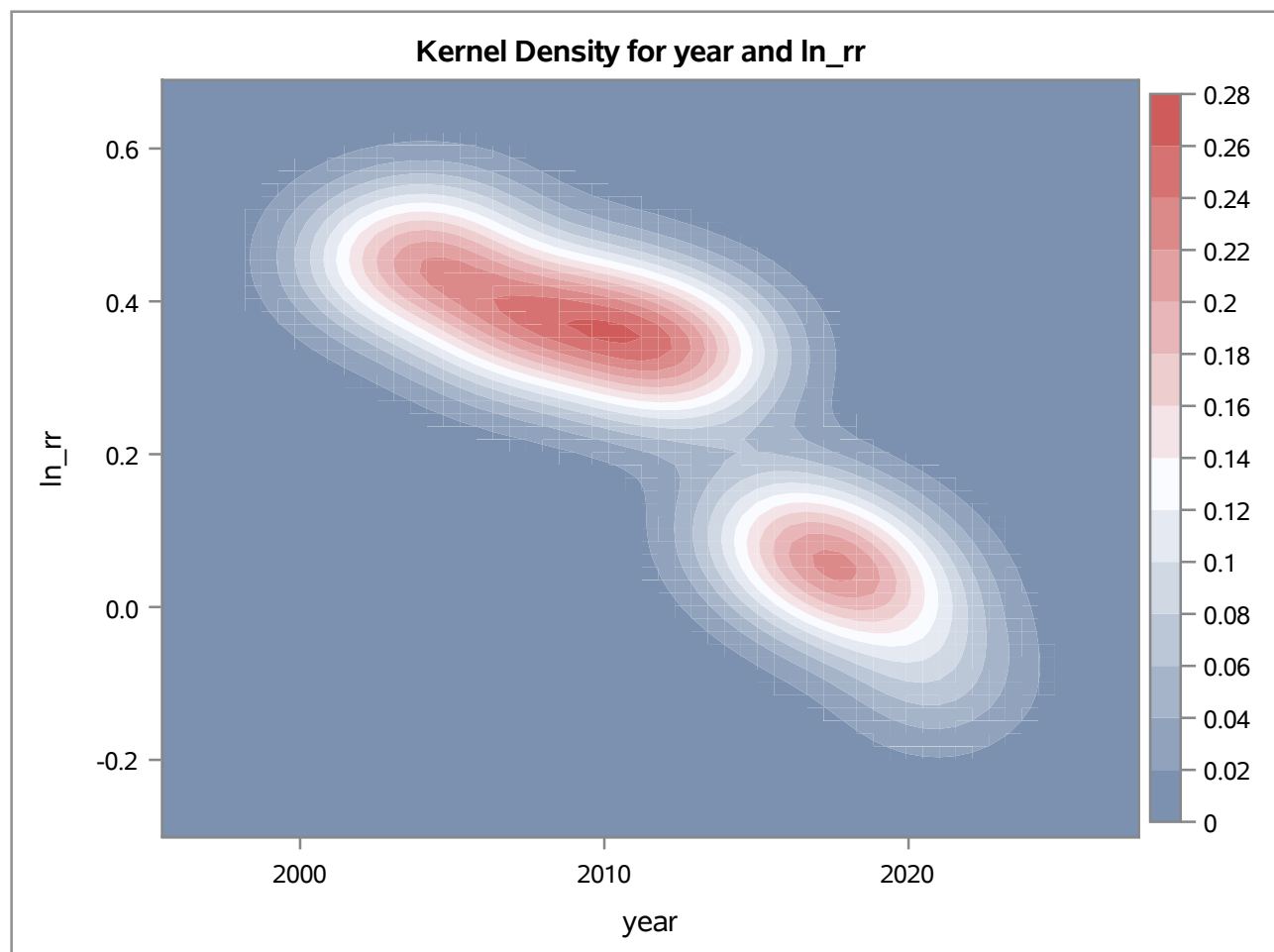
The LOESS Procedure  
Selected Smoothing Parameter: 0.725  
Dependent Variable: ln\_rr



The KDE Procedure

Inputs	
Data Set	WORK.BINGE
Number of Observations Used	20
Variable 1	year
Variable 2	ln_rr
Bandwidth Method	Simple Normal Reference

Controls		
	year	ln_rr
Grid Points	60	60
Lower Grid Limit	1995.5	-0.3
Upper Grid Limit	2027.5	0.6897
Bandwidth Multiplier	0.6	0.6



