

April_25_20_Sharp_RD_with_Stata_and_R

April 25, 2020

- Name: Jikhan Jeong
- Ref: <https://www.masteringmetrics.com/resources/> (Stata)
- Ref: <https://jrnold.github.io/masteringmetrics/mlda-regression-discontinuity.html> (R)
- Ref: Mastering Metrics: Chapter 4. RD analysis of the minimum legal drinking age (MLDA).
- Table 4.1 and Figures 4.2, 4.4, and 4.5 in Mastering Metrics.
- Table 4.1 presents sharp RD estimates of the effect of the minimum legal drinking age (MLDA) on mortality.
- Paper(2009, AEJ) : <http://masteringmetrics.com/wp-content/uploads/2015/01/Carpenter-and-Dobkin-2009.pdf>
- Paper(2011, JEP) : <http://masteringmetrics.com/wp-content/uploads/2015/01/Carpenter-and-Dobkin-2011.pdf>
-

0.1 DF: AEJfigs.dta

```
[1]: !pwd
```

```
/data/cahnrs/jikhan.jeong/stata kernel
```

- gives you the type of presentation you see in academic papers.
- Ref: : <https://www.princeton.edu/~otorres/Outreg2.pdf>
- Ref: <https://www.masteringmetrics.com/resources/>
-

0.2 Ref: http://masteringmetrics.com/wp-content/uploads/2015/01/master_cd_rd.dta (do file)

```
[1]: use "AEJfigs.dta", clear
```

```
[2]: sum
```

Variable	Obs	Mean	Std. Dev.	Min	Max
----------	-----	------	-----------	-----	-----

```

-----+-----
      agecell |          50          21    1.126957    19.06849    22.93151
        all |          48    95.67272    3.831062    88.42776    105.2683
    allfitted |          50    95.80284    3.286415    91.70615    102.8918
      internal |          48    20.28529    2.253907    15.97709    24.37291
internalfi~d |          50     20.2813    1.994682    16.73813    24.04378
-----+-----
      external |          48    75.38743    2.986008    71.34142    83.33099
externalfi~d |          50    75.52154    2.269976    73.15786    81.78372
      alcohol |          48     1.257337     .3503116     .639138    2.519309
alcoholfit~d |          50     1.267447     .2598618     .7943445    1.817361
      homicide |          48    16.91207     .7299822    14.94773    18.41097
-----+-----
homicidefi~d |          50    16.95311     .4534175    16.26115    17.76202
      suicide |          48    12.35198     1.063468    10.88936    14.83189
suicidefit~d |          50    12.36285     .7597357     11.5921    13.54707
          mva |          48    31.62298     2.384977    26.85506    36.3852
      mvafitted |          50    31.67968     2.003196    27.86828    34.81778
-----+-----
          drugs |          48     4.24966     .6155793     3.202071    5.564563
      drugsfitted |          50     4.255325     .5214404     3.448835    5.130238
externalot~r |          48     9.598514     .7483688     7.972546    11.48252
externalot~d |          50     9.610208     .465128     8.388236    10.3534

```

```
[3]: list in 1/5
```

```

+-----+
-----+
      | agecell      all    allfit~d    internal    intern~d    external
extern.. alcohol  alcoho~d  homicide  homici~d    suicide    suicid~d
mva  mvafit~d      drugs  drugsf~d    extern~r    ~rfitted |
      |-----+
-----+-----|
      1. | 19.06849    92.8254    91.70615    16.61759    16.73813    76.20782
74.96801    .639138    .7943445    16.31682    16.28457    11.20371    11.5921
35.82933    34.81778    3.872425    3.448835    8.534373    8.388236 |
      2. | 19.15068    95.10074    91.88372    18.32768    16.92065    76.77306
74.96307    .6774093    .8375749    16.85996    16.2707    12.19337    11.59361
35.63926    34.63389    3.236511    3.470022    8.655786    8.530174 |
      3. | 19.23288    92.14429    92.04906    18.91105    17.09884    73.23324
74.95023    .8664426    .8778347    15.21925    16.26288    11.71581    11.59513
34.20565    34.44674    3.202071    3.492069    8.513741    8.662681 |
      4. | 19.31507    88.42776    92.20214    16.10177    17.27268    72.32598
74.92947    .8673084    .9151149    16.74282    16.26115    11.27501    11.59665
32.27896    34.2563    3.280689    3.51498    8.258285    8.785728 |

```

```

5. | 19.39726  88.70494  92.34292  17.36352  17.44216  71.34142
74.90076  1.019163  .9494066  14.94773  16.26551  10.98431  11.59819
32.65097  34.06259  3.548198  3.538755  8.417533  8.899288 |

```

```

+-----+
-----+
-----+

```

```

[4]: * All = all deaths
gen age = agecell - 21
gen over21 = agecell >= 21

```

```

[5]: * age2 = age square
* over_age = interaction term between over21 dummy and age
gen age2 = age^2
gen over_age = over21*age
gen over_age2 = over21*age2

```

- linear trend, and linear on each side
-

0.3 Minimm legal drinking age (MLDA) cutoff in age 21, cutoff dummy is a function of age (=running variable)

```

[6]: reg all age over21
predict allfitlin

