

Analysis of Inbound US Border Crossings

Experimental Design Capstone
By Heather Knudson

Introduction



Research Question

Is there a significant difference in inbound US border crossings between 2012 and 2018 ?

Hypothesis 1

Ho: There is not a significant difference in overall inbound US border crossings from 2012 to 2018.



Hypothesis 2

2. H_0 : There is not a significant difference in inbound US-Mexico border crossings between 2012 and 2018.



Hypothesis 3

3. **Ho: There is not a significant difference in inbound US-Canada border crossings between 2012 and 2018.**



Hypothesis 4

4. H_0 : There is not a significant difference in inbound US border crossings between the US-Mexico border and the US-Canada border.




?



Data & Methods



Data Snapshot

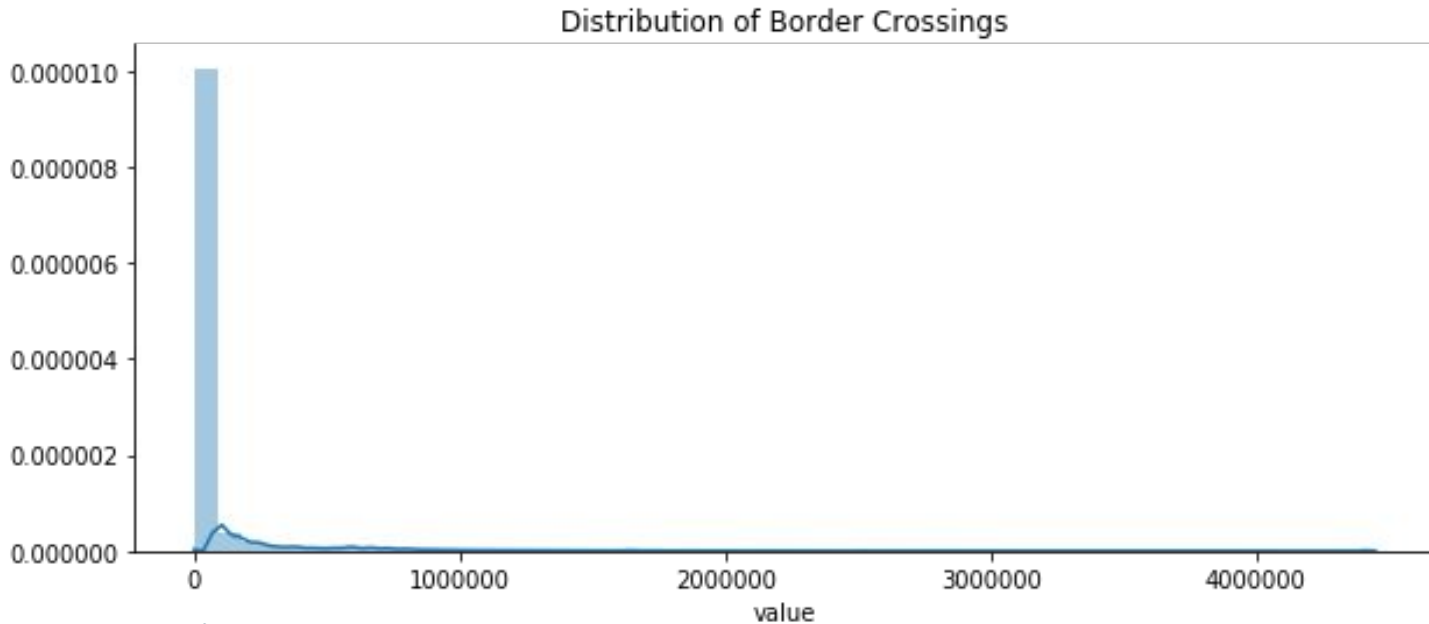


	port name	state	port code	border	date	measure	value	location	year	month	state_abbr
346728	Norton	Vermont	211	US-Canada Border	01/01/1996 12:00:00 AM	Personal Vehicle Passengers	9119	POINT (-71.79 45.01)	1996	1	VT
346729	Columbus	New Mexico	2406	US-Mexico Border	01/01/1996 12:00:00 AM	Personal Vehicles	29486	POINT (-107.63 31.78)	1996	1	NM
346730	Hansboro	North Dakota	3415	US-Canada Border	01/01/1996 12:00:00 AM	Rail Containers Full	0	POINT (-99.35 49)	1996	1	ND
346731	Calexico East	California	2507	US-Mexico Border	01/01/1996 12:00:00 AM	Buses	0	POINT (-115.39 32.67)	1996	1	CA
346732	Presidio	Texas	2403	US-Mexico Border	01/01/1996 12:00:00 AM	Trucks	347	POINT (-104.39000000000001 29.56)	1996	1	TX

