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Analysis of the Correlation Between Immigration and Narcotic Disclosure in Iran *Participants: Bijan Anjavi*

INTRODUCTION

Background to the Project



The original goal of this project was to analyze data regarding narcotics in Iran, and display that data over a map of the 31 Ostans of Iran, providing relevant data for each Ostan via map interaction (via jquery, java, and the d3.js framework). However, I underestimated the scope of this task, and realized I did not have the data visualization knowledge to create the idea I envisioned, and plan to continue work on this project in the CSC class data visualization offered next year. For now, however, I can complete the statistics-related work and analysis I would need. The goals for the project are now as follows:

- Analyze Immigration to each of the 31 Ostans of Iran, as recorded in the 1390 Census (2011-2012 in the Western Calendar).
- Analyze Narcotic Disclosure in each of the 31 Ostans Of Iran, as recorded in the 1392 Statistical Yearbook (2013 – 2014) .
- See if there is a correlation between the increase to *legal* immigration to Iran, and the increase kilograms of drugs seized in those Ostans by the judicial department.
- Identify weaknesses in the analysis that could draw holes in the correlation between immigration and drugs (higher population in those areas, weak police force, unrecorded immigration, etc.).
- Identify reasons for outliers in the data (e.g. Ostans of Iran that fall in the border between Pakistan and Afghanistan, i.e. the Golden Crescent of the drug trade. These Ostans would have a lot of illegal immigration that is unrecorded, but would have a high number of drugs seized in police raids).
- Comment on the political nature of the issue of immigration and drugs. Explore the issue of drugs in Iran.
- Experiment with R and Excel Data Visualizations to show this data.

Hypothesis

The increase in immigration to each of the 31 Ostans of Iran has resulted in a corresponding increase in the kilograms of drugs seized by the police in each of the 31 Ostans of Iran. In other words, there is a correlation between immigration and drugs in the Ostans of Iran.

MATERIALS AND METHODS

Nature of the Data

The first table displays kilograms of narcotics disclosed (i.e. seized) by police or the government. This data was used as opposed to arrests in relation to narcotics because the table for arrests in 2013-2014 seems incomplete and highly irregular (there could be political motive). Also, I am trying to see whether there is a correlation between the number of narcotics in an Ostan and the amount of immigration, as opposed to just analyzing arrests.

The second table displays immigration to each Ostan (the reason and duration of stay will be ignored in this analysis, just immigration en masse is being analyzed). The immigration data is from the last time the census was taken in Iran, which was in the year 2011-2012.

3. 21. IMMIGRANTS DURING THE LAST 5 YEARS BY OSTAN OF RESIDENCE AND DURATION OF STAY, 1390 CENSUS (**PAGE 163**)

<https://www.amar.org.ir/Portals/1/yearbook/1392/3.pdf>

**This data from the statistical yearbook of Iran will be manually combined into an excel table by myself that I can use to do a correlation analysis, and determine the correlation coefficient via the Pearson method in R.*

Presentation on Relevant Summaries of Data

**Outliers highlighted in Yellow*

Ostan	Total Immigrants (# of People)	Total Narcotics Disclosed(kg)
East Azarbayejan	209198	3498
West Azarbayejan	177539	6018
Ardebil	70906	787
Esfahan	377097	38074
Alborz	303850	7202
Ilam	42759	255
Bushehr	124458	1767
Tehran	978811	27271
Chaharmahal&Bakhtiari	54196	870
South Khorasan	84692	30701
Khorasan-e-Razavi	407680	19398
North Khorasan	81754	1522
Khuzestan	242181	5224
Zanjan	75536	520
Semnan	72098	861
Sistan&Baluchestan	100453	127598
Fars	364396	42811
Qazvin	89168	964
Qom	68202	7727
Kordestan	131568	1171

Kerman	168551	101317
Kermanshah	113612	1384
Kohgiluyeh&Boyerahmad	65175	3438
Golestan	151178	4295
Gilan	227185	5299
Lorestan	72062	2750
Mazandaran	236382	2471
Markazi	110465	3263
Hormozgan	120976	102414
Hamedan	109202	3640
Yazd	103336	18267

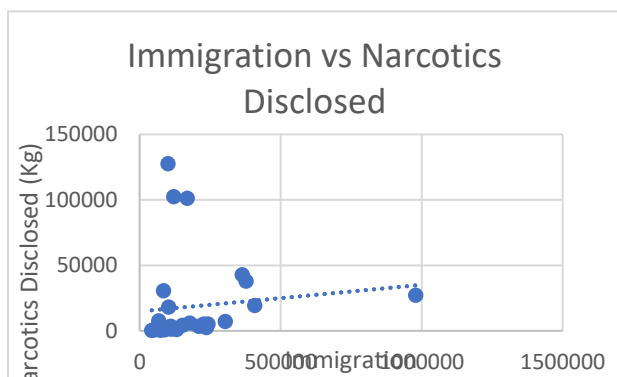
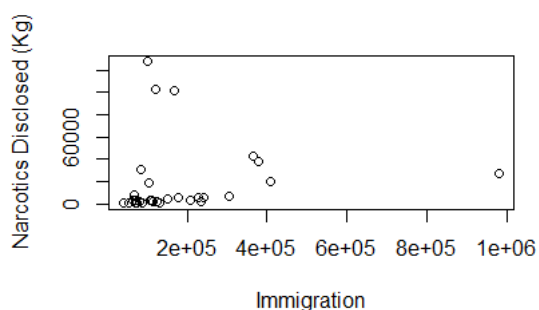
RESULTS

Determining the Correlation

```
> immigrants<-c(209198,177539,70906,377097,303850,42759,124458,978811,54196,84692,407680,81754,242181,
75536,72098,100453,364396,89168,68202,131568,168551,113612,65175,151178,227185,72062,236382,110465,12
0976,109202,103336)
> narcotics<-c(3498,6018,787,38074,7202,255,1767,27271,870,30701,19398,1522,5224,520,861,127598,42811,96
4,7727,1171,101317,1384,3438,4295,5299,2750,2471,3263,102414,3640,18267)
> cor(immigrants, narcotics)
[1] 0.1102084
```

Graphing in R and Excel

```
> plot(immigrants, narcotics, xlab="Immigration", ylab="Narcotics Disclosed (Kg)", pch=21)
```



*trend line shown in the dotted blue line

DISCUSSION

Explanation and Analysis of Correlation

The correlation = approximately 0.11, which is low. However, the graph showcases a somewhat linear correlation for a sample of the data points. The problem of unaccounted variables and large outliers in the data can explain this.

Factors to take into consideration:

- Certain Ostans of Iran are in high proximity to Afghanistan, and lie in the “Golden Crescent Region,” due to Iran’s position as one of the major drug gateways of the world (especially between Asia and Europe). As such in these Ostans, there is a vast amount of unrecorded smuggling / illegal immigration. However, there is also a vast amount narcotics used in these areas, many of which are seized by the Iranian police (this can account for Ostans close to the Afghanistan border that have very low recorded immigration, but extremely high kilograms of narcotics seized).
- Some cities are naturally larger than others, have a higher population, higher immigration, therefore higher drug usage (meaning correlation between population and higher drug usage overshadows that of immigration)
- Drug disclosed / seized may not be a completely accurate way to measure. What if there are Ostans in Iran in which the police are inept and therefore do not seize any of the drugs that are actually in Ostans? Maybe the Ostan with the highest number of drugs also has the least efficient police department, meaning the police don’t seize like 90% of the drugs in that Ostan. According to our data, that would mean the Ostan didn’t have a drug problem at all, when it was just that the police were inept.
- Drug seizure is in large part simply a measure of the effective, not an indication of drug use.
- An increase in immigration could correspond to an increase in the overall population, and an increase in population correlated to an increase in drug seizure is not necessarily a worrisome idea.
- Legal immigration was recorded, not illegal immigration, which is the main cause of concern.
-

Explanation and Analysis of Correlation (Upon Removing Outliers)

REMOVING OUTLIERS

```
> Oimmigrants<-  
c(209198,177539,70906,377097,303850,42759,124458,978811,54196,407680,81754,24  
2181,75536,72098,364396,89168,68202,131568,113612,65175,151178,227185,72062,2  
36382,110465,109202,103336)  
  
> Onarcotics<-c(3498,6018,787,38074,7202,255,1767,27271,870,19398,1522,5224,5  
20,861,42811,964,7727,1171,1384,3438,4295,5299,2750,2471,3263,3640,18267)  
> cor(Oimmigrants, Onarcotics)  
[1] 0.6620906
```

Correlation = approximately 0.66 which is somewhat high, affirming the original hypothesis – however, the same issues with third variables not accounted for do impact the legitimacy of this conclusion.

The outliers removed were countries on the border that had unusually high levels of narcotics seized – this could be because of the effectiveness of the drug enforcements officials in these regions of Iran, and the fact that these Ostans lie in the golden crescent next to Afghanistan and. Also, these countries would have very high levels of illegal immigration/smuggling, (which was not recorded in the statistical analysis yearbook), and that was not a variable being looked at. So in comparison it seems as if immigration is very low in regards to the number of narcotics seized, when in fact it is not the case – it is simply because legal immigration in these Ostans is low, perhaps because of the very fact that illegal immigration is presumed to be so high in these border areas.

The following source is a testament to the efficacy of drug enforcement officials in Iran:

https://www.unodc.org/doc/wdr2016/WDR_2016_Chapter_1_Opiates.pdf

“75 % of global opium seizures in 2014 came from Iran.

61.5 global morphine seizures,

17 % global heroin seizures.”

Again, this could simply speak to the efficacy of the law enforcement in Iran rather than a drug problem. As many news outlets have reported, Afghanistan and Pakistan are extremely large producers of opium, and Iran’s law enforcement is particularly adept at cracking down on this.

Conclusion

When I first started this project, I was not particularly interested in any data sets – I just knew I found the d3.js framework interesting, and was hoping to find a data set that could make for a good map visualization project. I did not think I would find a data set that would strike a chord with my own life, and affect my post-graduation plans at all.

However, when I found the Iranian Center of Statistics, I came across the section in the yearbook entitled Judicial Affairs, and it was in that section I first learned about the narcotic epidemic in Iran, specifically in regards to opium. After watching videos about the opium crisis in Iran and how narcotics were affecting citizens of the country, I felt a personal connection to the problem and thought learning more about it through a statistical analysis would be a great way for me to learn more. Hopefully, I can use this statistical analysis to help me in my future endeavors in grad school, as I want to create an interactive map visualization of the drug epidemic in Iran that really makes it clear to the common layperson what is going on in Iran exactly.

Overall, I was hoping to come away with a more concrete conclusion, and a more stable correlation with this project – that way, I would have a strong basis for my map visualization project I plan to implement over the summer + CSC 444 (data visualization). However, this project has instilled in me the importance of third variables in regards to correlation analysis, as well as what makes a good correlation analysis from a bad one. I will use the findings from this study in my future projects in regards to the issue of narcotics in Iran. I hope that prior to graduation that I am able to take CSC 444, finish my map visualization project, and send the completed and interactive version to Professor Watkins.

Thanks for reading.

Sources

<https://www.amar.org.ir/Portals/1/yearbook/1392/14.pdf>

<https://www.amar.org.ir/Portals/1/yearbook/1392/3.pdf>

<https://www.theguardian.com/world/2005/oct/27/iran.roberttait>

<https://www.unodc.org/islamicrepublicofiran/drug-trafficking-and-border-control.html>

https://www.unodc.org/doc/wdr2016/WDRC_2016_Chapter_1_Opiates.pdf

<https://www.youtube.com/watch?v=fttIX9SpbZY>

<https://www.youtube.com/watch?v=4RTINn7QQas>

Presentation Google Slides:

<https://docs.google.com/presentation/d/1iOfJGd5Ch82cZjuZmWkC1YiUbKXWEFjCORiBiH7saLo/edit?usp=sharing>

Data Created on Google Sheets:

https://docs.google.com/spreadsheets/d/1riuZ6-MJOyaxHDTvUc_oat0EcAJwczFj2WMu83zKnYk/edit?usp=sharing