```

Source	SS	df	MS	Number of obs	=	48
Model	410.138151	2	205.069075	F(2, 45)	=	32.99
Residual	279.682408	45	6.21516463	Prob > F	=	0.0000
Total	689.820559	47	14.6770332	R-squared	=	0.5946
				Adj R-squared	=	0.5765
				Root MSE	=	2.493

all	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
age	-.9746843	.6324613	-1.54	0.130	-2.248527 .2991581
over21	7.662709	1.440286	5.32	0.000	4.761824 10.56359
_cons	91.84137	.8050394	114.08	0.000	90.21994 93.4628

(option xb assumed; fitted values)

```

[7]: reg all age over21 over_age
predict allfitlini

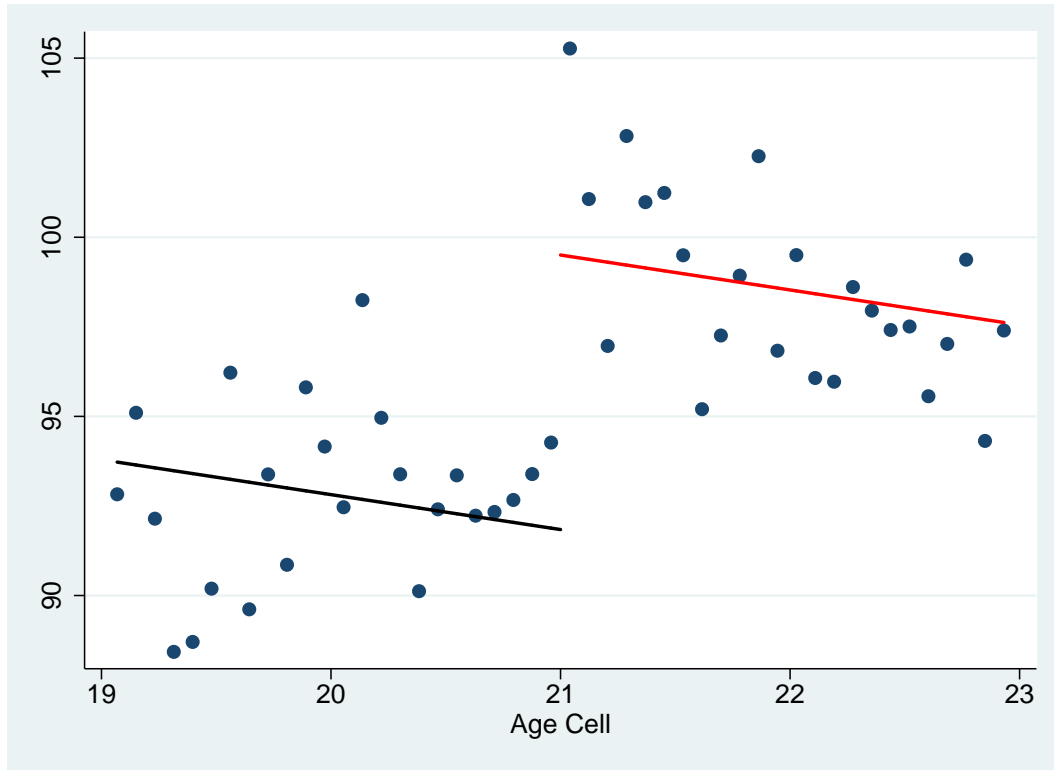
```

Source	SS	df	MS	Number of obs	=	48
				F(3, 44)	=	29.47
Model	460.574058	3	153.524686	Prob > F	=	0.0000
Residual	229.246501	44	5.21014775	R-squared	=	0.6677
				Adj R-squared	=	0.6450
Total	689.820559	47	14.6770332	Root MSE	=	2.2826

all	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	.8269952	.8189316	1.01	0.318	-.823453	2.477443
over21	7.662709	1.318704	5.81	0.000	5.005035	10.32038
over_age	-3.603359	1.158144	-3.11	0.003	-5.937445	-1.269273
_cons	93.61837	.9324647	100.40	0.000	91.73911	95.49763

(option xb assumed; fitted values)

```
[8]: * Figure 4.2. Linear Sharp RD
twoway (scatter all agecell) (line allfitlin agecell if age < 0, lcolor(black)
↳ lwidth(medthick)) ///
      (line allfitlin agecell if age >= 0, lcolor(red)
↳ lwidth(medthick medthick)), legend(off)
graph save "./fig42", replace
graph save "./fig42.eps", replace
```



(note: file ./fig42 not found)
(file ./fig42 saved)

(note: file ./fig42.eps not found)
(file ./fig42.eps saved)

```
[9]: * Quadratic sharp RD
reg all age age2 over21
predict allfitq
```

Source	SS	df	MS	Number of obs	=	48
Model	453.339903	3	151.113301	F(3, 44)	=	28.12
Residual	236.480656	44	5.37456037	Prob > F	=	0.0000
				R-squared	=	0.6572
				Adj R-squared	=	0.6338
Total	689.820559	47	14.6770332	Root MSE	=	2.3183

	all	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
	age	-.9746843	.5881378	-1.66	0.105	-2.159998	.2106296
	age2	-.8186505	.2887482	-2.84	0.007	-1.400584	-.2367167
	over21	7.662709	1.339349	5.72	0.000	4.963428	10.36199
	_cons	92.90274	.8370061	110.99	0.000	91.21587	94.58962