Conveyance Types



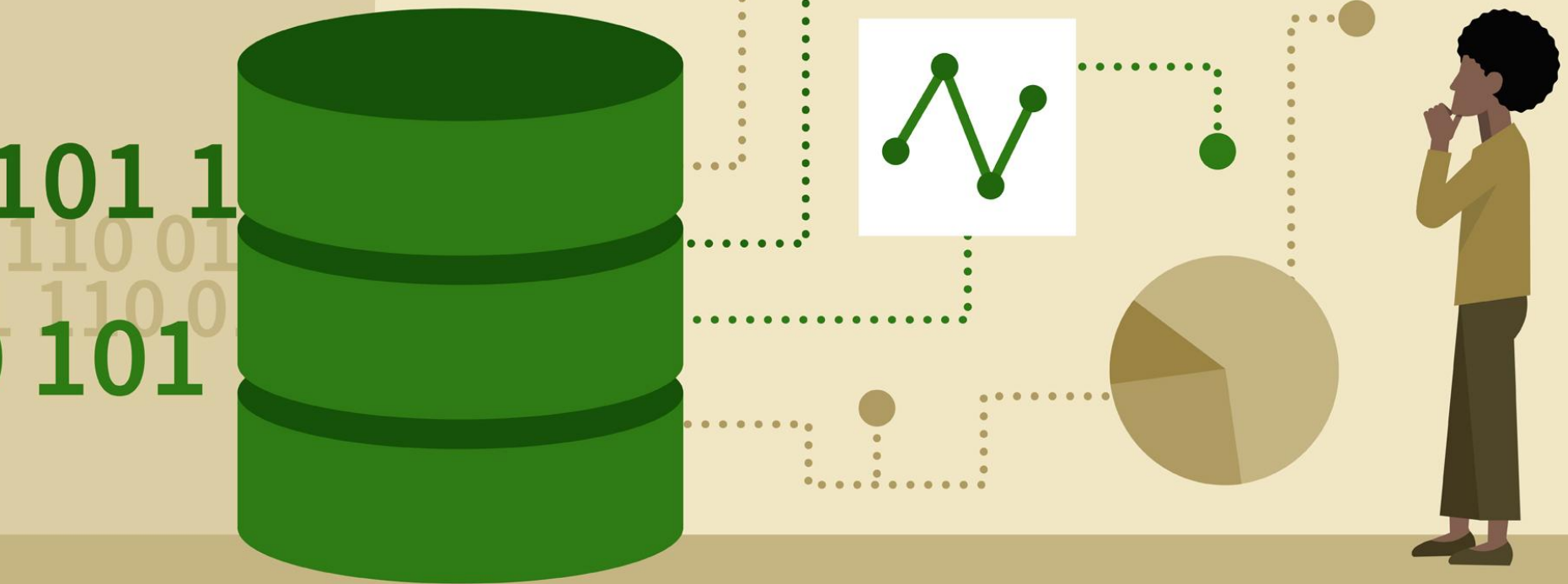
Methods



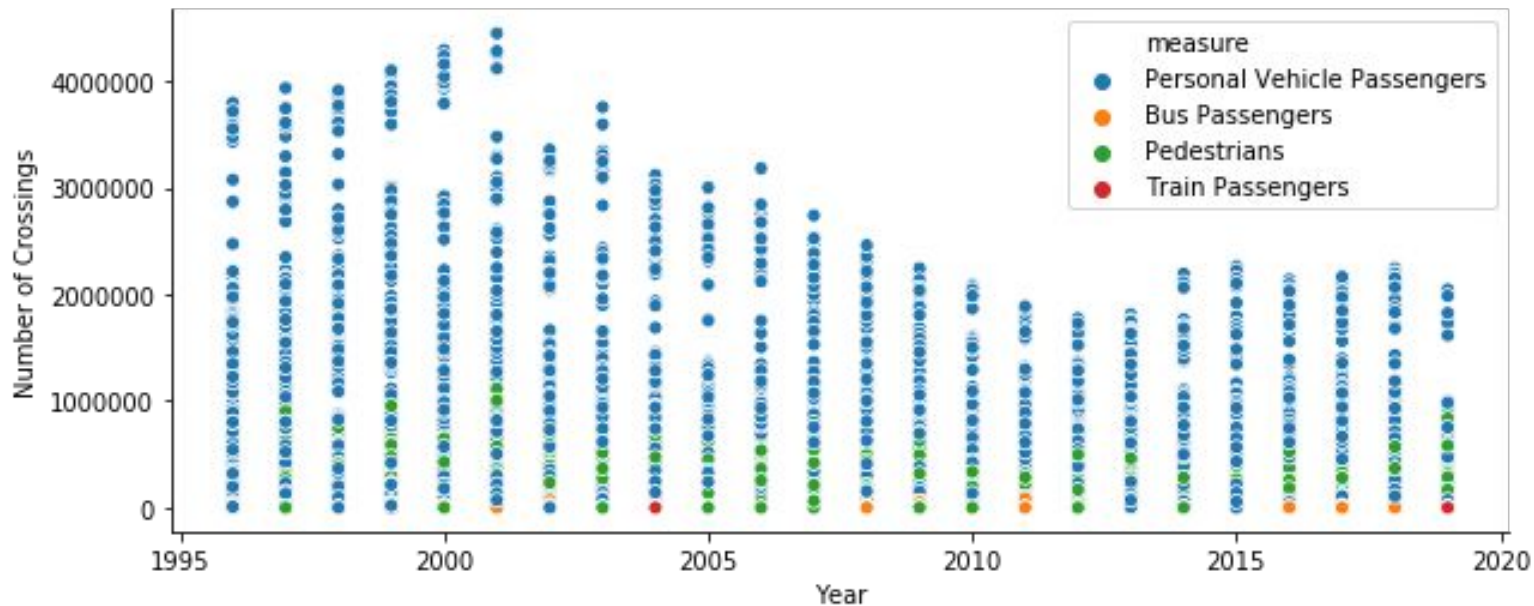
Non-Parametric

Results