# Binge Drinking US 18-25 by gender

## Percent Binge by Gender

28

gender=fema

Obs	year	percent
1	2002	31.7
2	2003	31.8
3	2004	32.3
4	2005	31.9
5	2006	34.1
6	2007	33.8
7	2008	34.0
8	2009	33.8
9	2010	32.6
10	2011	33.2
11	2012	33.2
12	2013	31.4
13	2014	31.8
14	2015	36.8
15	2016	37.1
16	2017	35.4
17	2018	34.4
18	2019	33.8
19	2020	31.4
20	2021	30.5

gender=male

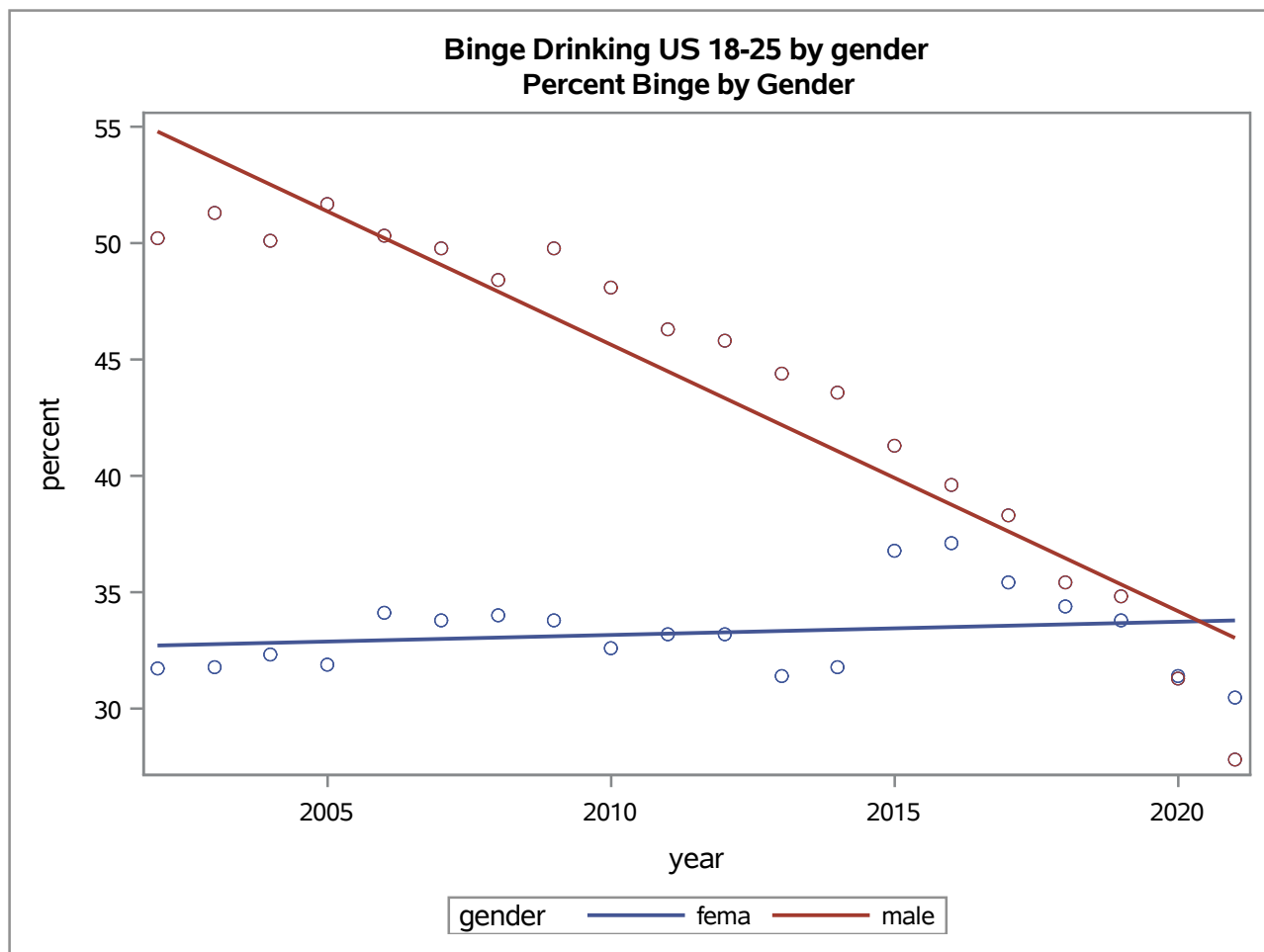
Obs	year	percent
21	2002	50.2
22	2003	51.3
23	2004	50.1
24	2005	51.7
25	2006	50.3
26	2007	49.8
27	2008	48.4
28	2009	49.8
29	2010	48.1
30	2011	46.3
31	2012	45.8
32	2013	44.4
33	2014	43.6