(option xb assumed; fitted values)

```
[10]: * Quadratic sharp RD with interaction
reg all age age2 over21 over_age over_age2
predict allfitqi
```

Source	SS	df	MS	Number of obs	=	48
				F(5, 42)	=	18.02
Model	470.512104	5	94.1024207	Prob > F	=	0.0000
Residual	219.308455	42	5.22162989	R-squared	=	0.6821
				Adj R-squared	=	0.6442
Total	689.820559	47	14.6770332	Root MSE	=	2.2851

	all	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
	age	-.8305828	3.290064	-0.25	0.802	-7.470202	5.809036
	age2	-.8402999	1.615268	-0.52	0.606	-4.100043	2.419443
	over21	9.547789	1.985277	4.81	0.000	5.541337	13.55424
	over_age	-6.017014	4.652854	-1.29	0.203	-15.40685	3.372824
	over_age2	2.904189	2.284334	1.27	0.211	-1.705784	7.514162
	_cons	93.07294	1.403803	66.30	0.000	90.23995	95.90593

(option xb assumed; fitted values)

```
[11]: label variable all "Mortality rate from all causes (per 100,000)"
label variable allfitlin "Mortality rate from all causes (per 100,000)"
label variable allfitqi "Mortality rate from all causes (per 100,000)"
```

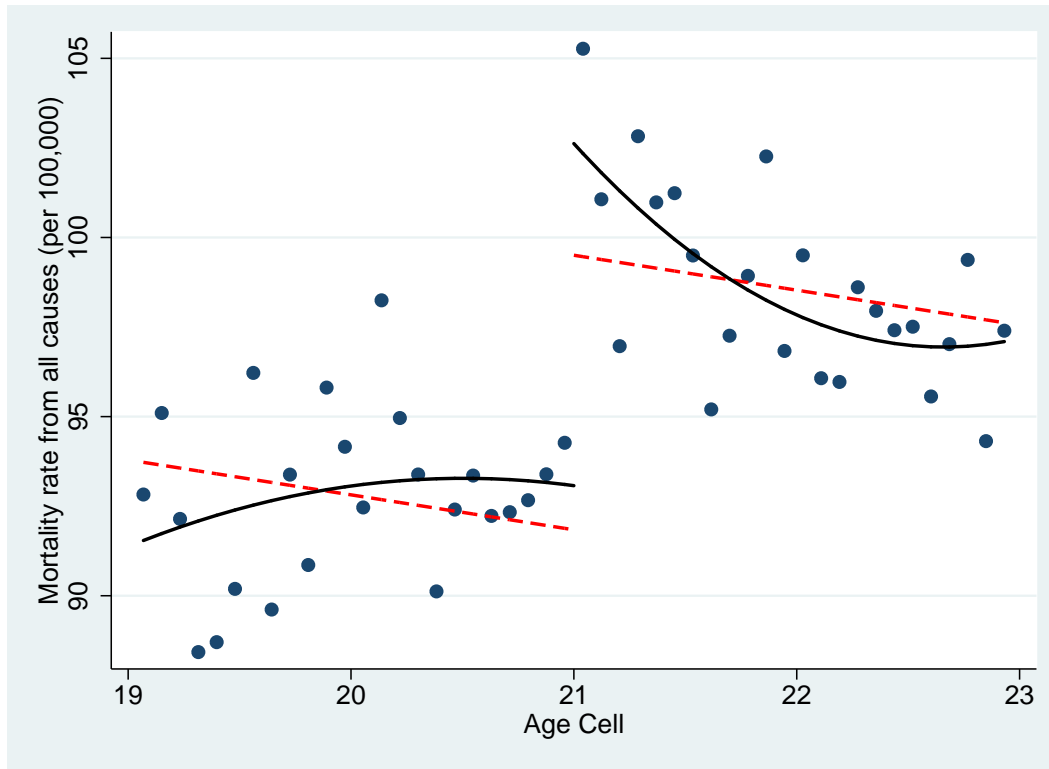
```
[12]: * Figure 4.4. Comparing RDD fitted Y with linear and
      ↪ quadratic(with interaction)
* allfitlin : all fitted linear regression (Red)
* allfitqi : all fitted quadratic age variable regression (Black)
twoway (scatter all agecell) (line allfitlin allfitqi agecell if age < 0,
      ↪ lcolor(red black) lwidth(medthick medthick) lpattern(dash)) ///
```

```

                                (line allfitlin allfitqi agecell if age >= 0,
                                ↪lcolor(red black) lwidth(medthick medthick) lpattern(dash)), legend(off)

graph save "./fig44", replace
graph save "./fig44.eps", replace

```



```

(note: file ./fig44 not found)
(file ./fig44 saved)

(note: file ./fig44.eps not found)
(file ./fig44.eps saved)