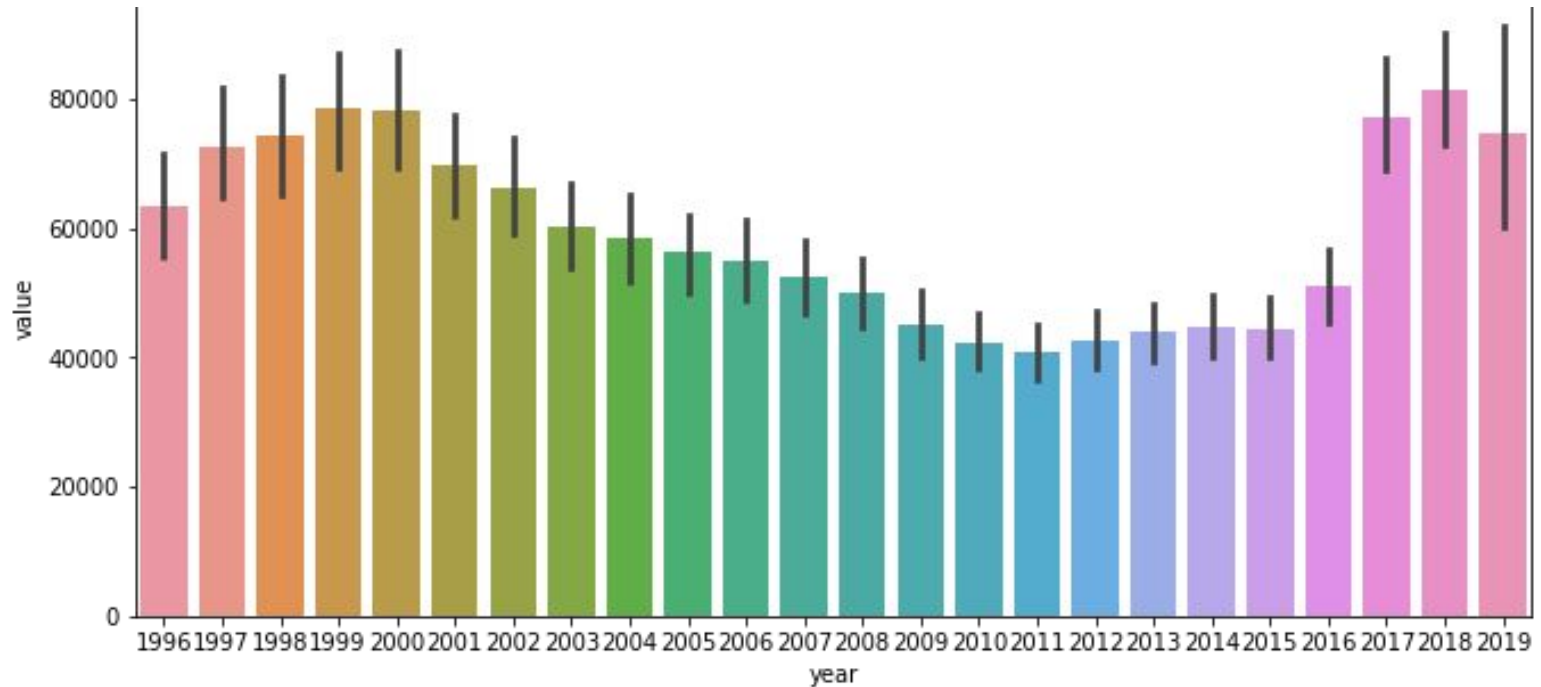
Descriptive Statistics



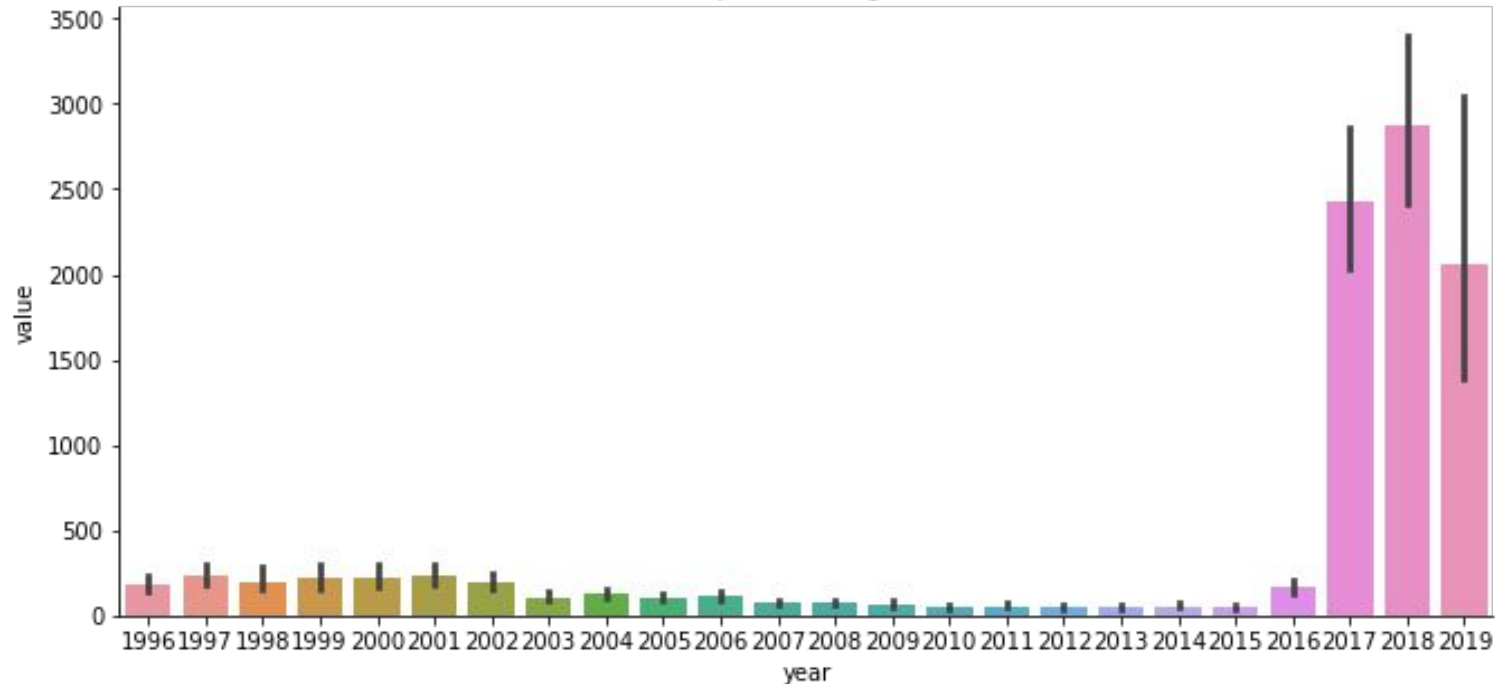
Relationship Between Year & Border Crossings



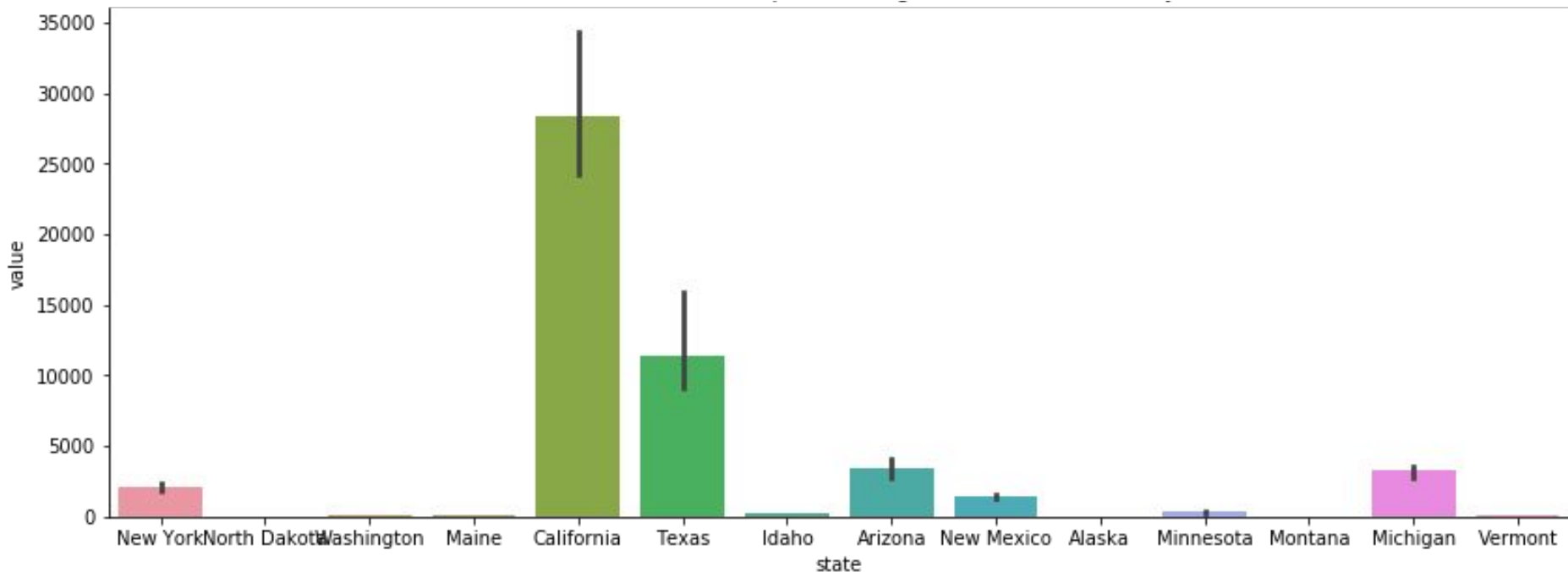
Means of the Amount of Border Crossings



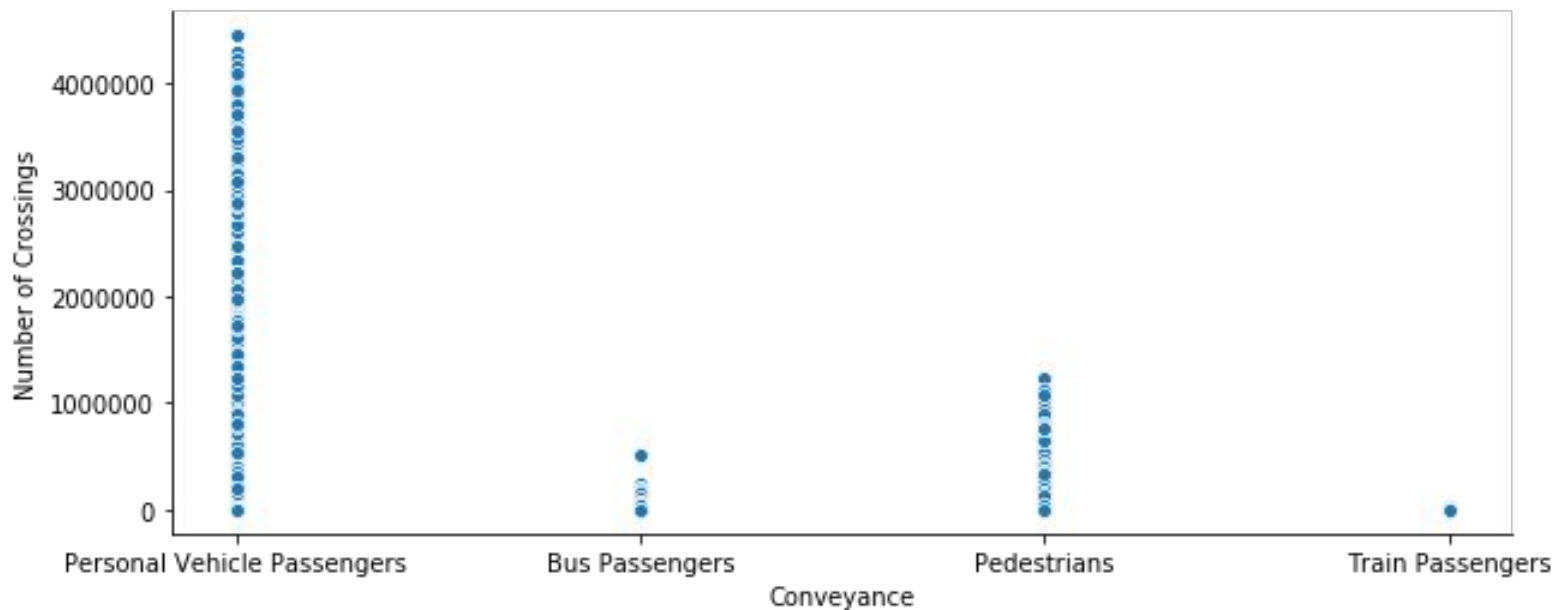
Medians of the Amount of Border Crossings



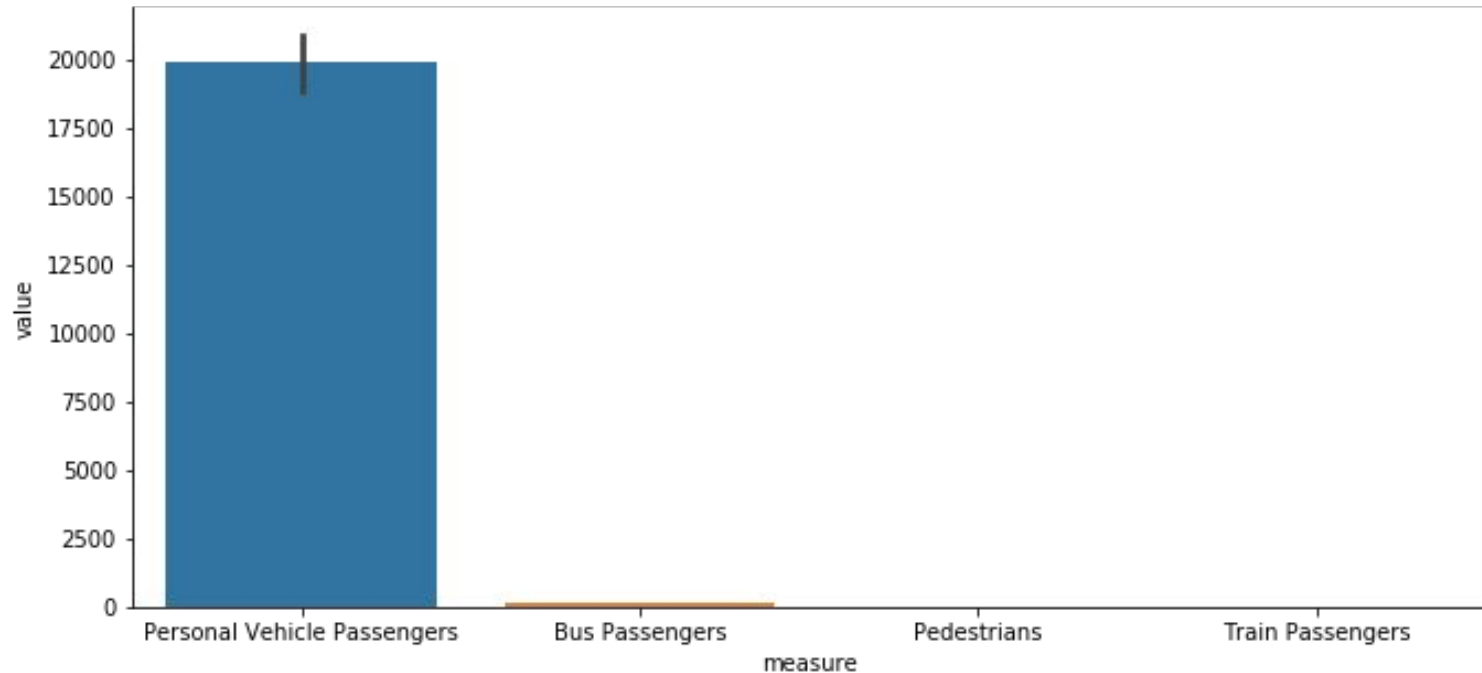
Medians of Amount of Crossings by State



Relationship Between Conveyance Type & Crossings



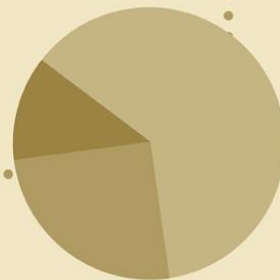
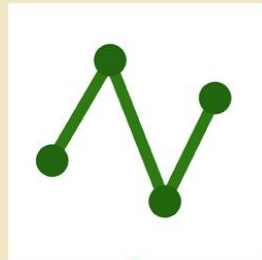
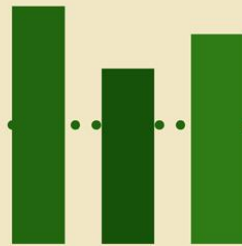
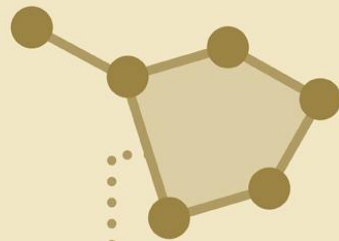
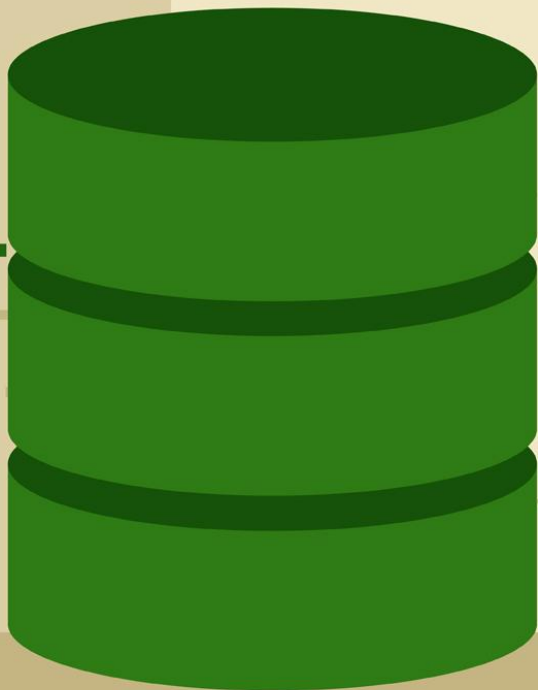
Medians of Amount of Crossings By Conveyance Type



Results

Inferential Statistics

101 1
110 01
110 0
101



Hypothesis 1

- Ha: There is a **significant difference** in overall inbound US border crossings from 2012 to 2018 ($p < .001$).
- 95% confidence interval:
2012's median was approximately 2857 to 2789 lower than 2018's.

Hypothesis 1 – By Conveyance Type



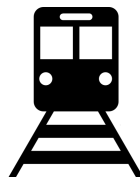
$P < .001$

2012's median was approximately **424.21 to 424.79** lower than 2018's.



$P < .001$

2012's median was approximately **915 to 833** lower than 2018's.



$P < .001$

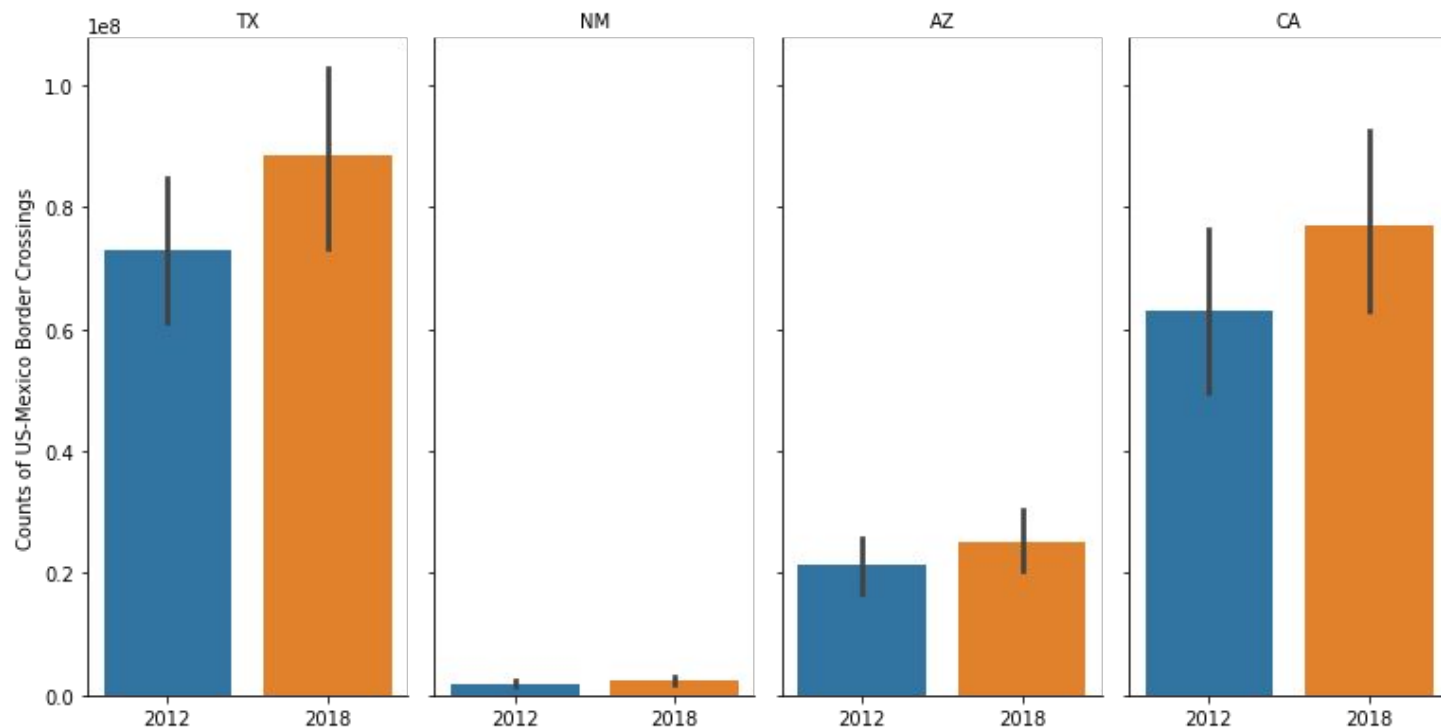
2012's median was approximately **115 to 69** lower than 2018's.



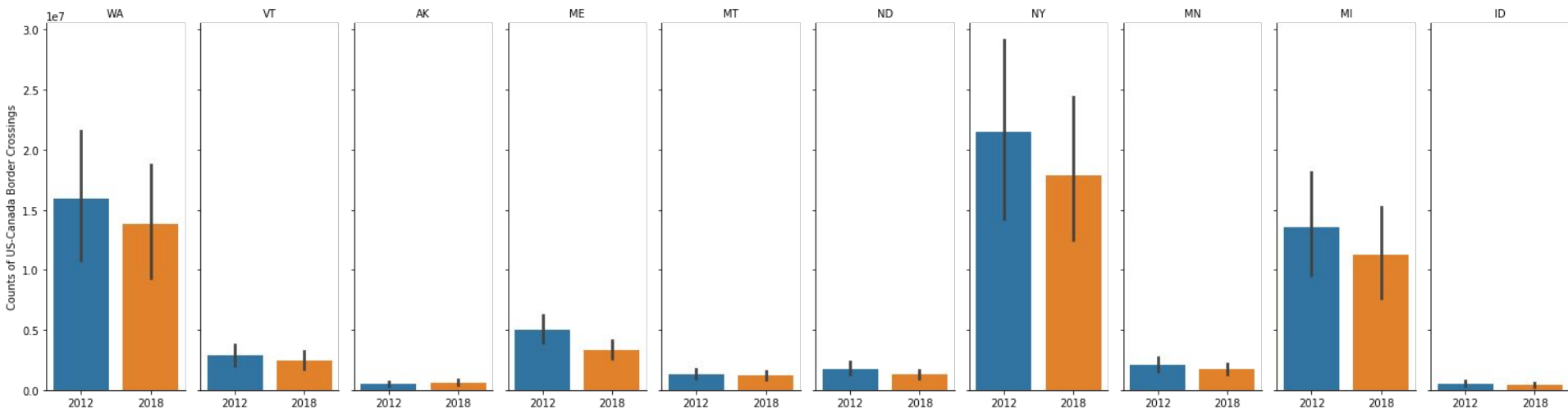
$P = .16$

2012's median was approximately 4389 to 4441 higher than 2018's.

Hypothesis 1 – Mexican Border States



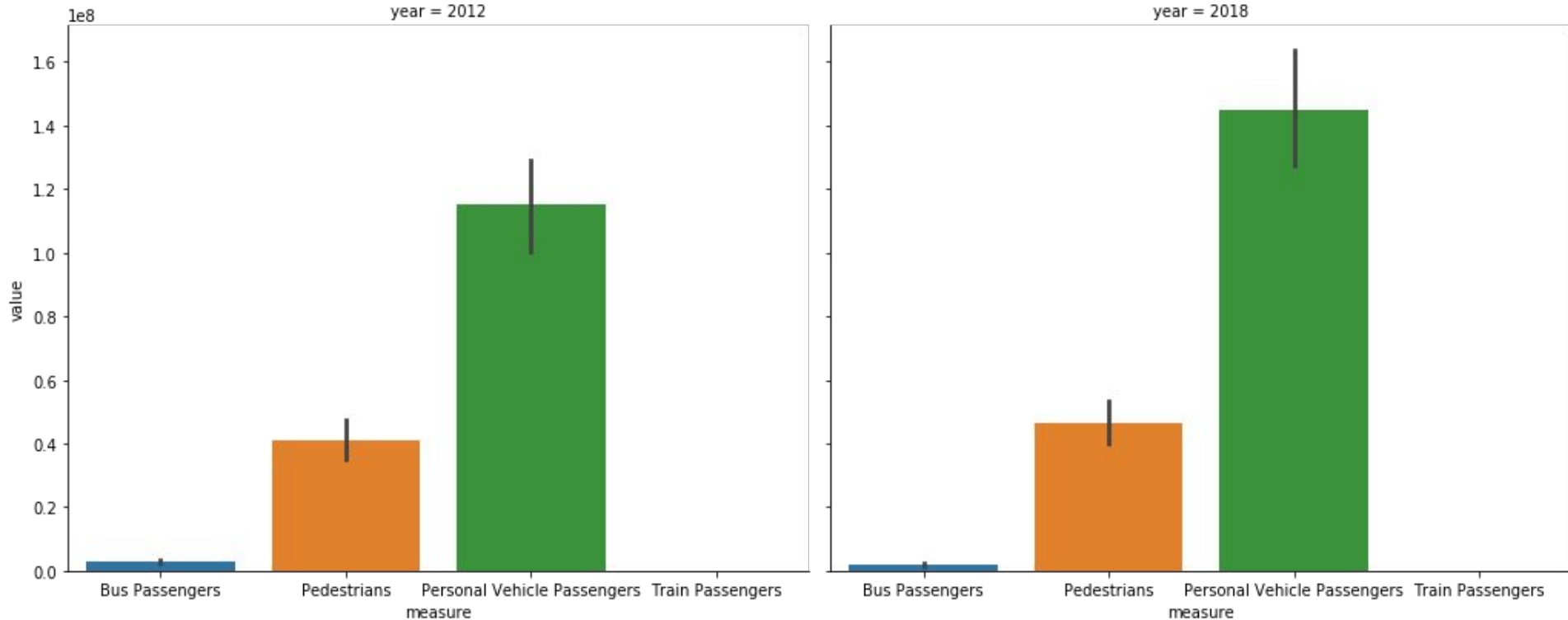
Hypothesis 1 – Canadian Border States



Hypothesis 2

- Ha: There is a **significant difference** in inbound US-Mexico border crossings from 2012 to 2018 ($p < .001$).¹⁸.
- 95% confidence interval:
2012's median was approximately 56,410 to 56,332 lower than 2018's.

