Predicting Police Violence

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Abstract

Using crowd-sourced data on civilian deaths attributable to police officers in the U.S. since 2013 linked to DOJ data on individual police departments, we estimate the effect of various departmental practices on civilian deaths. Descriptively, we find that official statistics undercount at least two in every three killings by police officers. Our analysis suggests that even after controlling for state fixed effects, there are large impacts of screening mechanisms for hiring new officers and the racial diversity of the police force, although the direction of the effects are often perverse. Additionally, we find moderate impacts of incentive schemes and policing equipment. Finally, we find little or no evidence to suggest that highly publicized, and often expensive, community policing initiatives have any effect on deterring police killings.

1 Data

1.1 Killings

We scrape data from the website `www.fatalencounters.org` (FE) for police deaths roughly from 2013 to 2015 totalling to 2,779 reported kills. The FE data report the location of death as well as the agency responsible for it. Table 1 provides a breakdown of total kills by year and state.

The FE data also provide demographic data on victims as well as information on the nature of the incident. These data are shown in Table 2, Table 3 and Table 4.

1.2 Police Departments

We collect publicly available data on police departments in the US. The Law Enforcement Management and Administrative Statistics (LEMAS) 2007 program surveys 3,224 state and local law enforcement agencies. The sample was designed to representative of all general purpose state and local law enforcement agencies in the United States. The LEMAS 2007 contains detailed information on police department resources as well as hiring and training practices.

2 Results

Of the 2,779 kills in our database, we successfully merge a little under 80% to their corresponding police department. We focus only on local police departments, which account for the lions share of all kills. We run a population weighted poisson regression on kills associated with a police department on all the departmental data we have from the LEMAS data with state fixed effects

Table 1: Victims: States and Years

State	Year of Incident			
	2013	**2014**	**2015**	**Total**
	No.	No.	No.	No.
AL	22	19	7	48
AZ	49	43	25	117
AR	15	7	4	26
CA	194	174	85	453
CO	22	22	14	58
CT	11	4	1	16
DE	2	3	2	7
DC	5	4	3	12
FL	105	100	39	244
GA	34	30	21	85
ID	4	4	5	13
IL	29	38	12	79
IN	22	11	10	43
IA	6	10	2	18
KS	6	19	7	32
KY	4	20	8	32
LA	11	24	10	45
ME	6	6	1	13
MD	33	23	11	67
MA	10	6	7	23
MI	13	26	8	47
MN	13	12	6	31
MS	6	18	5	29
MO	24	30	11	65
MT	9	6	2	17
NE	5	7	5	17
NV	11	20	3	34
NH	1	0	1	2
NJ	13	16	13	42
NM	11	19	7	37
NY	37	30	17	84
NC	33	42	14	89
ND	1	2	0	3
OH	27	29	14	70
OK	19	30	22	71
OR	12	17	12	41
PA	34	21	10	65
RI	1	1	0	2
SC	14	20	10	44
SD	2	3	0	5
TN	22	25	8	55
TX	101	121	53	275
UT	7	18	5	30
VT	1	1	0	2
VA	19	15	10	44
WA	31	37	9	77
WV	6	8	3	17
WI	15	9	5	29
WY	1	3	3	7
AK	4	1	1	6
HI	4	4	3	11
Total	1087	1158	534	2779

Source: master.dta

Table 2: Victim: Gender, Age and Race

	Mean Age
Race	
1. Black (21%)	32.1
2. White (34%)	39.2
3. Hispanic (12%)	32.3
4. Other Race (2%)	33.2
5. Unknown Race (28%)	38.7
Total (100%)	36.5
Gender	
1. Female (6%)	38.6
2. Male (93%)	36.3
Total (100%)	36.5
Symptoms of mental illness	
1. No Mental Illness (61%)	35.1
2. Mental Illness (14%)	40.0
3. Drug or Alcohol Abuse (6%)	36.4
4. Unknown (18%)	38.2
Total (100%)	36.5
Cause of death	
1. Gunshot (85%)	36.4
2. Taser (3%)	38.3
3. Medical Emergency (1%)	39.4
4. Vehicle (7%)	35.2
5. Other (1%)	36.9
Total (100%)	36.5

