



Appendix: Data Description

Three ESRI shape files are packed into **TXCNTY2020.ZIP**. All are in the *long/lat* format and must be imported in  with the option `proj4string=CRS("+proj=longlat")` to map properly projected. Since these files were digitized for high resolution maps it may take  a several seconds to draw the maps. Be a little patient and try to get right the first time!

The file names are:

- **TXCNTY2020.SHP**: *Area layer* with the 254 counties of Texas. Its associate **DBASE** file holds the attribute information for this analysis.
- **TXNEIGHBORS.SHP**: *Area layer* with the neighboring states of Mexico and the United States of America. You *may* use this shape file as reference frame for the Texas counties.
- **INTERSTATEHWY.SHP**: *Line layer* of the main highways in and around Texas. You *may* use this shape file as spatial reference frame to locate the Texas counties.

Variable in TXCNTY2020.SHP

All variable for this project were retrieved from [a] the American Community Survey by the U.S. Census Bureau (2014 and 2020 releases of the 5 years summary estimate), [b] the presidential election results for 2012 are documented in www.data.gov, and the 2016 presidential election results can be found at <http://www.sos.state.tx.us/index.html>, [c] the Texas Department of Public Safety for 2015 (<https://www.dps.texas.gov/>), the Texas Department of Transportation (<http://www.txdot.gov/inside-txdot/division/finance/discos.html>) for 2015/2016 and [d] calculated by Caliper Inc.

Name	Format	Description
Geo Reference		
ID	Integer	Internal shape identifier of the areas
LANDAREA	Numeric	County land area in square miles
WATERAREA	Numeric	County lakes area in square miles
SEQID	Numeric	Sequence number following the alphabetically sorted county names
FIPS	Character	Unique Census Bureau identifier of the counties
NAME	Character	County name
LINKNAME	Character	Internal name of counties to link to external TX databases
DISTMEX	Metric	Distance to the Mexican border in miles
LONG	Metric	Longitude of county centroid in decimal degrees
LAT	Metric	Latitude of county centroid in decimal degrees
Crime Statistics		
AGENCIES	Count	Number of police agencies within a county (2013)
OFFICERS	Count	Number of sworn-in police officers in a county (2013)

MURDER	Count	Number of murders in a county (2015)
RAPE	Count	Number of rapes in a county (2015)
ROBBERY	Count	Number of robberies in a county (2015)
ASSAULT	Count	Number of assaults in a county (2015)
BURGLARY	Count	Number of burglaries in a county (2015)
LARCENY	Count	Number of larceny/theft (excluding cars) in a county (2015)
CARTHEFT	Count	Number of car thefts in a county (2015)
TOTCRIME	Count	Total number of crimes in a county (2015)
CRIMERATE	RATE	Crime rate per 100.000 population in a county (2015)
2012 Presidential Election Results		
ROMVOT12	Count	Absolute number of votes for Governor Mitt Romney in 2012 (Republican Party)
OBVOT12	Count	Absolute number of votes for President Obama in 2012 (Democratic Party)
OTHERVOT12	Count	Absolute number of votes for other candidates in 2012 (Green, Libertarian etc.)
TOTALVOT12	Count	Absolute number of voters in 2012
REGVOT12	Count	Absolute number of registered voters in 2012
TURNOUT12	Rate	Proportion of voter turnout in 2012 (TOTALVOT12/REGVOT12)
2016 Presidential Election Results		
TRUMPVOT16	Count	Absolute number of votes for Donald Trump in 2016 (Republican Party)
CLINTONVOT	Count	Absolute number of votes for Hillary Clinton in 2016 (Democratic Party)
OTHERVOT16	Count	Absolute number of votes for other candidates in 2016 (Green, Libertarian etc.)
TOTALVOT16	Count	Absolute number of voters in 2016
REGVOT16	Count	Absolute number of registered voters in 2016
TURNOUT16	Rate	Proportion of voter turnout in 2016 (TOTALVOT16/REGVOT16)
Census and Geographic Information 2012		
AGE18PLUS	Rate	Proportion of persons 18 years and older
REGION	Factor	Classification of counties into the Texan regions
RELIGADHER	Factor	Declared adherence to a religion; grouped rates
POP2010	Count	Census county population (2010)
POPCRIME	Count	Population at risk by county used TX Dept. of Public Safety (2015)
UNINSURED	Rate	Proportion of non-institutionalized uninsured population
MEDAGE	Numeric	Median age of population in county
AGE18LESS	Rate	Proportion of persons younger than 18 years
AGE18TO64	Rate	Proportion of persons between 18 and 64 years
AGE65UP	Rate	Proportion of persons 65 years and older