```

```

[13]: * "Motor Vehicle Accidents (MVA) " on linear
reg mva age over21
predict exfitlin

```

Source	SS	df	MS	Number of obs	=	48
--------	----	----	----	---------------	---	----

-----+-----					F(2, 45)	=	53.14
Model		187.819794	2	93.909897	Prob > F	=	0.0000
Residual		79.5215648	45	1.76714588	R-squared	=	0.7025
-----+-----					Adj R-squared	=	0.6893
Total		267.341359	47	5.68811402	Root MSE	=	1.3293

-----+-----							
mva		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----							
age		-3.148829	.3372437	-9.34	0.000	-3.828073	-2.469585
over21		4.534033	.7679953	5.90	0.000	2.987211	6.080855
_cons		29.35597	.4292665	68.39	0.000	28.49138	30.22055

(option xb assumed; fitted values)

```
[14]: * "Motor Vehicle Accidents (MVA) " on quadratic
reg mva age age2 over21 over_age over_age2
predict exfitqi
```

Source		SS	df	MS	Number of obs	=	48
-----+-----					F(5, 42)	=	21.86
Model		193.13755	5	38.62751	Prob > F	=	0.0000
Residual		74.2038088	42	1.76675735	R-squared	=	0.7224
-----+-----					Adj R-squared	=	0.6894
Total		267.341359	47	5.68811402	Root MSE	=	1.3292

mva	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	-2.933014	1.91377	-1.53	0.133	-6.795159	.9291307
age2	-.1852363	.939572	-0.20	0.845	-2.081369	1.710897
over21	4.662859	1.154799	4.04	0.000	2.332379	6.993338
over_age	-.8231342	2.70648	-0.30	0.763	-6.285032	4.638763
over_age2	.1984711	1.328755	0.15	0.882	-2.483066	2.880008
_cons	29.80898	.8165665	36.51	0.000	28.16109	31.45688

(option xb assumed; fitted values)

```
[15]: * suicide ~ age + over21
reg suicide age over21
predict sufitlin
```


Source	SS	df	MS	Number of obs	=	48
				F(2, 45)	=	20.39
Model	25.2717131	2	12.6358566	Prob > F	=	0.0000
Residual	27.8835665	45	.619634811	R-squared	=	0.4754
				Adj R-squared	=	0.4521
Total	53.1552796	47	1.1309634	Root MSE	=	.78717

suicide	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	-.1814086	.1996988	-0.91	0.369	-.5836227	.2208055
over21	1.794289	.4547684	3.95	0.000	.8783385	2.71024
_cons	11.45484	.2541902	45.06	0.000	10.94287	11.9668

(option xb assumed; fitted values)

```
[16]: * Linear
reg internal age over21
predict infitlin
```

Source	SS	df	MS	Number of obs	=	48
				F(2, 45)	=	89.64
Model	190.857614	2	95.4288068	Prob > F	=	0.0000
Residual	47.9069341	45	1.06459854	R-squared	=	0.7994
				Adj R-squared	=	0.7904
Total	238.764548	47	5.08009676	Root MSE	=	1.0318

internal	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	1.600067	.2617584	6.11	0.000	1.072859	2.127275
over21	.3919185	.5960948	0.66	0.514	-.808678	1.592515
_cons	20.08933	.3331837	60.30	0.000	19.41826	20.7604

(option xb assumed; fitted values)

```
[17]: * Quadratic
reg internal age age2 over21 over_age over_age2
predict infitqi
```

Source	SS	df	MS	Number of obs	=	48
				F(5, 42)	=	35.26

Model		192.829423	5	38.5658847	Prob > F	=	0.0000
Residual		45.9351244	42	1.09369344	R-squared	=	0.8076
<hr/>							
Total		238.764548	47	5.08009676	Adj R-squared	=	0.7847
					Root MSE	=	1.0458

internal	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	1.499653	1.505737	1.00	0.325	-1.539047	4.538354
age2	-.0601118	.7392467	-0.08	0.936	-1.551972	1.431748
over21	1.073201	.9085858	1.18	0.244	-.7603996	2.906801
over_age	-1.869609	2.129434	-0.88	0.385	-6.166981	2.427762
over_age2	1.049596	1.045453	1.00	0.321	-1.060213	3.159405
_cons	20.06823	.6424672	31.24	0.000	18.77168	21.36478