Source: FE.dta

Table 3: Victims: Gender and Mental Illness

	Gender		
	1. Female	**2. Male**	**Total**
Race			
1. Black	27	576	603
2. White	74	898	972
3. Hispanic	24	332	356
4. Other Race	6	54	60
5. Unknown Race	61	727	788
Total	192	2,587	2,779
1. Black	4.5%	95.5%	100.0%
2. White	7.6%	92.4%	100.0%
3. Hispanic	6.7%	93.3%	100.0%
4. Other Race	10.0%	90.0%	100.0%
5. Unknown Race	7.7%	92.3%	100.0%
Total	6.9%	93.1%	100.0%
1. Black	14.1%	22.3%	21.7%
2. White	38.5%	34.7%	35.0%
3. Hispanic	12.5%	12.8%	12.8%
4. Other Race	3.1%	2.1%	2.2%
5. Unknown Race	31.8%	28.1%	28.4%
Total	100.0%	100.0%	100.0%
Symptoms of mental illness			
1. No Mental Illness	118	1,584	1,702
2. Mental Illness	29	370	399
3. Drug or Alcohol Abuse	6	169	175
4. Unknown	39	464	503
Total	192	2,587	2,779
1. No Mental Illness	6.9%	93.1%	100.0%
2. Mental Illness	7.3%	92.7%	100.0%
3. Drug or Alcohol Abuse	3.4%	96.6%	100.0%
4. Unknown	7.8%	92.2%	100.0%
Total	6.9%	93.1%	100.0%
1. No Mental Illness	61.5%	61.2%	61.2%
2. Mental Illness	15.1%	14.3%	14.4%
3. Drug or Alcohol Abuse	3.1%	6.5%	6.3%
4. Unknown	20.3%	17.9%	18.1%
Total	100.0%	100.0%	100.0%

Source: Fatal Encounters (2013 – 2015)

Table 4: Victims: Gender and Cause

Cause of death	**Gender** **1. Female**	**2. Male**	**Total**
1. Gunshot	133	2,242	2,375
2. Taser	2	95	97
3. Medical Emergency	1	46	47
4. Vehicle	54	151	205
5. Other	2	53	55
Total	192	2,587	2,779
1. Gunshot	5.6%	94.4%	100.0%
2. Taser	2.1%	97.9%	100.0%
3. Medical Emergency	2.1%	97.9%	100.0%
4. Vehicle	26.3%	73.7%	100.0%
5. Other	3.6%	96.4%	100.0%
Total	6.9%	93.1%	100.0%
1. Gunshot	69.3%	86.7%	85.5%
2. Taser	1.0%	3.7%	3.5%
3. Medical Emergency	0.5%	1.8%	1.7%
4. Vehicle	28.1%	5.8%	7.4%
5. Other	1.0%	2.0%	2.0%
Total	100.0%	100.0%	100.0%

Source: Fatal Encounters (2013 – 2015)

controling for the log number of sworn employees , the crime rate and the local demographic makeup. Our results are shown from Table 5 through Table 22.

Table 5: Racial and Gender Composition

	(1)	(2)	(3)	(4)
Pct Sworn Officers Black	30.46	12.99	15.97	63.83*
	(21.27)	(25.36)	(24.75)	(29.53)
Pct Sworn Officers Hispanic	3.624	-9.020	-7.153	-12.87*
	(2.474)	(4.819)	(4.713)	(5.441)
Pct Sworn Officers Other Race	19.07	5.247	8.106	40.95**
	(10.99)	(12.39)	(12.02)	(14.53)
Pct Sworn Officers Female	-6.486	-7.224	-5.201	8.345
	(11.29)	(11.04)	(11.64)	(12.09)
ln(Number of Sworn Officers)	9.708***	8.459***	7.551***	6.513***
	(0.526)	(1.314)	(1.282)	(1.305)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Hiring Requirements