PARTBLACK	Rate	Proportion of any part Afro-American population
PARTASIAN	Rate	Proportion of any part Asian population
HISPOG	Rate	Proportion of population with Hispanic ethnic background
WHINOHISP	Rate	Proportion of White non-Hispanic population (Caucasian population)
SINGLEMOM	Rate	Proportion of single mother families
BIR15TO50	Numeric	Number of annual births per 10,000 women aged 15 to 50
BIR15TO19	Numeric	Number of annual births per 10,000 women aged 15 to 19
NOGOODENG	Rate	Proportion of population 5+ years who do not speak English well
NODIPLOMA	Rate	Proportion of population 25+ who do not have a High School diploma
COLLEGEDEG	Rate	Proportion of population 25+ who do have a college degree and above
INCOLLEGE	Rate	Proportion of population 16+ who are currently enrolled in a college or university
UNEMPL	Rate	Proportion of population in labor force who are currently unemployed
INARMY	Rate	Proportion of population in labor force who are currently serving in the armed forces
INCOME	Numeric	Per capita income (\$)
POVERTY	Rate	Proportion of people living below the poverty line
MEDHOMEVAL	Numeric	Median home value (\$)
HOMEDENSE	Rate	Proportion of households with less than one room per person
Census and Geographic Information 2018		
POPCHG	Numeric	Rate of population change from 2010 to 2018
POPENSE	Numeric	Night-time population density by square miles land area
DAYPOP18	Count	Day-time population in a county
NIGHTPOP18	Count	Night-time population in a county
URBRURAL	Factor	Classification of the counties into <i>metropolitan</i> areas with their <i>suburbs</i> and their <i>urban fringe</i> , solely <i>urban</i> counties and <i>rural</i> counties. Urban counties have had at least one city with over 100,000 population and the majority of residents are living in these cities.
TIME2WORK	Numeric	Median travel time to work
HUOCC	Count	Occupied housing units
HUVAC	Count	Vacant housing units
OWNVACPCT	Rate	Percent of vacant owner housing
RENTVACPCT	Rate	Percent of vacant rental housing
B2010PCT	Rate	Percent of housing units built 2010 and later
B2000PCT	Rate	Percent of housing units built between 2000 and 2009
B1990PCT	Rate	Percent of housing units built between 1990 and 1999
B1980PCT	Rate	Percent of housing units built between 1980 and 1989
B1970PCT	Rate	Percent of housing units built between 1970 and 1979
B1960PCT	Rate	Percent of housing units built between 1960 and 1969

B1950PCT	Rate	Percent of housing units built between 1950 and 1959
B1940PCT	Rate	Percent of housing units built between 1940 and 1949
BPREPCT	Rate	Percent of housing units built before 1940
MEDROOMS	Numeric	Median number of rooms per housing unit
OWNOCC	Count	Number of owner-occupied housing units
RENTOCC	Count	Number of renter-occupied housing units
MEDVALHOME	Numeric	Median value in \$ of owner-occupied housing units
OWNOCCPCT	Rate	Percent of owner-occupied housing units
MOVE2010PC	Rate	Percent of population having moved into current home 2010 and later
MOVE2000PC	Rate	Percent of population having moved into current home between 2000 and 2009
MOVE1990PC	Rate	Percent of population having moved into current home between 1990 and 1999
MOVEPREPCT	Rate	Percent of population having moved into current home before 1990
TX Dept. of Transportation Statistics		
VECREG	Count	Number of registered vehicles in a county (2015/2016)
TXDOTREGION	Factor	Regions used by TXDOT
VMDD	Count	Estimate vehicle miles driven daily in a county (2015/2016)
VMDDPC	Rate	Per capita vehicle miles driven daily
ROADMILES	Count	Number of highway miles in a county (2015/2016)
LANEMILES	Count	Number of highway lane miles in a county (2015/2016)
ROADCON	Count	Dollars spend on road construction in a county (2015/2016)
ROADMAIN	Count	Dollars spend on road maintenance in a county (2015/2016)