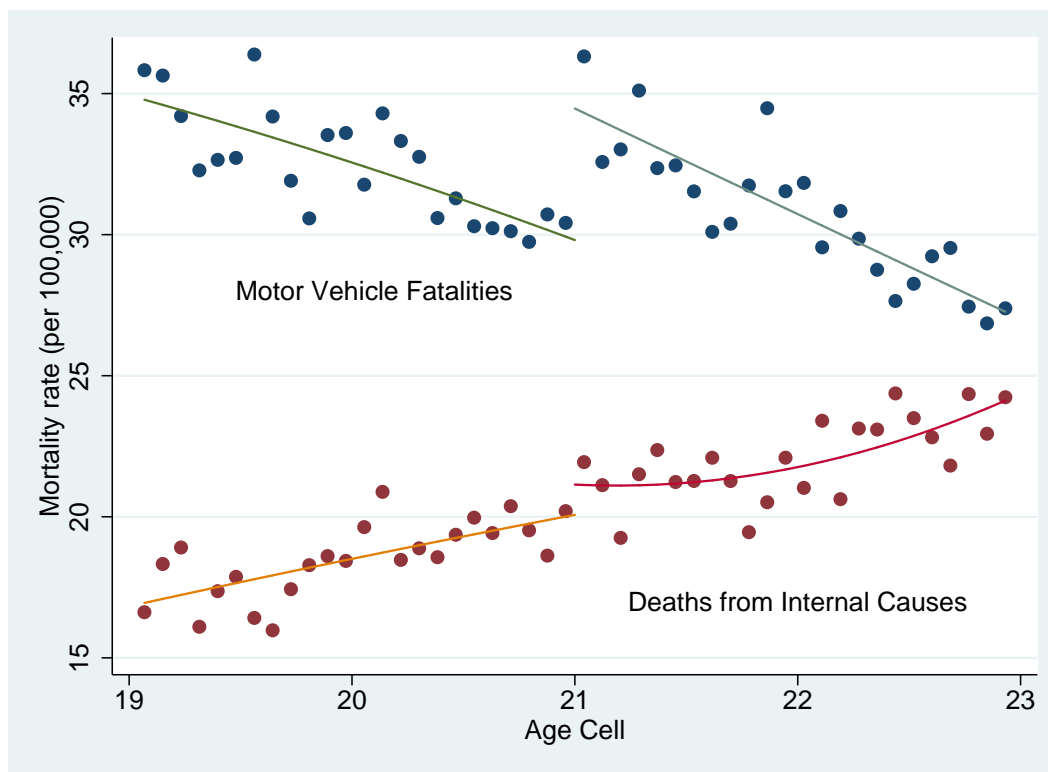
(option xb assumed; fitted values)

```
[18]: label variable mva "Mortality rate (per 100,000)"
label variable infitqi "Mortality rate (per 100,000)"
label variable exfitqi "Mortality rate (per 100,000)"

[19]: twoway (scatter mva internal agecell) (line exfitqi infitqi agecell if agecell
↪ < 21) ///
                                   (line exfitqi infitqi agecell if agecell
↪ >= 21), ///

↪ legend(off) text(28 20.1 "Motor Vehicle Fatalities") ///

↪ text(17 22 "Deaths from Internal Causes")
graph save "./fig45", replace
graph save "./fig45.eps", replace
```



(note: file ./fig45 not found)

(file ./fig45 saved)

(note: file ./fig45.eps not found)

(file ./fig45.eps saved)

[34]: `ssc install outreg2`

checking outreg2 consistency and verifying not already installed...
installing into /home/jikhan.jeong/ado/plus/...
installation complete.

[20]: `* dummy for first month after 21st birthday`
`gen exactly21 = agecell >= 21 & agecell < 21.1`

[21]: `* doesn't change`
`* drop if agecell>20.99 & agecell<21.01`

```
[22]: * Other causes
gen ext_oth = external - homicide - suicide - mva
```

(2 missing values generated)

```
[23]: * Iteration to produce table in each different dependent from 'all' to
      ↳ 'alcohol'
foreach x in all mva suicide homicide ext_oth internal alcohol {

reg `x' age over21, robust
if ("`x'"=="all"){
    outreg2 over21 using ./table41.xls, replace bdec(2) sdec(2) noaster
    ↳ excel
}
else{
    outreg2 over21 using ./table41.xls, append bdec(2) sdec(2) noaster
    ↳ excel
}

reg `x' age age2 over21 over_age over_age2, robust
outreg2 over21 using ./table41.xls, append bdec(2) sdec(2) noaster excel

reg `x' age over21 if agecell >= 20 & agecell <= 22, robust
outreg2 over21 using ./table41.xls, append bdec(2) sdec(2) noaster excel

reg `x' age age2 over21 over_age over_age2 if agecell >= 20 & agecell <= 22,
    ↳ robust
outreg2 over21 using ./table41.xls, append bdec(2) sdec(2) noaster excel

}
```

Linear regression	Number of obs	=	48
	F(2, 45)	=	32.55
	Prob > F	=	0.0000
	R-squared	=	0.5946
	Root MSE	=	2.493

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
all							
age		-.9746843	.663873	-1.47	0.149	-2.311793	.3624247
over21		7.662709	1.514233	5.06	0.000	4.612886	10.71253
_cons		91.84137	.7090399	129.53	0.000	90.41329	93.26945

./table41.xls
dir : seeout

Linear regression	Number of obs	=	48
	F(5, 42)	=	19.90
	Prob > F	=	0.0000
	R-squared	=	0.6821
	Root MSE	=	2.2851

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
all							
age		-.8305828	2.850182	-0.29	0.772	-6.582484	4.921318
age2		-.8402999	1.540545	-0.55	0.588	-3.949245	2.268645
over21		9.547789	1.829703	5.22	0.000	5.855299	13.24028
over_age		-6.017014	4.527834	-1.33	0.191	-15.15455	3.120524
over_age2		2.904189	2.256836	1.29	0.205	-1.65029	7.458668
_cons		93.07294	.7799418	119.33	0.000	91.49895	94.64692