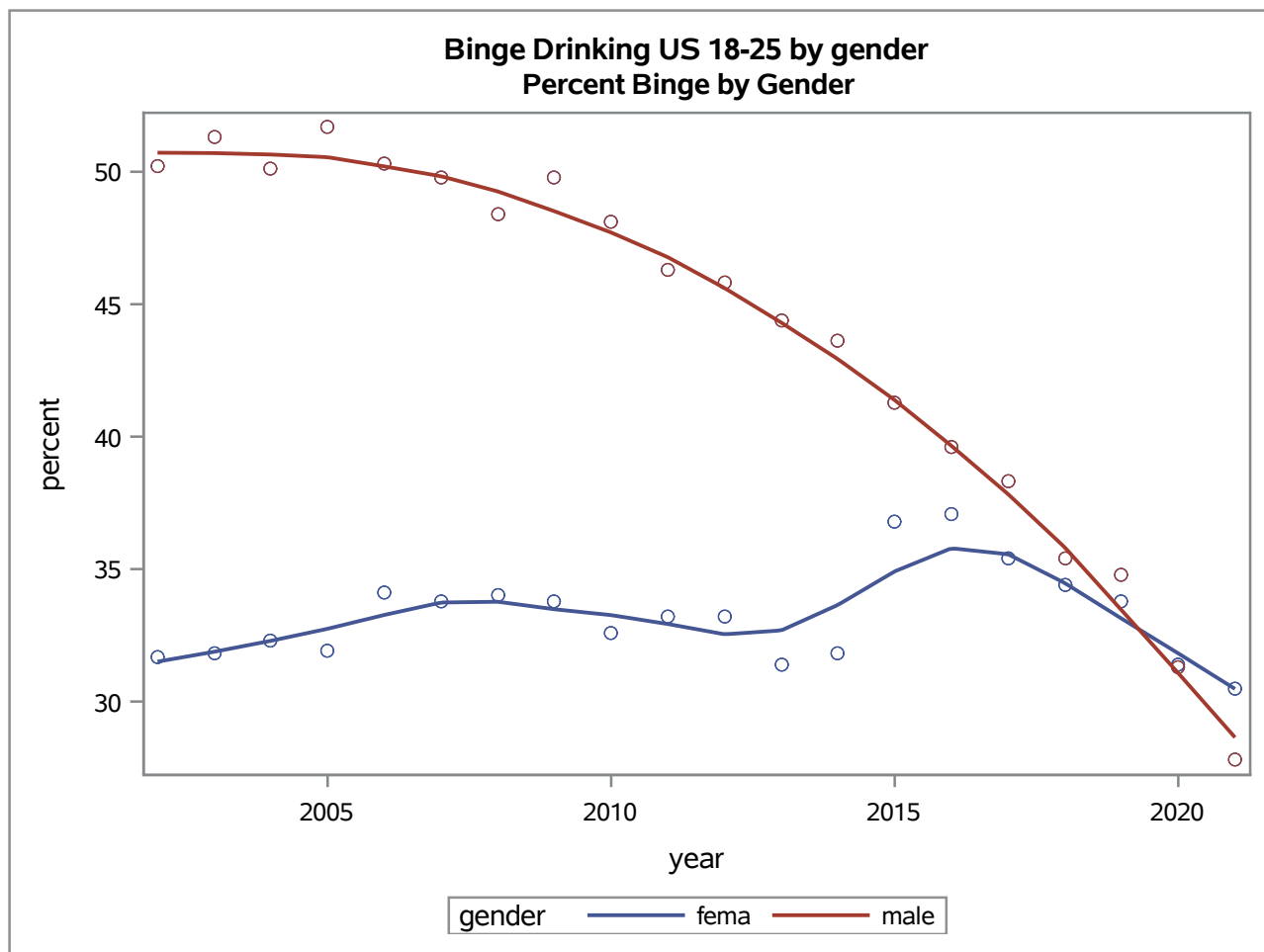
**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**

29

gender=male

Obs	year	percent
34	2015	41.3
35	2016	39.6
36	2017	38.3
37	2018	35.4
38	2019	34.8
39	2020	31.3
40	2021	27.8





**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**  
**Polynomial of degree 3**

**The ORTHOREG Procedure**

Class Level Information			
Factor	Levels	Values	
gender	2	fema	male



**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**  
**Polynomial of degree 3**

**The ORTHOREG Procedure**

**Dependent Variable: percent**

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	2124.229724	424.8459448	265.20	<.0001
Error	34	54.46802609	1.602000767		
Corrected Total	39	2178.697750			