Data Summary

```
> summary(county.shp)
```

```
Object of class SpatialPolygonsDataFrame
```

```
Coordinates:
```

```
      min      max
```

```
x -106.64558 -93.50804
```

```
y  25.83716  36.50070
```

```
Is projected: FALSE
```

```
proj4string : [+proj=longlat +ellps=GRS80 +no_defs]
```

```
Data attributes:
```

FIPS	ID	SEQID	NAME	LINKNAME	DISTMEX
48001 : 1	Min. : 1.00	Min. : 1.00	Anderson : 1	ANDERSON : 1	Min. : 8.373
48003 : 1	1st Qu.: 64.25	1st Qu.: 64.25	Andrews : 1	ANDREWS : 1	1st Qu.:143.680
48005 : 1	Median :127.50	Median :127.50	Angelina : 1	ANGELINA : 1	Median :254.886
48007 : 1	Mean :127.50	Mean :127.50	Aransas : 1	ARANSAS : 1	Mean :243.517
48009 : 1	3rd Qu.:190.75	3rd Qu.:190.75	Archer : 1	ARCHER : 1	3rd Qu.:338.871
48011 : 1	Max. :254.00	Max. :254.00	Armstrong: 1	ARMSTRONG: 1	Max. :474.842
(Other):248			(Other) :248	(Other) :248	

LONG	LAT	AGENCIES	OFFICERS	MURDER
Min. : -106234828	Min. :26129554	Min. : 1.000	Min. : 2.0	Min. : 0.000
1st Qu.: -100778539	1st Qu.:30134017	1st Qu.: 2.000	1st Qu.: 12.0	1st Qu.: 0.000
Median : -98542696	Median :31783336	Median : 3.000	Median : 33.5	Median : 0.000
Mean : -98654178	Mean :31661149	Mean : 4.126	Mean : 304.4	Mean : 5.185
3rd Qu.: -96573928	3rd Qu.:33177321	3rd Qu.: 4.000	3rd Qu.: 86.0	3rd Qu.: 2.000
Max. : -93744742	Max. :36278418	Max. :42.000	Max. :38546.0	Max. :404.000

RAPE	ROBBERY	ASSAULT	BURGLARY	LARCENY
Min. : 0.00	Min. : 0.00	Min. : 0.0	Min. : 0.00	Min. : 0.00
1st Qu.: 0.25	1st Qu.: 0.00	1st Qu.: 6.0	1st Qu.: 24.25	1st Qu.: 39.75
Median : 5.00	Median : 3.00	Median : 35.0	Median : 94.00	Median : 204.00
Mean : 48.06	Mean : 125.60	Mean : 265.3	Mean : 600.36	Mean : 2189.05

3rd Qu.: 21.00	3rd Qu.: 13.75	3rd Qu.: 104.0	3rd Qu.: 241.75	3rd Qu.: 751.75	
Max.: 1681.00	Max.: 14293.00	Max.: 16602.0	Max.: 32374.00	Max.: 108379.00	
CARTHEFT	TOTCRIME	CRIMRATE	ROMVOT12	OBAVOT12	OTHERVOT12
Min.: 0.00	Min.: 4.0	Min.: 152.2	Min.: 54	Min.: 5.0	Min.: 1.0
1st Qu.: 5.00	1st Qu.: 85.0	1st Qu.: 1292.7	1st Qu.: 1428	1st Qu.: 486.5	1st Qu.: 22.0
Median: 18.00	Median: 362.5	Median: 1930.1	Median: 4239	Median: 1661.5	Median: 69.5
Mean: 264.19	Mean: 3497.7	Mean: 2110.2	Mean: 17992	Mean: 13024.1	Mean: 456.2
3rd Qu.: 53.75	3rd Qu.: 1154.8	3rd Qu.: 2784.3	3rd Qu.: 12074	3rd Qu.: 4678.2	3rd Qu.: 188.2
Max.: 21796.00	Max.: 195529.0	Max.: 7954.5	Max.: 586073	Max.: 587044.0	Max.: 15468.0
TOTALVOT12	REGVOT12	TURNOUT12	TRUMPVOT16	CLINTONVOT	OTHERVOT16
Min.: 64	Min.: 123	Min.: 0.3494	Min.: 58	Min.: 4.0	Min.: 3.00
1st Qu.: 2035	1st Qu.: 3822	1st Qu.: 0.5316	1st Qu.: 1465	1st Qu.: 400.8	1st Qu.: 54.75
Median: 6228	Median: 10905	Median: 0.5867	Median: 4612	Median: 1477.0	Median: 163.50
Mean: 31472	Mean: 53725	Mean: 0.5782	Mean: 18445	Mean: 15267.2	Mean: 1599.65
3rd Qu.: 16748	3rd Qu.: 27908	3rd Qu.: 0.6270	3rd Qu.: 13196	3rd Qu.: 4535.0	3rd Qu.: 511.00
Max.: 1188585	Max.: 2000011	Max.: 0.8422	Max.: 545955	Max.: 707914.0	Max.: 58243.00
TOTALVOT16	REGVOT16	TURNOUT16	AGE18PLUS	REGION	RELIGADHER
Min.: 65	Min.: 110	Min.: 0.3661	Min.: 0.6490	North Central :44	< 35%:13
1st Qu.: 2138	1st Qu.: 3905	1st Qu.: 0.5412	1st Qu.: 0.7248	East Texas :43	< 50%:64
Median: 6434	Median: 11542	Median: 0.5948	Median: 0.7523	High Plains :41	> 50%:81
Mean: 35312	Mean: 59453	Mean: 0.5892	Mean: 0.7518	Edwards Plateau :29	> 65%:96
3rd Qu.: 18522	3rd Qu.: 30931	3rd Qu.: 0.6403	3rd Qu.: 0.7750	Low Rolling Plains:28	
Max.: 1312112	Max.: 2234671	Max.: 0.7883	Max.: 1.0000	South Central :25	
				(Other) :44	
POP2010	POPCRIME	UNINSURED	MEDAGE	AGE18LESS	AGE18TO64
Min.: 85	Min.: 88	Min.: 0.06854	Min.: 24.50	Min.: 0.0000	Min.: 0.4735
1st Qu.: 6763	1st Qu.: 6381	1st Qu.: 0.19293	1st Qu.: 35.20	1st Qu.: 0.2250	1st Qu.: 0.5666
Median: 18241	Median: 17927	Median: 0.21482	Median: 38.40	Median: 0.2477	Median: 0.5871
Mean: 99248	Mean: 108014	Mean: 0.22091	Mean: 38.89	Mean: 0.2482	Mean: 0.5932
3rd Qu.: 49246	3rd Qu.: 49151	3rd Qu.: 0.24336	3rd Qu.: 42.70	3rd Qu.: 0.2752	3rd Qu.: 0.6132
Max.: 4101752	Max.: 4566277	Max.: 0.40288	Max.: 55.30	Max.: 0.3510	Max.: 0.9412
AGE65UP	PARTBLACK	PARTASIAN	HISPORG	WHINOHISP	SINGLEMMOM
Min.: 0.05882	Min.: 0.00000	Min.: 0.0000000	Min.: 0.0295	Min.: 0.01319	Min.: 0.00000
1st Qu.: 0.12493	1st Qu.: 0.01621	1st Qu.: 0.002433	1st Qu.: 0.1614	1st Qu.: 0.45642	1st Qu.: 0.07535
Median: 0.14908	Median: 0.04702	Median: 0.005933	Median: 0.2414	Median: 0.62671	Median: 0.09871
Mean: 0.15861	Mean: 0.06992	Mean: 0.010638	Mean: 0.3242	Mean: 0.59018	Mean: 0.09829
3rd Qu.: 0.19100	3rd Qu.: 0.09723	3rd Qu.: 0.011105	3rd Qu.: 0.4658	3rd Qu.: 0.75456	3rd Qu.: 0.12125
Max.: 0.32471	Max.: 0.34523	Max.: 0.182059	Max.: 0.9832	Max.: 0.95161	Max.: 0.18245
BIR15TO50	BIR15TO19	NOGOODENG	NODIPLOMA	COLLEGEDEG	INCOLLEGE
Min.: 0.00	Min.: 0.00	Min.: 0.00000	Min.: 0.05979	Min.: 0.03658	Min.: 0.00000
1st Qu.: 50.25	1st Qu.: 0.00	1st Qu.: 0.03998	1st Qu.: 0.16718	1st Qu.: 0.13132	1st Qu.: 0.03396
Median: 62.00	Median: 36.00	Median: 0.06709	Median: 0.20061	Median: 0.15843	Median: 0.04639
Mean: 63.76	Mean: 46.04	Mean: 0.09125	Mean: 0.21936	Mean: 0.17518	Mean: 0.05608
3rd Qu.: 77.75	3rd Qu.: 64.50	3rd Qu.: 0.11359	3rd Qu.: 0.25466	3rd Qu.: 0.20237	3rd Qu.: 0.06539
Max.: 211.00	Max.: 386.00	Max.: 0.50135	Max.: 0.55123	Max.: 0.48991	Max.: 0.35189
UNEMPL	INARMY	INCOME	POVERTY	HOMEDENSE	VECREG
Min.: 0.00000	Min.: 0.000000	Min.: 11537	Min.: 0.0000	Min.: 0.00000	Min.: 205
1st Qu.: 0.05249	1st Qu.: 0.000000	1st Qu.: 19275	1st Qu.: 0.1406	1st Qu.: 0.02471	1st Qu.: 7348
Median: 0.06971	Median: 0.000000	Median: 21992	Median: 0.1686	Median: 0.03486	Median: 23043
Mean: 0.06918	Mean: 0.004225	Mean: 22432	Mean: 0.1748	Mean: 0.03969	Mean: 94638
3rd Qu.: 0.08479	3rd Qu.: 0.001679	3rd Qu.: 24756	3rd Qu.: 0.2049	3rd Qu.: 0.04729	3rd Qu.: 53541
Max.: 0.16354	Max.: 0.242718	Max.: 40241	Max.: 0.4273	Max.: 0.16301	Max.: 3534529
TXDOTREGIO	VECREGPC	VMDD	VMDDPC	ROADMILES	LANEMILES
AMA : 17	Min.: 0.6861	Min.: 45796	Min.: 8.901	Min.: 34.0	Min.: 68.0
LBB : 17	1st Qu.: 0.9739	1st Qu.: 335638	1st Qu.: 23.809	1st Qu.: 209.5	1st Qu.: 468.0
SJT : 15	Median: 1.1001	Median: 709359	Median: 32.122	Median: 293.0	Median: 681.5
ABL : 13	Mean: 1.1330	Mean: 2030971	Mean: 57.249	Mean: 316.1	Mean: 770.2
CHS : 13	3rd Qu.: 1.2511	3rd Qu.: 1598928	3rd Qu.: 52.287	3rd Qu.: 378.2	3rd Qu.: 890.8
ODA : 12	Max.: 2.9231	Max.: 60390553	Max.: 1203.916	Max.: 1272.0	Max.: 5057.0
(Other):167					
ROADCON	ROADMAIN	URBRURAL	LANDAREA	WATERAREA	DAYPOP18
Min.: -2132	Min.: 389454	fringe: 11	Min.: 127.0	Min.: 0.0133	Min.: 0
1st Qu.: 382835	1st Qu.: 6054833	metro: 6	1st Qu.: 835.7	1st Qu.: 1.9465	1st Qu.: 4555
Median: 2308647	Median: 13366698	rural: 213	Median: 908.7	Median: 7.0906	Median: 12254
Mean: 18212328	Mean: 32571282	suburb: 7	Mean: 1028.5	Mean: 28.9951	Mean: 81104
3rd Qu.: 9088642	3rd Qu.: 25051632	urban: 17	3rd Qu.: 1041.2	3rd Qu.: 20.0155	3rd Qu.: 33487
Max.: 703246397	Max.: 776695177		Max.: 6183.7	Max.: 525.8356	Max.: 3763358
NIGHTPOP18	TIME2WORK	HUOCC	HUVAC	OWNVACPCT	RENTVACPCT
Min.: 102	Min.: 12.16	Min.: 33	Min.: 37.0	Min.: 0.000	Min.: 0.000
1st Qu.: 7100	1st Qu.: 19.57	1st Qu.: 2238	1st Qu.: 814.2	1st Qu.: 1.186	1st Qu.: 4.803
Median: 18584	Median: 23.11	Median: 6304	Median: 1902.5	Median: 1.790	Median: 7.486
Mean: 109784	Mean: 23.99	Mean: 37610	Mean: 4790.8	Mean: 2.299	Mean: 7.928
3rd Qu.: 49873	3rd Qu.: 28.35	3rd Qu.: 16770	3rd Qu.: 4081.2	3rd Qu.: 2.780	3rd Qu.: 9.734

Max. :4602523	Max. :40.34 NA's :43	Max. :1583486	Max. :157487.0	Max. :19.048	Max. :28.021
B2010PCT	B2000PCT	B1990PCT	B1980PCT	B1970PCT	B1960PCT
Min. :0.00000	Min. :0.01106	Min. :0.02257	Min. :0.0264	Min. :0.0363	Min. :0.01516
1st Qu.:0.02727	1st Qu.:0.08169	1st Qu.:0.09072	1st Qu.:0.1189	1st Qu.:0.1292	1st Qu.:0.08300
Median :0.04916	Median :0.13351	Median :0.13638	Median :0.1472	Median :0.1579	Median :0.10582
Mean :0.05413	Mean :0.13916	Mean :0.13166	Mean :0.1432	Mean :0.1581	Mean :0.11556
3rd Qu.:0.07073	3rd Qu.:0.18074	3rd Qu.:0.17009	3rd Qu.:0.1684	3rd Qu.:0.1840	3rd Qu.:0.14238
Max. :0.24359	Max. :0.42345	Max. :0.28346	Max. :0.2702	Max. :0.3857	Max. :0.31356
B1950PCT	B1940PCT	BPREPCT	MEDROOMS	OWNOCC	RENTOCC
Min. :0.01090	Min. :0.003905	Min. :0.00000	Min. :4.400	Min. : 21	Min. : 12
1st Qu.:0.06430	1st Qu.:0.030750	1st Qu.:0.03535	1st Qu.:5.100	1st Qu.: 1502	1st Qu.: 578
Median :0.09936	Median :0.050072	Median :0.06232	Median :5.300	Median : 4808	Median : 1522
Mean :0.11422	Mean :0.061651	Mean :0.08228	Mean :5.308	Mean : 23298	Mean : 14312
3rd Qu.:0.15625	3rd Qu.:0.082884	3rd Qu.:0.10757	3rd Qu.:5.500	3rd Qu.: 12501	3rd Qu.: 4984
Max. :0.33993	Max. :0.195069	Max. :0.40331	Max. :7.000	Max. :865645	Max. :717841
MEDVALHOME	OWNOCCPCT	MOVE2010PC	MOVE2000PC	MOVE1990PC	MOVEPREPCT
Min. : 31400	Min. :0.3397	Min. :0.1706	Min. :0.0000	Min. :0.04036	Min. :0.04487
1st Qu.: 77600	1st Qu.:0.6701	1st Qu.:0.3631	1st Qu.:0.2485	1st Qu.:0.11927	1st Qu.:0.12245
Median : 98800	Median :0.7294	Median :0.4119	Median :0.2800	Median :0.13602	Median :0.16226
Mean :111849	Mean :0.7153	Mean :0.4168	Mean :0.2789	Mean :0.13953	Mean :0.16485
3rd Qu.:133100	3rd Qu.:0.7704	3rd Qu.:0.4626	3rd Qu.:0.3079	3rd Qu.:0.15563	3rd Qu.:0.20126
Max. :326800	Max. :0.8824	Max. :0.6669	Max. :0.4077	Max. :0.51515	Max. :0.39504
NA's :1					
POPDPENSE	POPCHG				
Min. : 0.1525	Min. :-0.13886				
1st Qu.: 6.4517	1st Qu.: -0.01304				
Median : 21.6566	Median : 0.01846				
Mean : 116.1041	Mean : 0.03352				
3rd Qu.: 64.2390	3rd Qu.: 0.06555				
Max. :2968.6832	Max. : 0.31929				

Median Owner-Occupied Home Values

