Assignment 5 Packet

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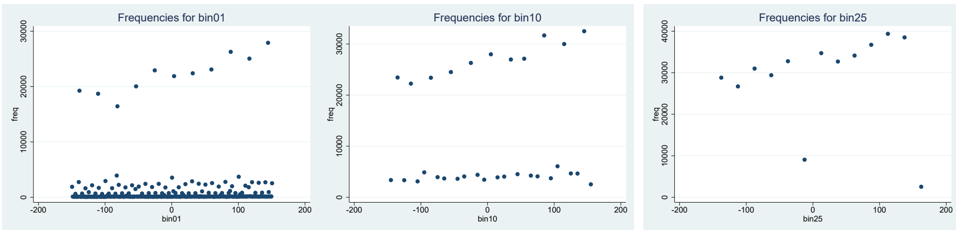
Question A.1

From Figure 1 we see that the distribution of birth weights is not smooth. It more clusters in some bins.



(a) Bin Length: 01 gram (b) Bin Length: 10 gram (c) Bin Length: 25 gram

Figure 1: Frequencies of bins with different lengths

Question A.2

From table 1, table 2 and table 3 we basically observe no significant discontinuity of the frequencies of running variable pre and post the cutoff. However, we can see a jump on the intercept when the bandwidth is 150 on 90% significance level.

Question A.3

From table 4, table 5 and table 6, we can see that with larger bandwidth (90 gram), both the race of mom and the education level of mom are discontinuous on the slopes. As the bandwidth goes smaller, the race of mom losts discontinuity on the slopes, but the education of mom keeps the discontinuity. Therefore the results are sensitive to bandwidth.

We can also observe that rectangular kernel is usually more able to capture the discontinuity.

We can guess from data that since mom's education level slope becomes flat after cutoff, then before the cutoff, the more educated mom tends to

Table 1: Test continuity via frequency, bin01

	bandwidth:150	bandwidth:100	bandwidth:50
cut	-447.2	-740.2	-1611.6
	(-0.46)	(-0.64)	(-1.04)
bin01	1.124	-4.347	-38.87
	(0.14)	(-0.31)	(-1.03)
inter	-3.018	1.099	33.74
	(-0.27)	(0.06)	(0.63)
_cons	1356.6**	1600.0*	2319.9**
	(1.97)	(1.97)	(2.12)
N	300	200	100

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Test continuity via frequency, bin10

	bandwidth:150	bandwidth:100	bandwidth:50
cut	-4270.2	-7335.8	-11093.7
	(-0.49)	(-0.68)	(-0.67)
bin10	13.07	-41.96	-238.6
	(0.19)	(-0.32)	(-0.58)
inter	-31.16	9.290	238.2
	(-0.31)	(0.05)	(0.41)
_cons	13429.1**	15924.7*	19447.9
	(2.20)	(2.08)	(1.66)
N	30	20	10

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Test continuity via frequency, bin25

	bandwidth:150	bandwidth:100	bandwidth:50
cut	-13216.7*	-20013.0	-38534.5
	(-1.88)	(-2.06)	(.)
bin25	47.48	29.84	-80.92
	(0.82)	(0.25)	(.)
inter	-141.4	-279.7	-867.7
	(-1.73)	(-1.65)	(.)
_cons	32462.2***	33075.0***	35729.5
	(6.53)	(4.82)	(.)
N	12	8	4

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

push to keep their babies in the program. The same logic may apply to non-white mom. This confounder may harm the validity of our regression discontinuity method.

Question A.4

From table 7, table 8, table 9 and table 10, we can observe that infants at the ounce heaps are more possible to have a white mom. However, there are basically no significant jumps on mom's education level for those ounce heap infants.

From table 11, we can observe that the infants heaping at 1500 gram are less likely to have a white mom, but are more likely to have a mom at least having a high school level education.