<b>Root MSE</b>	1.2657016897
<b>R-Square</b>	0.9749997327

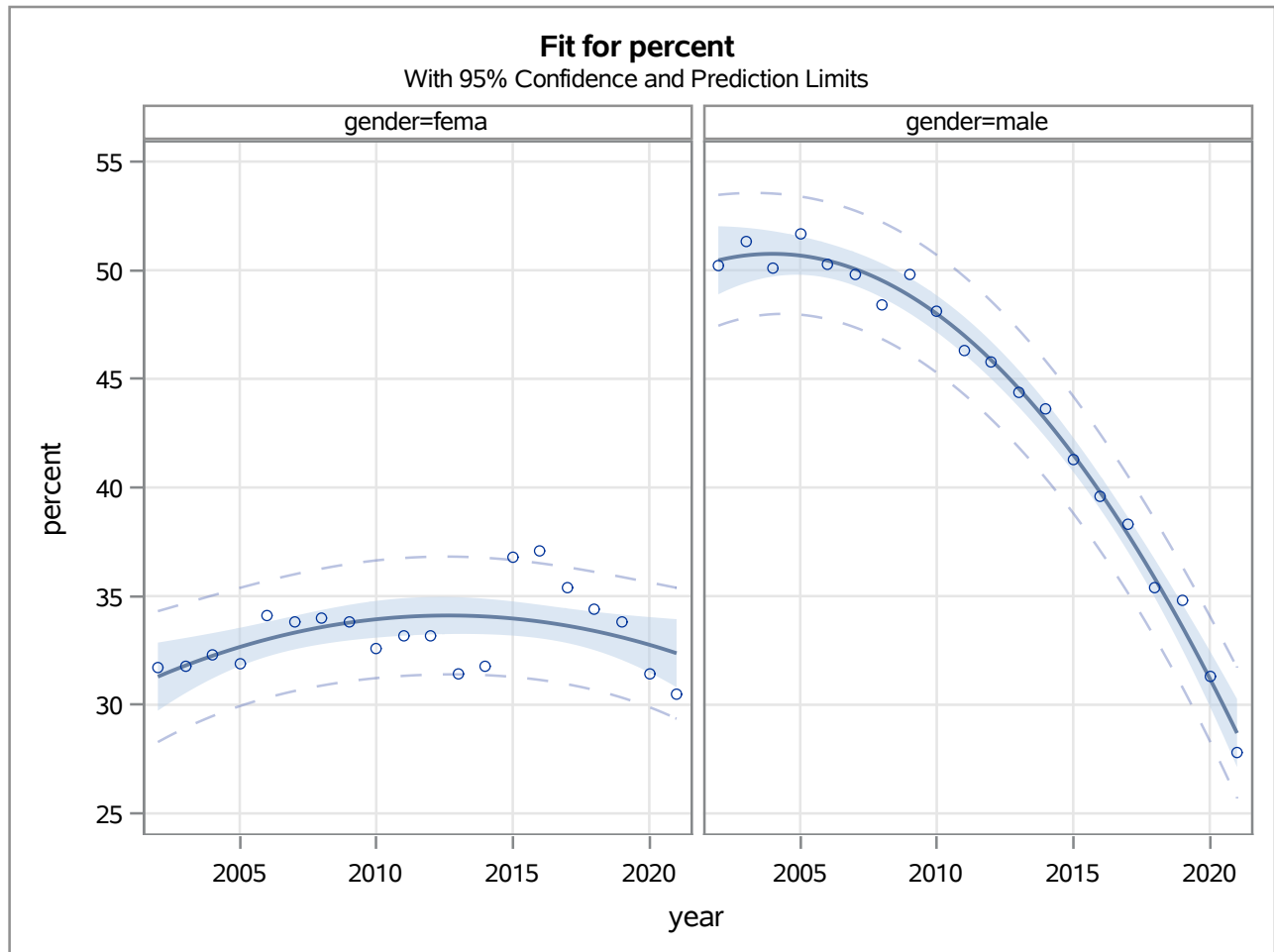
Parameter	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	-305627.14032	38650.62273	-7.91	<.0001
(gender='fema')	1	205016.14393	54660.23486	3.75	0.0007
(gender='male')	0	0	.	.	.
year	1	305.071199590141	38.42987400	7.94	<.0001
year^2	1	-0.076116427432	0.0095525336	-7.97	<.0001
year*gender fema	1	-205.058219412734	54.34804901	-3.77	0.0006
year*gender male	0	0	.	.	.
year^2*gender fema	1	0.051270221007	0.0135093226	3.80	0.0006
year^2*gender male	0	0	.	.	.