	(1)	(2)	(3)	(4)
4 Yr Coll.	2.834	2.081	1.260	1.935
	(2.918)	(2.780)	(2.571)	(2.008)
2 Yr Coll.	-0.541	-0.788	-0.105	0.898
	(1.737)	(1.774)	(1.792)	(1.482)
Some Coll.	0.724	0.534	0.352	4.481**
	(1.811)	(1.842)	(1.739)	(1.655)
HS Equiv.	2.033	1.824	1.593	4.195***
	(1.450)	(1.503)	(1.423)	(1.148)
Credit History	0.380	-0.118	0.272	0.765
	(1.182)	(1.241)	(1.208)	(1.472)
Personality Test	-0.873	-1.084	-1.226	-0.422
	(0.976)	(0.972)	(0.935)	(0.958)
Polygraph Exam	-0.129	-0.183	0.0824	-1.362
	(1.022)	(0.992)	(0.914)	(1.195)
Psychological Exam	-5.287	-7.262*	-11.54*	-15.79*
	(3.232)	(3.479)	(4.960)	(7.196)
Voice Stress Analyser	0.894	0.809	0.422	0.526
	(1.064)	(1.032)	(1.008)	(0.993)
Written Aptitude Test	0.388	0.278	-0.755	-0.821
	(1.144)	(1.149)	(1.203)	(1.215)
Analytical Prob Solving Test	1.477	1.467	1.081	0.429
	(0.829)	(0.815)	(0.786)	(0.821)
Cultural Diversity Understanding	-0.964	-0.551	-0.461	-0.0296
	(1.059)	(1.115)	(1.087)	(1.018)
Conflict Mgmt Skills	0.0581	0.292	0.365	0.208
	(1.001)	(1.042)	(1.008)	(0.915)
Second Language Test	2.678	3.404	4.167*	5.140*
	(1.849)	(1.933)	(2.014)	(2.321)
Community Service Check	1.538*	1.002	0.490	-0.653
	(0.688)	(0.661)	(0.645)	(0.699)
Drug Test	-0.575	-0.711	0.922	-0.429
	(2.140)	(2.147)	(1.864)	(1.641)
Medical Exam	7.531***	7.584***	7.593***	7.509***
	(0.490)	(0.426)	(0.422)	(0.524)
Physical	-4.533**	-3.730*	-3.330*	-1.274
	(1.759)	(1.674)	(1.460)	(1.256)
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
State FEs	No	No	No	Yes
N	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Monetary Resources

	(1)	(2)	(3)	(4)
Budget per Sworn Officer (100,000 USD)	2.883**	2.192*	2.164**	-0.143
	(1.055)	(0.922)	(0.833)	(0.946)
Drug Forfeitures per Sworn Officer	0.0000458	0.0000219	0.0000526	0.0000449
	(0.0000678)	(0.0000671)	(0.0000661)	(0.0000625)
Gambling Forfeitures per Sworn Officer	-0.00620*	-0.00781**	-0.00729*	-0.0133**
	(0.00302)	(0.00291)	(0.00290)	(0.00425)
Other Forfeitures per Sworn Officer	0.000120	0.000149	0.0000857	-0.00118
	(0.000272)	(0.000271)	(0.000254)	(0.000639)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Resources

	(1)	(2)	(3)	(4)
Number of Dogs per Sworn Officer	72.52*	75.38**	76.37**	68.14*
	(28.48)	(27.29)	(27.20)	(30.94)
Number of Horses per Sworn Officer	-48.43	-42.83	-48.73	-16.93
	(41.66)	(39.07)	(37.57)	(33.94)
Number of Marked Cars per Sworn Officer	2.726	3.101	4.100	1.917
	(3.187)	(3.034)	(2.865)	(3.100)
Number of Unmarked Cars per Sworn Officer	13.35*	16.68**	16.31*	20.68**
	(6.197)	(6.084)	(6.408)	(6.596)
Number of Aerial Vehicles per Sworn Officer	-24.88	-22.67	-49.56	-22.86
	(133.9)	(123.1)	(128.2)	(128.2)
Number of Motorcycles per Sworn Officer	23.76	24.34	23.73	35.43*
	(21.10)	(20.03)	(19.76)	(17.56)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

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Table 9: Equipment

	(1)	(2)	(3)	(4)
Semiautomatic authorized as backup	-0.470	-0.763	-0.0931	-0.428
	(1.368)	(1.429)	(1.324)	(1.513)
Revolver authorized as backup	0.302	-0.0238	-0.0163	-0.927
	(0.869)	(0.944)	(0.936)	(0.843)
Body armor at all times in the field	0.311	0.863	0.751	-0.234
	(0.891)	(0.830)	(0.828)	(0.904)
Body armor in some cases in the field	-1.197	-0.797	-0.402	-0.320
	(0.967)	(0.919)	(0.976)	(1.040)
Traditional batons	3.021***	3.055***	2.553***	3.127***
	(0.768)	(0.750)	(0.720)	(0.674)
PR-24 batons	-0.971	-1.095	-1.341	-0.677
	(0.799)	(0.765)	(0.743)	(0.691)
Collapsible batons	1.895	1.679	1.864	2.769**
	(1.054)	(1.053)	(1.007)	(1.070)
Soft Projectiles	0.464	0.798	0.193	-0.660
	(0.763)	(0.759)	(0.759)	(0.774)
Blackjack	-3.738***	-3.274***	-3.036**	-1.812
	(0.929)	(0.991)	(0.974)	(1.529)
Rubber bullets	2.908**	2.665**	2.961**	2.355**
	(1.038)	(0.996)	(0.988)	(0.909)
Other impact devices	0.645	0.758	0.908	0.275
	(0.931)	(0.943)	(0.973)	(0.872)
Pepper spray	-1.679	-1.383	-1.790	-2.262
	(7.616)	(7.207)	(7.554)	(8.655)
Other chemical agents	2.186	1.947	1.975	1.358
	(1.167)	(1.146)	(1.098)	(1.242)
Tazers	-0.774	-0.752	-0.697	-3.903**
	(1.110)	(1.103)	(1.034)	(1.446)
Carotid Hold	0.561	0.653	0.182	-1.889*
	(0.852)	(0.829)	(0.782)	(0.932)
Other non-lethal weapons	-0.0729	0.536	0.768	0.532
	(1.318)	(1.453)	(1.431)	(1.484)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: Fleet