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(2, 21)	=	25.34
	Prob > F	=	0.0000
	R-squared	=	0.7029
	Root MSE	=	2.3624

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
all							
age		-3.256257	1.918101	-1.70	0.104	-7.245167	.7326533
over21		9.753311	2.06443	4.72	0.000	5.460094	14.04653
_cons		91.71302	.9673647	94.81	0.000	89.70128	93.72477

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(5, 18)	=	15.06
	Prob > F	=	0.0000
	R-squared	=	0.7517
	Root MSE	=	2.3326

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
--	--	-------	---------------------	---	------	----------------------	--

all	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	9.398777	7.003331	1.34	0.196	-5.314675	24.11223
age2	11.16331	8.81694	1.27	0.222	-7.36039	29.68702
over21	9.611077	2.291093	4.19	0.001	4.797668	14.42449
over_age	-24.44781	11.75759	-2.08	0.052	-49.14958	.2539658
over_age2	-.8742369	13.10782	-0.07	0.948	-28.41273	26.66426
_cons	94.34029	.854749	110.37	0.000	92.54453	96.13605

./table41.xls

dir : seeout

Linear regression	Number of obs	=	48
	F(2, 45)	=	60.81
	Prob > F	=	0.0000
	R-squared	=	0.7025
	Root MSE	=	1.3293

mva	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
age	-3.148829	.3094685	-10.17	0.000	-3.772131	-2.525527
over21	4.534033	.7172984	6.32	0.000	3.08932	5.978746
_cons	29.35597	.3409441	86.10	0.000	28.66927	30.04266

./table41.xls

dir : seeout

Linear regression	Number of obs	=	48
	F(5, 42)	=	33.21
	Prob > F	=	0.0000
	R-squared	=	0.7224
	Root MSE	=	1.3292

mva	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
age	-2.933014	1.625218	-1.80	0.078	-6.212838	.3468095
age2	-.1852363	.8247072	-0.22	0.823	-1.849563	1.47909
over21	4.662859	1.092857	4.27	0.000	2.457384	6.868333
over_age	-.8231342	2.730162	-0.30	0.765	-6.332825	4.686557
over_age2	.1984711	1.304084	0.15	0.880	-2.433277	2.830219
_cons	29.80898	.4868663	61.23	0.000	28.82645	30.79152

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          24
                                                F(2, 21)       =          10.54
                                                Prob > F        =          0.0007
                                                R-squared      =          0.4736
                                                Root MSE      =          1.3414

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
mva							
age		-3.468309	1.088291	-3.19	0.004	-5.731534	-1.205084
over21		4.759284	1.081625	4.40	0.000	2.50992	7.008647
_cons		29.58616	.5359734	55.20	0.000	28.47155	30.70078

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          24
                                                F(5, 18)       =           7.67
                                                Prob > F        =          0.0005
                                                R-squared      =          0.6029
                                                Root MSE      =          1.2584

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
mva							
age		.6801167	3.816214	0.18	0.861	-7.337451	8.697684
age2		4.459867	4.715611	0.95	0.357	-5.447264	14.367
over21		5.892489	1.329178	4.43	0.000	3.09999	8.684988
over_age		-15.16667	6.350687	-2.39	0.028	-28.50897	-1.824368
over_age2		6.96523	7.052903	0.99	0.336	-7.85237	21.78283
_cons		30.1883	.5619943	53.72	0.000	29.0076	31.36901

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          48
                                                F(2, 45)       =          19.99
                                                Prob > F        =          0.0000
                                                R-squared      =          0.4754
                                                Root MSE      =          .78717

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
suicide							

age		-.1814086	.2111302	-0.86	0.395	-.6066467	.2438294
over21		1.794289	.4960862	3.62	0.001	.7951202	2.793458
_cons		11.45484	.236895	48.35	0.000	10.9777	11.93197

./table41.xls
dir : seeout

Linear regression	Number of obs	=	48
	F(5, 42)	=	7.79
	Prob > F	=	0.0000
	R-squared	=	0.4887
	Root MSE	=	.8044

suicide		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age		.1382259	.6147566	0.22	0.823	-1.102403 1.378855
age2		.0555234	.3039805	0.18	0.856	-.557934 .6689809
over21		1.814332	.782268	2.32	0.025	.2356513 3.393013
over_age		-.7001801	1.735563	-0.40	0.689	-4.202687 2.802327
over_age2		.0308786	.8340787	0.04	0.971	-1.65236 1.714118
_cons		11.69811	.2852942	41.00	0.000	11.12236 12.27385

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(2, 21)	=	12.49
	Prob > F	=	0.0003
	R-squared	=	0.5409
	Root MSE	=	.84656

suicide		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age		-.0054221	.6210454	-0.01	0.993	-1.296957 1.286112
over21		1.724426	.7331671	2.35	0.029	.1997217 3.24913
_cons		11.64025	.3476599	33.48	0.000	10.91725 12.36324

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(5, 18)	=	4.44
	Prob > F	=	0.0082
	R-squared	=	0.5480