Binge Drinking US 18-25 by gender  
Percent Binge by Gender  
Polynomial of degree 3

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The ORTHOREG Procedure

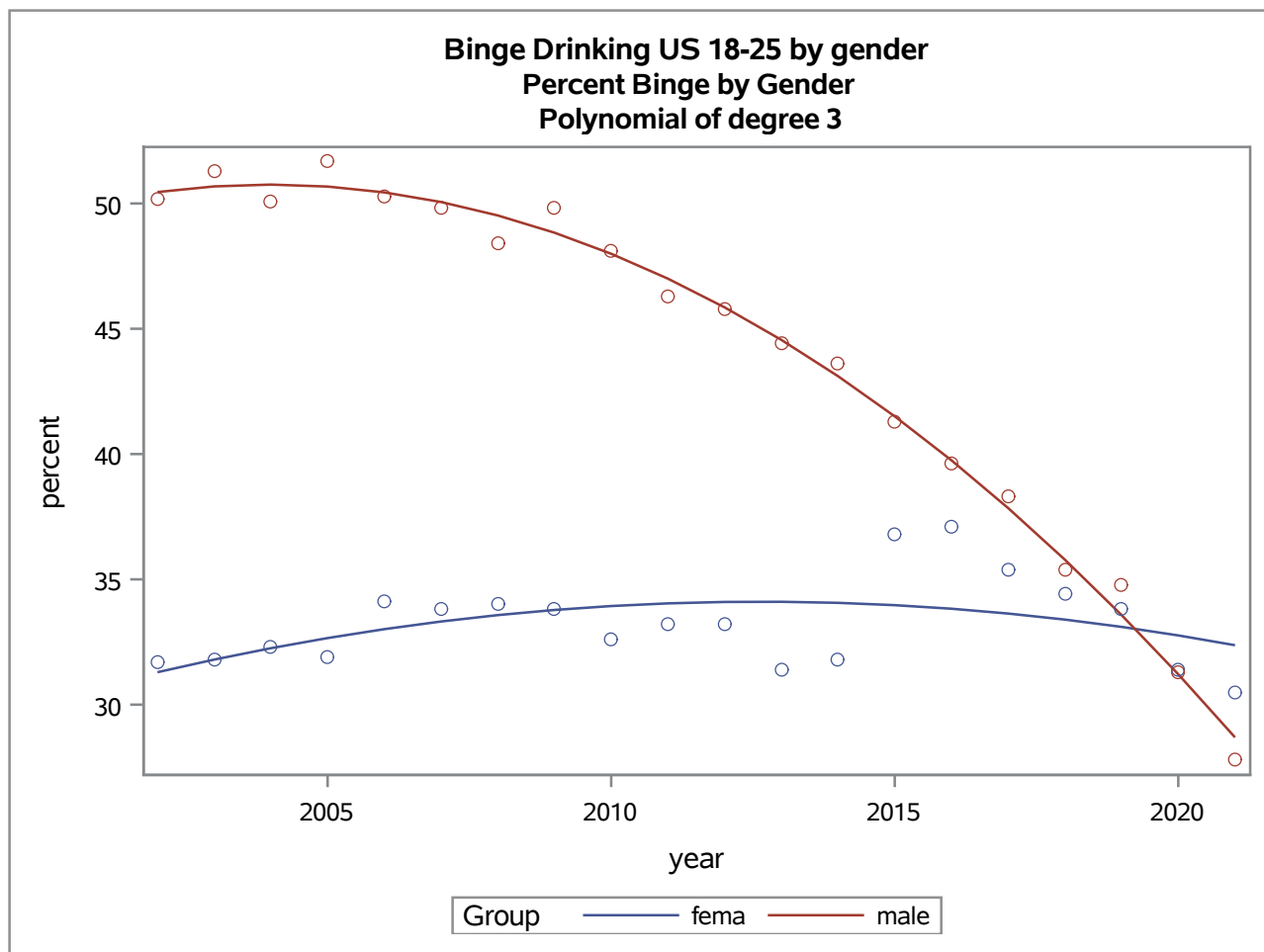
Dependent Variable: percent



**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**  
**Polynomial of degree 3**

**The PLM Procedure**

Store Information	
Item Store	WORK.OSTORE
Data Set Created From	WORK.NEW_BINGE
Created By	PROC ORTHOREG
Date Created	22APR24:17:55:20
Response Variable	percent
Class Variable	gender
Constructed Effect	xMod
Model Effects	Intercept gender year year^2 year*gender year^2*gender