Question B.1

From table 12, table 13, table 14, we can observe obvious effect of cutoff of birth weight on mortality. We can observe even stronger effects on both intercept and slope as brandwidth becomes smaller and use the triangular kernel method.

Question B.2

From table 15, table 16, table 17, we can observe that the cutoff effect loses its significance on slope differences. But we still can get a lower one year death rate if the infants are assigned to the less than 1500 gram group.

Table 4: Test continuity via characteristics, bandwidth: 90

	mom_white_TK	mom_white_RK	mom_high_TK	mom_high_RK
bwtnorm	-0.000110	-0.0000360	0.0000512	0.0000323
	(-1.33)	(-0.57)	(0.68)	(0.56)
cut	0.00482	0.00120	0.00209	0.00182
	(1.01)	(0.28)	(0.48)	(0.47)
inter	0.000188*	0.000154**	-0.000177*	-0.000119*
	(1.82)	(2.05)	(-1.87)	(-1.73)
_cons	0.654***	0.657***	0.253***	0.252***
	(161.81)	(185.54)	(68.26)	(77.81)
N	230248	233887	230248	233887

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Test continuity via characteristics, bandwidth: 60

	mom_white_TK	mom_white_RK	mom_high_TK	mom_high_RK
bwtnorm	-0.000220	-0.000215*	0.000202	0.0000210
	(-1.35)	(-1.82)	(1.35)	(0.19)
cut	0.00843	0.00673	-0.00174	0.00385
	(1.33)	(1.24)	(-0.30)	(0.78)
inter	0.000240	0.000345**	-0.000314*	-0.000188
	(1.21)	(2.52)	(-1.72)	(-1.50)
_cons	0.651***	0.651***	0.256***	0.252***
	(115.85)	(136.78)	(49.64)	(57.75)
N	158693	163422	158693	163422

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Test continuity via characteristics, bandwidth: 30

	mom_white_TK	mom_white_RK	mom_high_TK	mom_high_RK
bwtnorm	-0.000179	-0.000409	0.000546	0.000682*
	(-0.39)	(-0.99)	(1.29)	(1.81)
cut	0.00712	0.0165	-0.00734	-0.0115
	(0.64)	(1.59)	(-0.72)	(-1.21)
inter	0.000397	-0.000689	-0.00107*	-0.000776*
	(0.63)	(-1.40)	(-1.86)	(-1.73)
_cons	0.652***	0.647***	0.264***	0.266***
	(61.88)	(65.29)	(27.10)	(29.33)
N	68207	72941	68207	72941

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Test jump on oz 51, bandwidth: 25

	mom_white	mom_high
bweight	-0.000169	-0.0000465
	(-0.70)	(-0.21)
inter51	0.0000185***	-0.000000925
	(5.58)	(-0.31)
_cons	0.890**	0.319
	(2.55)	(1.00)
N	39519	39519

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Test jump on oz 52, bandwidth: 25

	mom_white	mom_high
bweight	0.000170	0.000228
	(0.71)	(1.04)
inter52	0.0000135***	-0.00000460
	(4.24)	(-1.59)
_cons	0.393	-0.0810
	(1.12)	(-0.25)
N	41928	41928

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Test jump on oz 53, bandwidth: 25

	mom_white	mom_high
bweight	0.000516**	-0.000353*
	(2.26)	(-1.68)
inter53	0.0000186***	0.00000120
	(5.90)	(0.41)
_cons	-0.131	0.782**
	(-0.38)	(2.49)
N	40358	40358

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Test jump on oz 54, bandwidth: 25

	mom_white	mom_high
bweight	0.000215	0.000145
	(0.93)	(0.68)
inter54	0.0000147***	-0.00000186
	(4.94)	(-0.68)
_cons	0.317	0.0314
	(0.89)	(0.10)
N	43655	43655

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Test jump on 1500, bandwidth: 25

	mom_white	mom_high
bweight	0.000292	-0.000132
	(1.32)	(-0.66)
inter2	-0.0000137**	0.0000116**
	(-2.34)	(2.18)
_cons	0.206	0.450
	(0.62)	(1.49)
N	22613	22613

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Birth weight class on mortality, bandwidth: 90

	Triangular	Rectangular
bwtnorm	-0.000166***	-0.000128***
	(-4.19)	(-4.06)
cut	0.0114***	0.00737***
	(4.86)	(3.53)
inter	-0.0000858*	-0.0000175
	(-1.70)	(-0.47)
_cons	0.0525***	0.0539***
	(27.28)	(31.02)
N	230248	233887

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Birth weight class on mortality, bandwidth: 60

	Triangular	Rectangular
bwtnorm	-0.000279***	-0.000184***
	(-3.69)	(-3.16)
cut	0.0161***	0.0110***
	(5.34)	(4.13)
inter	-0.000128	-0.0000431
	(-1.35)	(-0.64)
_cons	0.0497***	0.0522***
	(19.08)	(22.64)
N	158693	163422

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Birth weight class on mortality, bandwidth: 30

	Triangular	Rectangular
bwtnorm	-0.000554***	-0.000464**
	(-2.67)	(-2.44)
cut	0.0263***	0.0214***
	(5.18)	(4.43)
inter	-0.00112***	-0.000394*
	(-3.76)	(-1.73)
_cons	0.0445***	0.0461***
	(9.43)	(10.18)
N	68207	72941

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Birth weight class on mortality, bandwidth: 90 , 1500 dropped

	Triangular	Rectangular
bwtnorm	-0.000166***	-0.000128***
	(-4.19)	(-4.06)
cut	0.00650***	0.00376*
	(2.77)	(1.79)
inter	0.0000226	0.0000365
	(0.45)	(0.97)
_cons	0.0525***	0.0539***
	(27.28)	(31.02)
N	226704	230343

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Birth weight class on mortality, bandwidth: 60 , 1500 dropped

	Triangular	Rectangular
bwtnorm	-0.000279***	-0.000184***
	(-3.69)	(-3.16)
cut	0.0101***	0.00648**
	(3.34)	(2.42)
inter	0.0000771	0.0000544
	(0.81)	(0.80)
_cons	0.0497***	0.0522***
	(19.08)	(22.64)
N	155149	159878

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Birth weight class on mortality, bandwidth: 30 , 1500 dropped

	Triangular	Rectangular
bwtnorm	-0.000554***	-0.000464**
	(-2.67)	(-2.44)
cut	0.0175***	0.0151***
	(3.45)	(3.12)
inter	-0.000153	-0.0000515
	(-0.53)	(-0.22)
_cons	0.0445***	0.0461***
	(9.43)	(10.18)
N	64663	69397

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Question B.3

From table 18, table 19, table 20, we notice that by dropping 1500 and ounce heaps, we almost lost all cutoff effects. The exception is that, with 90 bandwidth, we still could see a higher slope for the infants who is close but above the 1500 gram cutoff, which means without further care, the mortality grows faster as baby's weight gets less.

Question B.4

From table 21, table 22, table 23, we can observe similar resutls as B.3. [1]

Question B.5

From the above analysis, we would like to conclude that we will use estimates in B.3 and B.4. These methods can get rid of the potential biases. It rules out two potential confounders to the estimate:

1. High education and non-white mom's effort in putting their babies in the less than 1500 group even their babies are actually above this level.

2. White mom's habit to record their babies' weight in ounce unit.

By ruling out these factors, we find it difficult to support the argument that this kind of program would reduce the death rate of very low birth weight babies.

[1] However, I cannot figure out why there are collinearity problems in my models.