Root MSE = .90732

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
suicide							
age		1.483894	2.041657	0.73	0.477	-2.805468	5.773255
age2		1.406693	2.125001	0.66	0.516	-3.05777	5.871155
over21		1.296599	1.139562	1.14	0.270	-1.097533	3.69073
over_age		-.3850182	4.892971	-0.08	0.938	-10.66477	9.894732
over_age2		-2.629635	4.555603	-0.58	0.571	-12.2006	6.941331
_cons		11.91936	.3317131	35.93	0.000	11.22245	12.61626

./table41.xls

dir : seeout

Linear regression

Number of obs = 48
F(2, 45) = 4.76
Prob > F = 0.0133
R-squared = 0.1713
Root MSE = .67912

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
homicide							
age		.2218874	.1967917	1.13	0.265	-.1744715	.6182463
over21		.1043579	.4497449	0.23	0.818	-.8014748	1.010191
_cons		16.85989	.2450709	68.80	0.000	16.36629	17.35349

./table41.xls

dir : seeout

Linear regression

Number of obs = 48
F(5, 42) = 4.69
Prob > F = 0.0017
R-squared = 0.3943
Root MSE = .60098

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
homicide							
age		1.321966	.8347311	1.58	0.121	-.3625895	3.006521
age2		.2673265	.416655	0.64	0.525	-.5735173	1.10817
over21		.2002209	.5023706	0.40	0.692	-.813604	1.214046
over_age		-2.491488	1.102971	-2.26	0.029	-4.717373	-.2656018
over_age2		.1476884	.5535036	0.27	0.791	-.9693271	1.264704

_cons		17.59831	.3803027	46.27	0.000	16.83083	18.36579
-------	--	----------	----------	-------	-------	----------	----------

./table41.xls

dir : seeout

Linear regression	Number of obs	=	24
	F(2, 21)	=	1.27
	Prob > F	=	0.3019
	R-squared	=	0.0945
	Root MSE	=	.66504

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
homicide							
age		.2211324	.4797948	0.46	0.650	-.7766556	1.21892
over21		.1638189	.5893898	0.28	0.784	-1.061884	1.389522
_cons		17.10312	.3435573	49.78	0.000	16.38865	17.81759

./table41.xls

dir : seeout

Linear regression	Number of obs	=	24
	F(5, 18)	=	1.58
	Prob > F	=	0.2150
	R-squared	=	0.2927
	Root MSE	=	.63486

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
homicide							
age		4.437454	2.896132	1.53	0.143	-1.647093	10.522
age2		3.441949	2.611607	1.32	0.204	-2.044834	8.928732
over21		-.4526931	.9268679	-0.49	0.631	-2.39997	1.494584
over_age		-4.695171	4.191576	-1.12	0.277	-13.50135	4.111004
over_age2		-3.789381	3.782756	-1.00	0.330	-11.73666	4.157893
_cons		18.06824	.6704247	26.95	0.000	16.65973	19.47675

./table41.xls

dir : seeout

Linear regression	Number of obs	=	48
	F(2, 45)	=	30.30
	Prob > F	=	0.0000
	R-squared	=	0.5803
	Root MSE	=	.87207

ext_oth	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
age	.5335982	.1877507	2.84	0.007	.1554489	.9117476
over21	.8381123	.4249421	1.97	0.055	-.017765	1.693989
_cons	14.08134	.2154729	65.35	0.000	13.64736	14.51533

./table41.xls

dir : seeout

Linear regression	Number of obs	=	48
	F(5, 42)	=	27.91
	Prob > F	=	0.0000
	R-squared	=	0.6422
	Root MSE	=	.83347

ext_oth	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
age	-.8574098	1.174666	-0.73	0.469	-3.227981	1.513162
age2	-.9177998	.5684979	-1.61	0.114	-2.065075	.2294754
over21	1.79718	.5631014	3.19	0.003	.6607949	2.933564
over_age	-.1326175	1.610339	-0.08	0.935	-3.382412	3.117177
over_age2	1.477557	.7794358	1.90	0.065	-.0954079	3.050522
_cons	13.89931	.4008398	34.68	0.000	13.09038	14.70824

./table41.xls

dir : seeout

Linear regression	Number of obs	=	24
	F(2, 21)	=	10.98
	Prob > F	=	0.0005
	R-squared	=	0.4763
	Root MSE	=	.79539

ext_oth	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
age	.0057589	.6375004	0.01	0.993	-1.319996	1.331513
over21	1.413522	.5938869	2.38	0.027	.1784668	2.648577
_cons	13.89479	.3229814	43.02	0.000	13.22312	14.56647

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          24
                                                F(5, 18)        =          4.82
                                                Prob > F         =         0.0057
                                                R-squared       =         0.5269
                                                Root MSE       =         .81659

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ext_oth							
age		.0495123	2.902777	0.02	0.987	-6.048996	6.14802
age2		-.7644889	3.053148	-0.25	0.805	-7.178915	5.649937
over21		1.625275	.749856	2.17	0.044	.049886	3.200664
over_age		-1.371213	4.247653	-0.32	0.751	-10.2952	7.552774
over_age2		1.301536	4.581178	0.28	0.780	-8.323163	10.92623
_cons		14.16384	.5111747	27.71	0.000	13.0899	15.23778