**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**  
**Diff = female - male percent binge drinking**

37

**The PLM Procedure**

Store Information	
Item Store	WORK.OSTORE
Data Set Created From	WORK.NEW_BINGE
Created By	PROC ORTHOREG
Date Created	22APR24:17:55:20
Response Variable	percent
Class Variable	gender
Constructed Effect	xMod
Model Effects	Intercept gender year year^2 year*gender year^2*gender

Class Level Information		
Class	Levels	Values
gender	2	fema male

**Binge Drinking US 18-25 by gender**  
**Percent Binge by Gender**  
**Diff = female - male percent binge drinking**

**The PLM Procedure**

Details for Polynomial Effect xMod	
Number of Variables	1
Degree	2
Number of Terms	2

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2015	-7.5351	0.5475	34	-13.76	<.0001	0.05	-8.6477	-6.4225

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2016	-5.9231	0.5372	34	-11.03	<.0001	0.05	-7.0148	-4.8313

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2017	-4.2085	0.5546	34	-7.59	<.0001	0.05	-5.3356	-3.0814

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2018	-2.3913	0.6153	34	-3.89	0.0004	0.05	-3.6417	-1.1410

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2019	-0.4717	0.7265	34	-0.65	0.5205	0.05	-1.9481	1.0047

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2020	1.5505	0.8865	34	1.75	0.0893	0.05	-0.2511	3.3521

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2021	3.6753	1.0899	34	3.37	0.0019	0.05	1.4602	5.8903

## The ORTHOREG Procedure

Class Level Information			
Factor	Levels	Values	
gender	2	fema	male

## The ORTHOREG Procedure

Dependent Variable: percent

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	2155.404590	165.8003531	185.07	<.0001
Error	26	23.29315985	0.895890763		
Corrected Total	39	2178.697750			

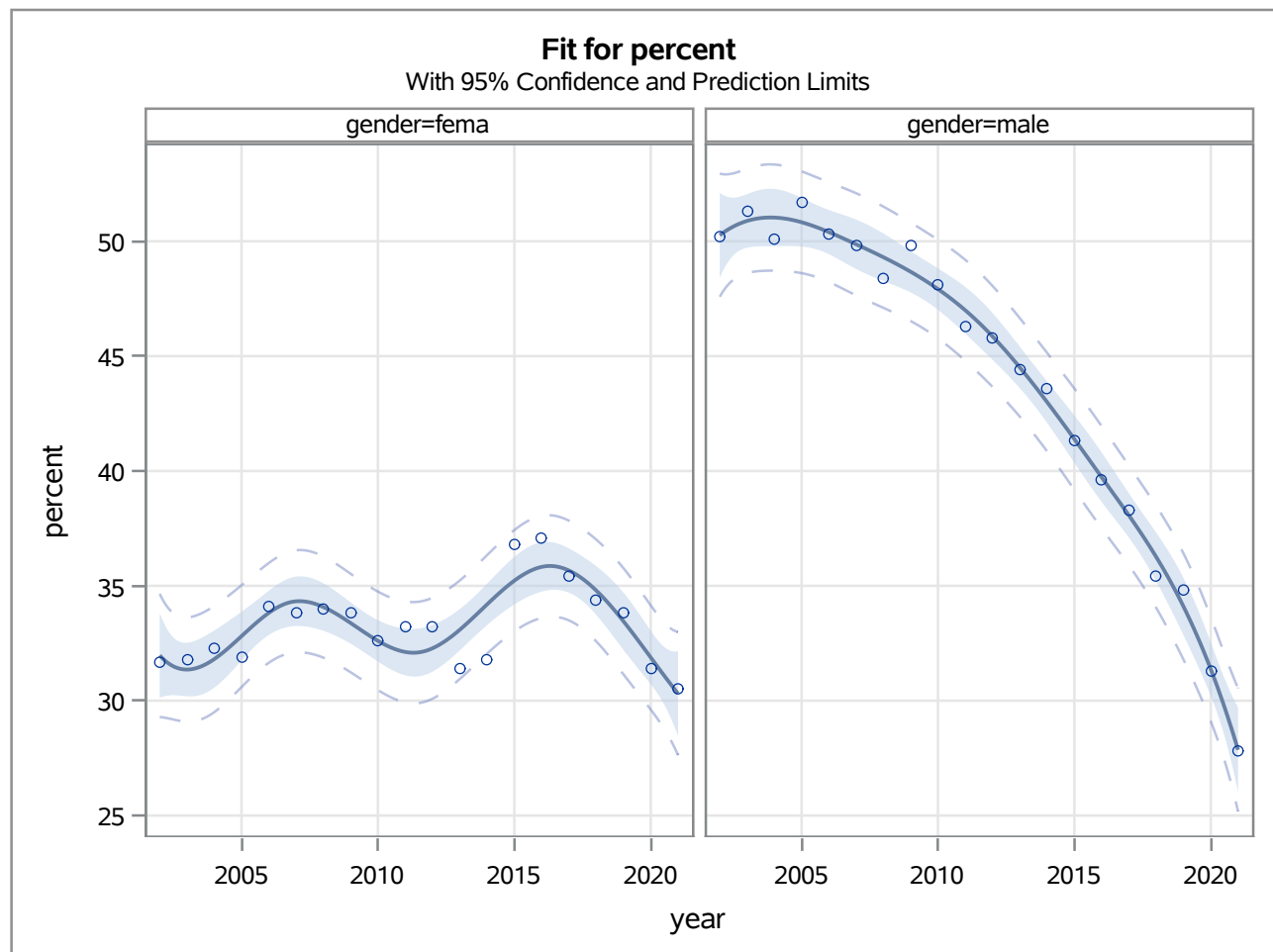
Root MSE	0.9465150624
R-Square	0.9893086777

Parameter	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
(gender='fema')	1	25.053337437092	12.00310627	2.09	0.0468
(gender='male')	1	1.465940456542	12.00310627	0.12	0.9037
spl 1	1	40.032695230358	15.67922315	2.55	0.0169
spl 2	1	51.049309242183	12.73212622	4.01	0.0005
spl 3	1	48.569708430327	11.70731137	4.15	0.0003
spl 4	1	45.904532991891	12.55231330	3.66	0.0011
spl 5	1	37.757534613837	11.14207999	3.39	0.0022
spl 6	1	30.151344717763	14.32244848	2.11	0.0451
spl 7	0	0	.	.	.
spl*gender 1 fema	1	-14.810509370581	22.17377003	-0.67	0.5101
spl*gender 1 male	0	0	.	.	.
spl*gender 2 fema	1	-50.140485967510	18.00594558	-2.78	0.0099
spl*gender 2 male	0	0	.	.	.
spl*gender 3 fema	1	-35.931972872763	16.55663851	-2.17	0.0393
spl*gender 3 male	0	0	.	.	.
spl*gender 4 fema	1	-42.029586508071	17.75165171	-2.37	0.0256
spl*gender 4 male	0	0	.	.	.
spl*gender 5 fema	1	-23.596364596501	15.75728064	-1.50	0.1463
spl*gender 5 male	0	0	.	.	.
spl*gender 6 fema	1	-25.808399829904	20.25500088	-1.27	0.2139
spl*gender 6 male	0	0	.	.	.
spl*gender 7 fema	0	0	.	.	.
spl*gender 7 male	0	0	.	.	.