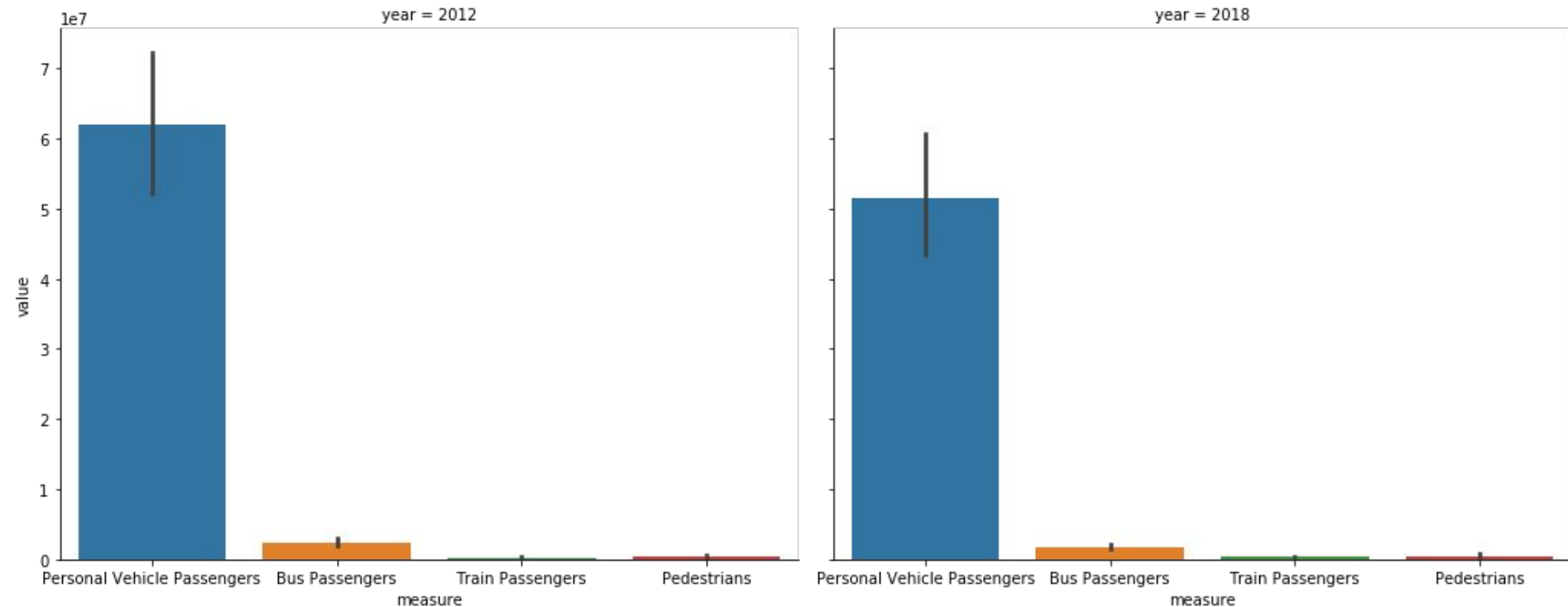
H2 - Counts of US-Mexico Crossings by Conveyance



Hypothesis 3

- Ho: There is not a significant difference in inbound US-Canada border crossings between 2012 and 2018.
- Ha: There is a **significant difference** in inbound US-Canada border crossings between 2012 and 2018 ($p < .001$).
- 95% confidence interval:
2012's median was approximately 959 to 943 lower than 2018's.

Counts of US–Canada Crossings by Conveyance

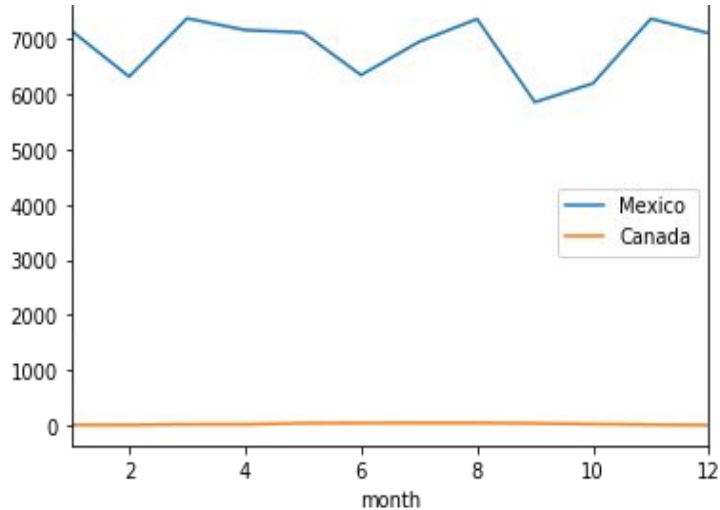


Hypothesis 4

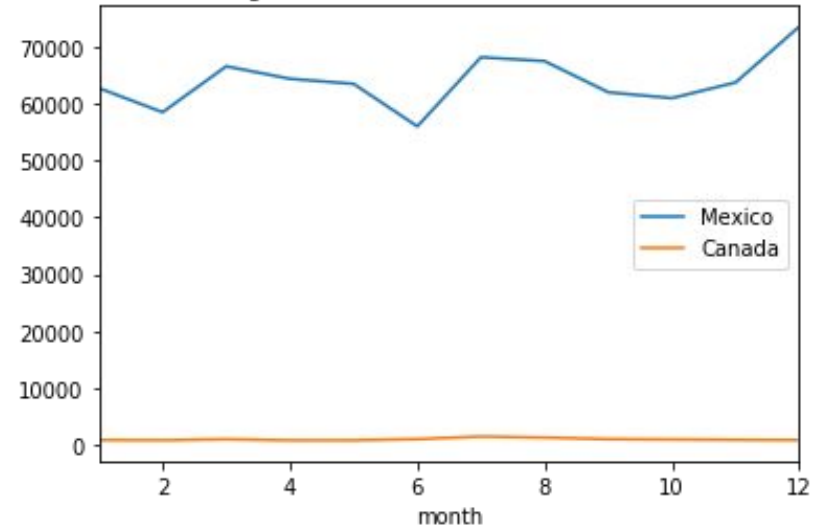
- Ha: There is a significant difference in inbound US border crossings between the US-Mexico border and the US-Canada border ($p < .001$).
- 95% confidence interval for 2012 test:
The US-Mexico border's median amount of crossings was approximately 6989 to 7066 higher than the US-Canada border's in 2012.
- 95% confidence interval for 2018 test:
The US-Mexico border's median amount of crossings was approximately 62,399 to 62,497 higher than the US-Canada border's in 2018.

Hypothesis 4 – Comparing Rates of Crossing at Each Border By Month in 2012, 2018

Median - 2012



Median - 2018



Discussion & Recommendations

1. There was a massive increase in the median amount of inbound border crossings at the US-Mexican border from 2012 to 2018.
2. There was a substantial decrease in the total amount of inbound border crossings at the US-Canada border from 2012 to 2018.
3. Border crossings - from both borders - in personal vehicles are significantly more numerous than crossings in other types of conveyances.