Table 18: Birth weight class on mortality, bandwidth: 90 , 1500 and ounce heaps dropped

	Triangular	Rectangular
bwtnorm	-0.000170***	-0.000169***
	(-3.73)	(-4.49)
cut	0.00118	0.000866
	(0.33)	(0.27)
inter	0.000168***	0.000174***
	(2.60)	(3.61)
_cons	0.0497***	0.0497***
	(19.30)	(20.53)
N	139461	143100

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Birth weight class on mortality, bandwidth: 60 , 1500 and ounce heaps dropped

	Triangular	Rectangular
bwtnorm	-0.000262**	-0.000133
	(-2.29)	(-1.58)
cut	0.00373	-0.000902
	(0.80)	(-0.22)
inter	0.000212	0.000162
	(1.45)	(1.62)
_cons	0.0479***	0.0508***
	(13.65)	(16.24)
N	67906	72635

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Birth weight class on mortality, bandwidth: 30 , 1500 and ounce heaps dropped

	Triangular	Rectangular
bwtnorm	-0.000588	-0.000312
	(-1.60)	(-1.26)
cut	0.00951	0.00603
	(1.27)	(0.96)
inter	0.000377	0.000121
	(0.77)	(0.38)
_cons	0.0442***	0.0475***
	(7.81)	(10.00)
N	19856	24590

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Birth weight class on mortality, bandwidth: 90 , 1500 and ounce heaps controlled

	Triangular	Rectangular
bwtnorm	-0.000170***	-0.000169***
	(-3.73)	(-4.49)
cut	0.00118	0.000866
	(0.33)	(0.27)
inter	0.000168***	0.000174***
	(2.60)	(3.61)
heap_1446	0	0
	(.)	(.)
heap_1474	0	0
	(.)	(.)
heap_1503	0	0
	(.)	(.)
heap_1531	0	0
	(.)	(.)
heapinter_1446	-0.0000908**	-0.0000911**
	(-2.37)	(-2.45)
heapinter_1474	-0.000180**	-0.000180**
	(-2.10)	(-2.10)
heapinter_1503	0.00332***	0.00341***
	(3.50)	(4.05)
heapinter_1531	0.000163**	0.000166***
	(2.56)	(2.63)
_cons	0.0497***	0.0497***
	(19.30)	(20.53)
N	226704	230343

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 22: Birth weight class on mortality, bandwidth: 60 , 1500 and ounce heaps controlled

	Triangular	Rectangular
bwtnorm	-0.000262**	-0.000133
	(-2.29)	(-1.58)
cut	0.00373	-0.000902
	(0.80)	(-0.22)
inter	0.000212	0.000162
	(1.45)	(1.62)
heap_1446	0	0
	(.)	(.)
heap_1474	0	0
	(.)	(.)
heap_1503	0	0
	(.)	(.)
heap_1531	0	0
	(.)	(.)
heapinter_1446	-0.0000304	-0.000107**
	(-0.42)	(-2.00)
heapinter_1474	-0.000154*	-0.000174**
	(-1.77)	(-2.03)
heapinter_1503	0.00309***	0.00361***
	(2.82)	(3.67)
heapinter_1531	0.000185***	0.000163**
	(2.79)	(2.56)
_cons	0.0479***	0.0508***
	(13.65)	(16.24)
N	155149	159878

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 23: Birth weight class on mortality, bandwidth: 30 , 1500 and ounce heaps controlled

	Triangular	Rectangular
bwtnorm	-0.000588	-0.000312
	(-1.60)	(-1.26)
cut	0.00951	0.00603
	(1.27)	(0.96)
inter	0.000377	0.000121
	(0.77)	(0.38)
heap_1446	0	0
	(.)	(.)
heap_1474	0	0
	(.)	(.)
heap_1503	0	0
	(.)	(.)
heap_1531	0	0
	(.)	(.)
heapinter_1446	0	0
	(.)	(.)
heapinter_1474	0.0000276	-0.000122
	(0.14)	(-0.92)
heapinter_1503	0.00257*	0.00262**
	(1.77)	(2.00)
heapinter_1531	0	0
	(.)	(.)
_cons	0.0442***	0.0475***
	(7.81)	(10.00)
N	64663	69397

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$