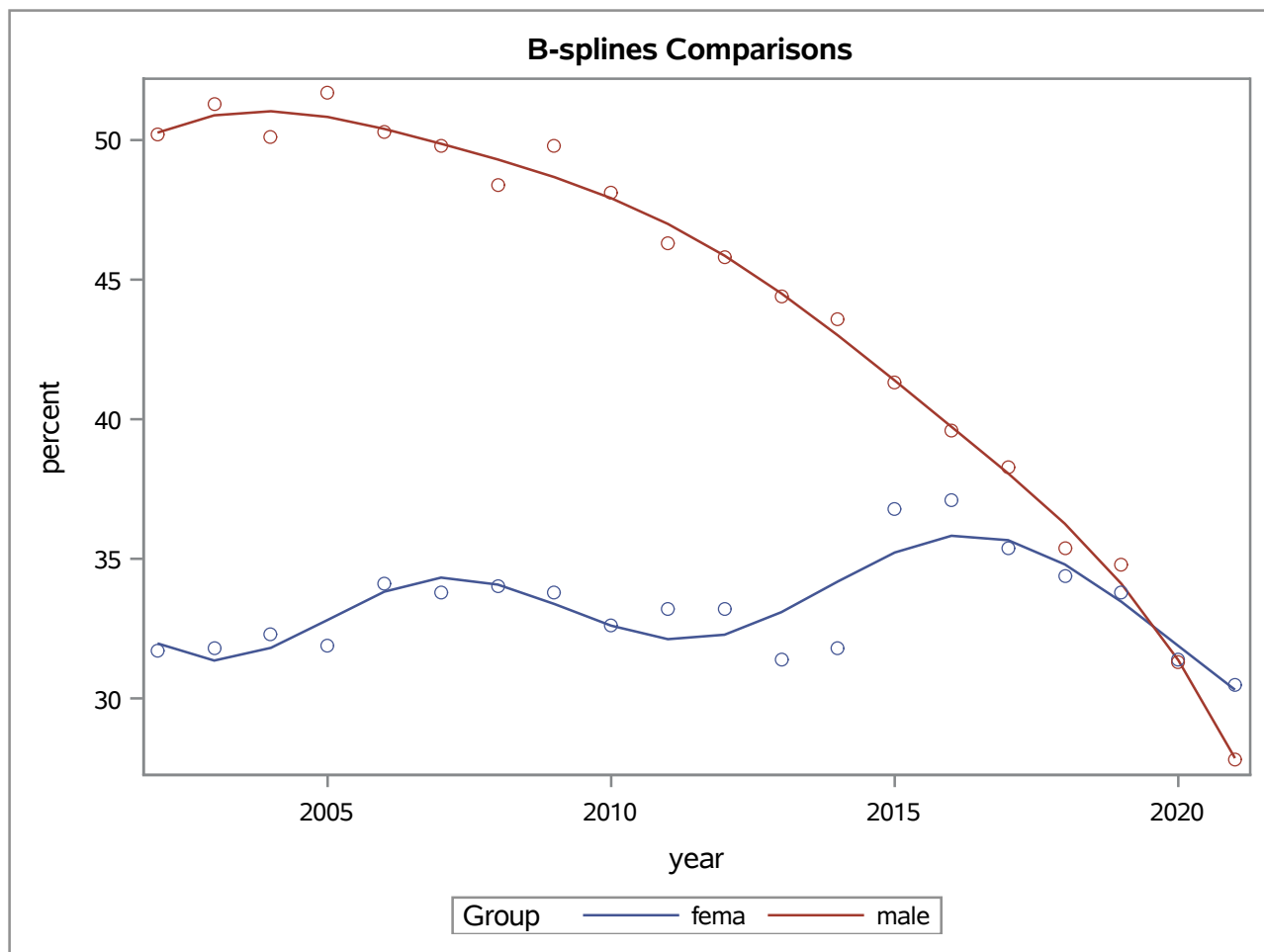
## The ORTHOREG Procedure

Dependent Variable: percent



## The PLM Procedure

Store Information	
Item Store	WORK.ORTHO_SPLINE
Data Set Created From	WORK.NEW_BINGE
Created By	PROC ORTHOREG
Date Created	22APR24:17:55:20
Response Variable	percent
Class Variable	gender
Constructed Effect	spl
Model Effects	gender spl spl*gender



Diff = female - male percent binge drinking

## The PLM Procedure

Store Information	
Item Store	WORK.ORTHO_SPLINE
Data Set Created From	WORK.NEW_BINGE
Created By	PROC ORTHOREG
Date Created	22APR24:17:55:20
Response Variable	percent
Class Variable	gender
Constructed Effect	spl
Model Effects	gender spl spl*gender

Class Level Information		
Class	Levels	Values
gender	2	fema male

Diff = female - male percent binge drinking

The PLM Procedure

Knots for Spline Effect spl		
Knot Number	Boundary	year
1	*	1992.5
2	*	1997.25
3	*	2002
4		2006.75
5		2011.5
6		2016.25
7	*	2021
8	*	2025.75
9	*	2030.5

Diff = female - male percent binge drinking

## The PLM Procedure

Basis Details for Spline Effect spl			
Column	Support		Support Knots
1	1992.5	2006.75	1-4
2	1992.5	2011.5	1-5
3	1997.25	2016.25	2-6
4	2002	2021	3-7
5	2006.75	2025.75	4-8
6	2011.5	2030.5	5-9
7	2016.25	2030.5	6-9

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2015	-6.1619	0.7114	26	-8.66	<.0001	0.05	-7.6241	-4.6996

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2016	-3.9042	0.7405	26	-5.27	<.0001	0.05	-5.4263	-2.3821

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2017	-2.3946	0.6630	26	-3.61	0.0013	0.05	-3.7574	-1.0319

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2018	-1.4573	0.7290	26	-2.00	0.0562	0.05	-2.9558	0.04131

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2019	-0.6402	0.8571	26	-0.75	0.4618	0.05	-2.4020	1.1216

Diff = female - male percent binge drinking

## The PLM Procedure

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2020	0.5105	0.8017	26	0.64	0.5299	0.05	-1.1375	2.1585

Estimate								
Label	Estimate	Standard Error	DF	t Value	Pr >  t	Alpha	Lower	Upper
Diff at year=2021	2.4491	1.2686	26	1.93	0.0645	0.05	-0.1586	5.0567