	(1)	(2)	(3)	(4)
Personal Use of Marked Vehicles	0.673	0.933	0.714	0.325
	(1.089)	(1.098)	(1.054)	(1.158)
Marked Vehicles Outside Jurisdication	1.238	1.367	1.495*	0.0414
	(0.772)	(0.749)	(0.709)	(0.799)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: Employees

	(1)	(2)	(3)	(4)
Number Civilian Employees Per Officer	3.860	3.542	2.439	1.193
	(2.496)	(2.293)	(2.212)	(2.396)
Pct Sworn Personnel Assigned to Multi-Agency Gang Task Force	13.02	22.74	19.20	23.21
	(26.40)	(26.03)	(25.78)	(27.19)
Pct Sworn Personnel Assigned to Multi-Agency Drug Task Force	13.27	6.157	-0.828	14.18
	(21.43)	(21.70)	(21.64)	(19.58)
Pct Sworn Personnel Assigned to Multi-Agency Terrorism Task Force	-72.15	-52.34	-9.555	-29.50
	(74.62)	(73.28)	(67.39)	(54.95)
Pct Sworn Personnel Assigned to Multi-Agency Human Trafficking Task Force	92.54	84.42	18.92	129.3
	(94.10)	(99.99)	(102.9)	(119.8)
Pct Sworn Personnel Responding to Citizen Calls	-1.748	-0.587	-1.112	-2.147
	(2.071)	(2.085)	(2.037)	(1.898)
Pct Sworn Personnel Engaged in Community Policing	0.579	0.921	0.678	3.132*
	(1.417)	(1.450)	(1.392)	(1.469)
Pct Sworn Personnel Engaged as School Resource Officers	9.420	1.632	9.225	-10.62
	(18.23)	(18.24)	(17.39)	(20.93)
Pct Sworn Personnel Engaged in Gathering Intelligence	26.60**	28.32***	27.84***	21.26**
	(8.358)	(8.117)	(7.361)	(8.116)
Civilian Personnel Engaged in Gathering Intelligence per Sowrn Officer	133.4	45.98	31.96	115.7
	(142.5)	(158.5)	(160.9)	(134.0)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: Written Policy or Procedural Directives On

	(1)	(2)	(3)	(4)
Less Than Lethal Force	6.822***	6.692***	6.540***	6.052***
	(0.534)	(0.620)	(0.628)	(0.809)
Off-Duty Employment	-13.92	-13.75	-18.09	-27.97
	(10.49)	(10.29)	(12.05)	(15.38)
Maximum Work Hours Allowed	-0.365	-0.745	-0.747	0.0155
	(0.885)	(0.884)	(0.825)	(0.774)
Off-Duty Conduct	5.917***	5.753***	5.748***	4.829**
	(1.532)	(1.673)	(1.605)	(1.772)
Interacting with Media	-1.667	-1.688	-1.691	-1.816
	(4.086)	(4.130)	(3.848)	(3.327)
Employee Assistance Counseling	-0.408	-0.983	-0.665	-0.542
	(2.048)	(2.232)	(1.806)	(1.448)
Mentally Ill Persons	1.523	1.504	1.813	0.799
	(1.367)	(1.357)	(1.259)	(1.380)
Homeless Persons	-0.208	-0.225	0.0717	0.206
	(0.758)	(0.727)	(0.730)	(0.704)
Domestic Disputes	-0.367	0.0347	0.122	2.147
	(2.324)	(2.182)	(2.144)	(1.715)
Juveniles	-10.05	-8.489	-5.841	-2.702
	(5.503)	(5.133)	(4.010)	(3.172)
Limited English Proficiency	3.249***	3.178***	2.883***	1.863**
	(0.566)	(0.545)	(0.549)	(0.656)
Collection of Information on In-Custody Deaths	-1.934	-1.820	-1.831	-1.354
	(1.151)	(1.085)	(1.015)	(1.055)
Racial Profiling	1.700	1.928	1.198	0.447
	(1.058)	(1.025)	(1.094)	(1.073)
Citizen Complaints	1.027	1.113	1.139	0.545
	(5.948)	(6.034)	(6.185)	(6.086)
Checking of Immigration Status by Patrol Officers	1.128	1.015	0.922	1.021
	(0.707)	(0.683)	(0.664)	(0.681)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13: Salary Policies

	(1)	(2)	(3)	(4)
Education Incentive Pay	1.587*	1.861*	1.410	0.286
	(0.808)	(0.796)	(0.779)	(0.903)
Hazardous Duty Pay	-0.829	-1.122	-1.284	-1.381
	(0.832)	(0.829)	(0.836)	(0.864)
Performance Pay	-0.892	-0.807	-0.669	-1.488*
	(0.760)	(0.733)	(0.709)	(0.694)
Shift Differential Pay	-0.590	-0.871	-1.334*	-0.973
	(0.757)	(0.756)	(0.674)	(0.718)
Special Skills Prof. Pay	1.548*	1.393*	1.563*	2.155***
	(0.665)	(0.661)	(0.609)	(0.617)
Bilingual Ability Pay	0.989	0.265	0.293	-0.959
	(0.792)	(0.839)	(0.834)	(1.169)
Tuition Reimbursement	-1.097	-0.429	-0.818	-2.136*
	(1.045)	(0.991)	(0.992)	(1.022)
Military Service Pay	-1.850*	-2.312**	-2.659**	-2.173*
	(0.830)	(0.859)	(0.832)	(0.845)
Collective Bargaining Rights	0.589	0.895	0.796	0.975
	(0.891)	(0.875)	(0.840)	(1.017)
Residential Incentive Pay	0.490	0.678	1.091	3.816
	(1.759)	(1.832)	(1.916)	(2.325)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Salary Schedule (per 1,000 USD)

	(1)	(2)	(3)	(4)
Chief: Min Salary	-0.0355***	-0.0319***	-0.0265***	-0.0209*
	(0.00770)	(0.00784)	(0.00715)	(0.0104)
Sgt: Min Salary	0.0240	0.0230	0.00531	0.0658
	(0.0341)	(0.0337)	(0.0339)	(0.0437)
Entry: Min Salary	-0.0709	-0.0722	-0.0615	-0.114*
	(0.0410)	(0.0426)	(0.0412)	(0.0472)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: Community Policing

	(1)	(2)	(3)	(4)
Mission Statement Includes Community Policing	-1.537	-2.097	-1.948	-1.424
	(1.081)	(1.119)	(1.069)	(1.078)
Patrol Officers Engage in SARA Problem Solving	-1.411	-1.644*	-1.263	-1.946*
	(0.792)	(0.770)	(0.727)	(0.879)
Citizen Police Academy	0.415	0.232	0.384	0.149
	(1.015)	(0.990)	(0.916)	(0.904)
Formal, Written Community Policing Plan	0.0468	0.0663	0.232	-0.383
	(0.740)	(0.731)	(0.712)	(0.687)
Specific Geographic Beats for Patrol Offcrs	0.531	0.159	0.287	-0.686
	(1.031)	(1.022)	(1.000)	(1.169)
Collab. Prob. Solving Included in Evaluations	1.112	1.432*	0.490	-0.293
	(0.700)	(0.690)	(0.714)	(0.837)
Upgraded Technology to Analyse Community Probs	0.321	0.378	0.414	1.316
	(0.718)	(0.739)	(0.738)	(0.695)
Partnered with Citizen Groups	-0.508	-0.419	-1.285	-1.092
	(1.194)	(1.159)	(1.276)	(1.209)
Sponsored Survey on Crime and Satisfaction	-0.482	-0.514	-0.0702	0.0370
	(0.682)	(0.661)	(0.669)	(0.679)
Full Time Community Policing Unit	0.451	0.320	0.273	-0.112
	(0.712)	(0.734)	(0.710)	(0.706)
State FEs	No	No	No	Yes
Census Controls	No	Yes	Yes	Yes
UCR Offences Known Controls	No	No	Yes	Yes
Observations	1554	1554	1539	1539

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$