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          48
                                                F(2, 45)        =         84.50
                                                Prob > F         =         0.0000
                                                R-squared       =         0.7994
                                                Root MSE       =         1.0318

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
internal							
age		1.600067	.2472443	6.47	0.000	1.102091	2.098042
over21		.3919185	.5430902	0.72	0.474	-.7019214	1.485758
_cons		20.08933	.273033	73.58	0.000	19.53941	20.63925

./table41.xls

dir : seeout

```

Linear regression                                Number of obs   =          48
                                                F(5, 42)        =         35.58
                                                Prob > F         =         0.0000
                                                R-squared       =         0.8076
                                                Root MSE       =         1.0458

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
internal							
age		1.499653	1.339859	1.12	0.269	-1.204292	4.203599

age2		-.0601118	.6886446	-0.09	0.931	-1.449853	1.329629
over21		1.073201	.8015423	1.34	0.188	-.544377	2.690779
over_age		-1.869609	2.014794	-0.93	0.359	-5.935628	2.19641
over_age2		1.049596	.9882146	1.06	0.294	-.9447017	3.043894
_cons		20.06823	.4899727	40.96	0.000	19.07942	21.05703

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(2, 21)	=	10.35
	Prob > F	=	0.0007
	R-squared	=	0.4938
	Root MSE	=	.91073

internal		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age		-.0094185	.6917679	-0.01	0.989	-1.448029 1.429192
over21		1.692263	.7448802	2.27	0.034	.1431993 3.241326
_cons		19.4887	.3774137	51.64	0.000	18.70382 20.27357

./table41.xls
dir : seeout

Linear regression	Number of obs	=	24
	F(5, 18)	=	4.13
	Prob > F	=	0.0113
	R-squared	=	0.5077
	Root MSE	=	.97014

internal		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age		2.747812	2.548893	1.08	0.295	-2.607214 8.102838
age2		2.619305	2.51303	1.04	0.311	-2.660375 7.898985
over21		1.24941	1.012008	1.23	0.233	-.8767397 3.375559
over_age		-2.82976	4.225938	-0.67	0.512	-11.70813 6.048607
over_age2		-2.721989	4.301021	-0.63	0.535	-11.7581 6.314122
_cons		20.00056	.6134096	32.61	0.000	18.71183 21.28928

./table41.xls
dir : seeout

Linear regression	Number of obs	=	48
	F(2, 45)	=	17.35

Prob > F = 0.0000
 R-squared = 0.4222
 Root MSE = .27214

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
alcohol							
age		.0040971	.088112	0.05	0.963	-.1733696	.1815637
over21		.442357	.2060135	2.15	0.037	.0274245	.8572895
_cons		1.036159	.0879096	11.79	0.000	.8590996	1.213218

./table41.xls

dir : seeout

Linear regression

Number of obs = 48
 F(5, 42) = 13.88
 Prob > F = 0.0000
 R-squared = 0.5260
 Root MSE = .25514

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
alcohol							
age		-.4208805	.2436486	-1.73	0.091	-.9125832	.0708222
age2		-.2853848	.1129688	-2.53	0.015	-.5133651	-.0574045
over21		.7992282	.3240426	2.47	0.018	.1452838	1.453173
over_age		-.2345868	.6863237	-0.34	0.734	-1.619644	1.15047
over_age2		.5498025	.3092787	1.78	0.083	-.0743473	1.173952
_cons		.9870015	.1060055	9.31	0.000	.7730737	1.200929

./table41.xls

dir : seeout

Linear regression

Number of obs = 24
 F(2, 21) = 6.34
 Prob > F = 0.0070
 R-squared = 0.4161
 Root MSE = .28965

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
alcohol							
age		-.3267959	.2654614	-1.23	0.232	-.8788532	.2252614
over21		.74045	.3325104	2.23	0.037	.0489568	1.431943
_cons		.9132887	.1410297	6.48	0.000	.6200014	1.206576

```

./table41.xls
dir : seeout

```

```

Linear regression      Number of obs   =      24
                      F(5, 18)         =      3.59
                      Prob > F          =     0.0199
                      R-squared         =     0.5841
                      Root MSE       =     .26402

```

		Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
alcohol							
age		.3572718	.5263514	0.68	0.506	-.7485515	1.463095
age2		.3448061	.486452	0.71	0.488	-.6771916	1.366804
over21		1.027679	.4126053	2.49	0.023	.1608272	1.89453
over_age		-3.109398	1.755207	-1.77	0.093	-6.796951	.5781557
over_age2		1.765446	1.597773	1.10	0.284	-1.591351	5.122244
_cons		1.139023	.1202988	9.47	0.000	.8862848	1.391762

```

./table41.xls
dir : seeout

```

- figure42.eps (Figure 4.2)
- figure44.eps (Figure 4.4)
- figure45.eps (Figure 4.5)
-

0.4 table41.xls (Table 4.1) This is table format in excel

-

0.5 This replication don't cover Fuzzy RD

[]: