IBUS 6101: Empirical Project – 2 Part: 1

Stories from the Atlas

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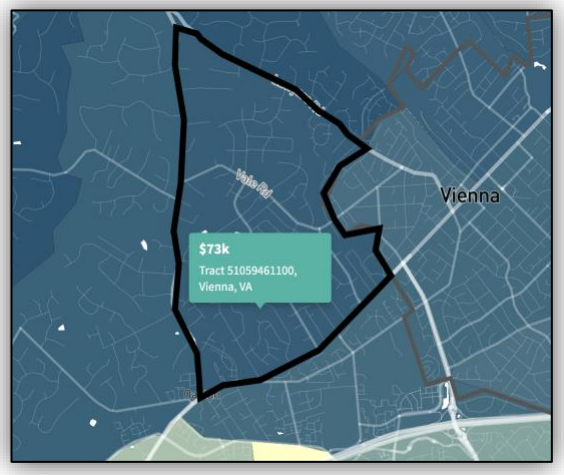
1. Describe the census tract you are looking at, what are your general observations on the tract (try to google some details about this area), and what data are being visualized. In a table, examine household income and incarceration rates for different groups by income, race, and gender. Highlight key takeaways from this table and if it aligns with your general observations or anecdotal evidence.

A:



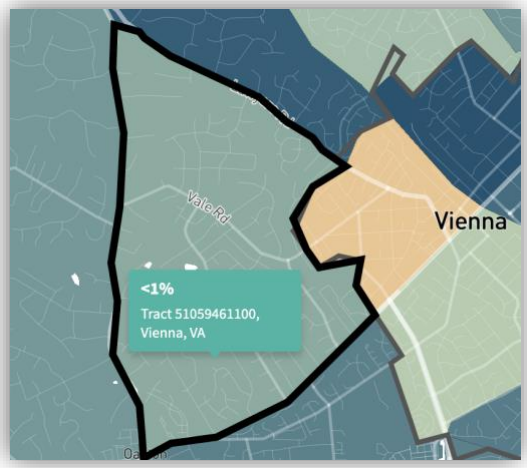


Fig 1: Household Income (All Parents' Income, Child Race & Gender) Fig 2: Incarceration rate (All parents' Income, Child Race & Gender)

Income Level, Household (Thousand $)	White	Asian	Black	Hispanic
High, Male	65	77	N/A	68
Middle, Male	56	66	N/A	51
Low, Male	49	58	N/A	38
High, Female	74	78	68	66
Middle, Female	65	61	62	59
Low, Female	57	52	N/A	53

Incarceration Rate (%)	White	Asian	Black	Hispanic
High, Male	1.1	0.19	N/A	2.9
Middle, Male	0.74	0.18	N/A	1.9
Low, Male	<0.1	0.15	N/A	0.48
ALL	0.55	<0.1	0.65	<0.1
High, Female	<0.1	<0.1	0.14	<0.1
Middle, Female	0.19	<0.1	0.25	<0.1
Low, Female	0.39	<0.1	0.41	0.11

For our assignment, we focused on Census Tract "51059461100" in Vienna, VA which happens to be close to where our teammate, Rohan lives. This tract sits between Vienna and Dunn Loring and is bordered by I-66 and Gallows Road. It's also connected to the new 66 Parallel Trail and within a short distance of multiple Metro stops, Dunn Loring–Merrifield and Vienna metro stations. The proximity to public transit makes the area more accessible to a wide range of people, but it can also explain some of the higher incarceration rates compared to tracts deeper inside Vienna. Transit hubs often

bring more policing and connect populations from different backgrounds, some from areas with higher crime rates. The region also includes a mix of higher-income neighbourhoods and some affordable housing, which brings in families with lower household incomes and adds to the variation in outcomes. In terms of racial composition, the largest groups here are White, Asian, and Hispanic. We observe Whites and Asians tend to have higher incomes and lower incarceration rates compared to all other races. Between these two racial groups we see Asian and White females having highest incomes and even lower incarceration rates. We can also see there are a lot of N/A values pertaining to Black men, this might be due to insufficient data available for them or due to other disparities. But Black women from middle and high income seem to be doing slightly on par with the Hispanic women. Hispanics are third in the race overall; but we see higher income Hispanic men have higher incarceration rates (2.9), which is the highest in our tract. Anecdotally, Rohan's experience of a stable community supports the income trends, though racial nuances warrant further study.

2. How does average upward mobility, pooling races and genders, for children with parents at the 25th percentile (variable kfr pooled_p25) in your home Census tract compared to population-weighted mean upward mobility in your state and in the U.S. overall? Do kids where you grew up have better or worse chances of climbing the income ladder than the average child in America?

```
. list kfr_pooled_p25 if state=="51" & county=="0
> 59" & tract=="461100"

        | kfr_p~25
--------+---------
67637.  | 48491.12
```

```
. * Weighted Mean of US Population *
. summ kfr_pooled_p25 [aw =weights_national]

    Variable |     Obs      Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_poole~25 |  71,923   .999469401    34311.68   7899.586         0   105732.4

.
. *VA Population-weighted mean*
. summ kfr_pooled_p25 if state=="51" [aw=weights_state]

    Variable |     Obs      Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_poole~25 |   1,863   .999059729    34275.99   8481.509    14368.6   69198.53
```

A: Using the atlas_new.dta dataset, we filter out a specific geographic location. In our case, we analyze the families whose income is 25% of the national income. We list the State as Virginia, County as Fairfax County (059) and Tract as 461100. In this tract, data suggests that children whose

parents were at the 25th percentile of income grew up to have an average household income of $48,491 as adults. When we compare these findings to the ones in the 2nd figure we see that the national and VA average for families in the US having an income of 25% is *$34,311.68* and *$34,275.99*. The tract's value for 'kfr_pooled_p25' being higher indicates greater upward mobility for children from low-income families in that tract compared to the average child in the U.S & VA. This indicates that children growing up here access to better resources and tend to maintain or have higher incomes than their parents. So they do have better chances at climbing the income ladder than anywhere else.

3. What is the standard deviation of upward mobility in your home county? Is it larger or smaller than the standard deviation across tracts in your state? Across tracts in the country? What do you learn from these comparisons?

```
. * VA State Standard Deviation *
. summ kfr_pooled_p25 if state=="51", d

      Household income ($) for children with parents at
                        25 percentile
-------------------------------------------------------------
      Percentiles      Smallest
 1%     18394.4       14368.6
 5%     21850.6       15259.55
10%     24581.58      15722.67       Obs               1,865
25%     28200.16      16229.95       Sum of wgt.       1,865

50%     32956.23                     Mean           34323.13
                      Largest        Std. dev.      8820.091
75%     39128.42      67780.41
90%     46438.01      68322.33       Variance       7.78e+07
95%     50963.73      69198.53       Skewness       .8313936
99%     60579.65      77725.8        Kurtosis       3.930416
```

```
. * Fairfax County Standard Deviation *
. summ kfr_pooled_p25 if state=="51" & county=="059", d

      Household income ($) for children with parents at
                        25 percentile
-------------------------------------------------------------
      Percentiles      Smallest
 1%     31159.35      30545.22
 5%     35815.14      30641.08
10%     37824.07      31159.35       Obs                 255
25%        41771      31483.13       Sum of wgt.         255

50%     45847.23                     Mean           46226.45
                      Largest        Std. dev.      6644.019
75%     50404.89      63114.71
90%     55159.69      63365.82       Variance       4.41e+07
95%     57608.86      64348.43       Skewness       .2745788
99%     63365.82      69198.53       Kurtosis       3.191985
```

```
. * US Standard Deviation *
. summ kfr_pooled_p25, d

      Household income ($) for children with parents at
                        25 percentile
-------------------------------------------------------------
      Percentiles      Smallest
 1%     18227.86             0
 5%     21963.63             0
10%      24648.4             0       Obs               72,011
25%     28972.88      8.840433       Sum of wgt.       72,011

50%     33733.37                     Mean           34443.48
                      Largest        Std. dev.      8169.155
75%      39167.3      86950.57
90%     45102.87      88609.61       Variance       6.67e+07
95%     48974.12      89560.85       Skewness        .594013
99%     57185.97      105732.4       Kurtosis       4.047082
```

A: Standard deviation is the measure of disproportion for upward mobility. These values help us understand, the differences and similarities between upward mobility for each geographical regions. Using STATA commands, we compare the SD's (and few other values) for Fairfax County, VA and the US. We felt the output as well as the observations were on par for the course. Fairfax county has the lowest standard deviation when compared with VA and the US. This indicates that children

from low-income families likely experience similar access to opportunities as those from higher-income households. This might be because of the proximity to the DC metro area or seeing as Fairfax County invests a ton in public schools. Another reason is because the slightly high kurtosis (approx. 4) for the state and national levels indicates a distribution with heavier tails, meaning a few tracts deviate substantially from the mean upward mobility. But we can conclude that children growing up in our tract have a fighting chance to improve their social standing or even exceed their parents income. We learn that uniformity is the strongest asset possessed by our tract. It helps bridge the gap between families of different socioeconomic strata.

4. Now let's turn to downward mobility: repeat questions (2) and (3) looking at children who start with parents at the 75th and 100th percentiles. How do the patterns differ?

A: Part a: Analyzing Downward Mobility for Children with Parents at the 75th Percentile income.

```
. list kfr_pooled_p75 if state=="51" & county=="059" & tract=="461100"

       | kfr_p~75 |
67637. | 68088.53 |
```

```
. summ kfr_pooled_p75 [aw= weights_national]

    Variable |     Obs      Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_poole~75 |  71,925   .999479724    51284.03    9326.094    156.9863     137454
```

```
. sum kfr_pooled_p75 if state=="51" [aw= weights_state]

    Variable |     Obs      Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_poole~75 |   1,863   .999059729    52148.29    8318.711    21927.34    81420.2
```

Utilizing STATA commands, we performed analysis on the given dataset. We find that an average household income of $68,088.53 for children with parents at the 75th percentile remuneration. We can clearly see that our tracts mean is higher that weighted mean of Virginia ($52,148) and the whole of US ($51,284). It's akin to the findings from the question before. This indicates uniformity and accessibility across different levels of income.

```
. sum kfr_pooled_p75 if state=="51", d

      Household income ($) for children with parents at 75 percentile
-------------------------------------------------------------------------------
      Percentiles      Smallest
 1%     29053.58       21927.34
 5%     35992.87       22760.21
10%     41046.82       22799.78      Obs                 1,865
25%     47842.77       23064.11      Sum of wgt.         1,865

50%     52562.12                     Mean               52128.73
                       Largest       Std. dev.          8432.608
75%     57292.06       76265.18
90%     62222.13       76744.73      Variance           7.11e+07
95%      65501.8       76911.92      Skewness           -.450439
99%     70479.29        81420.2      Kurtosis           3.799228
```

```
. sum kfr_pooled_p75 if state=="51" & county=="059", d

      Household income ($) for children with parents at 75 percentile
-------------------------------------------------------------------------------
      Percentiles      Smallest
 1%     45639.84       42324.73
 5%     50322.59       44989.38
10%      52641.3       45639.84      Obs                   255
25%     56659.78       46343.93      Sum of wgt.           255

50%     61196.45                     Mean               60710.81
                       Largest       Std. dev.          6044.393
75%     64914.03       72433.11
90%      68444.1       72776.14      Variance           3.65e+07
95%     69751.57        73692.7      Skewness           -.2715225
99%     72776.14       76265.18      Kurtosis           2.82304
```

Fairfax County's SD ($6,644) is smaller than both VA ($8,433) and the US ($9,326). This indicates less variation in mobility outcomes for children from high-income families across Fairfax compared to state or the US. This pattern mimics the 25th percentile income level as well. We also notice Fairfax's uniformity being prevalent for families of various income levels. This is mainly due to consistent resources and opportunities. These results suggest that children raised in upper-middle-income families in Fairfax tend to maintain or slightly improve their economic standing, and that opportunity and stability are distributed fairly evenly. In contrast, greater variation at the state and national levels indicates that location plays a much larger role in determining whether children from affluent families hold onto their parents' income rank.

```
. sum kfr_pooled_p75, d

      Household income ($) for children with parents at
                          75 percentile
-------------------------------------------------------------
      Percentiles      Smallest
 1%     26611.02            0
 5%     34176.76            0
10%     39241.16            0       Obs              72,012
25%     46162.17       94.01663     Sum of wgt.      72,012

50%     52024.44                    Mean             51500.78
                        Largest     Std. dev.        9491.954
75%     57623.49       119864.2
90%     62670.61       120177.7     Variance         9.01e+07
95%     65936.23       120240.3     Skewness        -.2862652
99%     72737.19         137454     Kurtosis         4.052682
```

Part b: Analyzing Downward Mobility for Children with Parents at the 100th Percentile income.

```
. list kfr_pooled_p100 if state=="51" & county=="059" & tract=="461100"

       +-----------+
       | kfr_po~0  |
       |-----------|
67637. | 87782.05  |
       +-----------+
```

```
. sum kfr_pooled_p100 [aw=weights_national]

    Variable |       Obs        Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_pool~100 |    71,886   .999276576    69218.15   16362.81           0     980579
```

```
. sum kfr_pooled_p100 if state=="51" [aw=weights_state]

    Variable |       Obs        Weight        Mean   Std. dev.       Min        Max
-------------+--------------------------------------------------------------------
kfr_pool~100 |     1,863   .999059729    71155.75   13106.88    24298.07   203450.4
```

At both percentiles, Fairfax County outperforms national and state averages, with the advantage slightly narrowing at the 100th percentile. This indicates Fairfax provides a robust buffer against downward mobility, especially for high-income families, likely due to its economic stability and resources at hand.

```
. sum kfr_pooled_p100 if state=="51", d

      Household income ($) for children with parents at
                          100 percentile
------------------------------------------------------------
      Percentiles      Smallest
 1%     35834.56       24298.07
 5%     46567.34       25201.28
10%     53773.22       26766.84       Obs               1,865
25%     63667.69        26777.8       Sum of wgt.       1,865

50%     72033.97                      Mean           71194.98
                        Largest       Std. dev.      13945.95
75%     79166.52       120233.3
90%      86554.2       123993.9       Variance       1.94e+08
95%     91544.84       135139.9       Skewness       .3237513
99%     104462.5       203450.4       Kurtosis       7.994742
```

```
. sum kfr_pooled_p100 if state=="51" & county=="059", d

      Household income ($) for children with parents at
                          100 percentile
------------------------------------------------------------
      Percentiles      Smallest
 1%     50064.45        43297.5
 5%     58554.33       49551.32
10%     63414.73       50064.45       Obs                 255
25%     68438.29       50747.19       Sum of wgt.         255

50%     75744.13                      Mean           75011.99
                        Largest       Std. dev.      9419.838
75%     82505.27       89690.01
90%     86934.92       90818.78       Variance       8.87e+07
95%     88367.23        91216.3       Skewness      -.5001243
99%     90818.78       95882.86       Kurtosis       2.899212
```

```
. sum kfr_pooled_p100, d

      Household income ($) for children with parents at
                          100 percentile
------------------------------------------------------------
      Percentiles      Smallest
 1%     31171.29              0
 5%     42092.04              0
10%     49161.02              0       Obs               71,968
25%     60158.85              0       Sum of wgt.       71,968

50%     70335.16                      Mean           69699.34
                        Largest       Std. dev.      18074.19
75%     79232.45       686242.8
90%      87458.2       794910.1       Variance       3.27e+08
95%     93258.79       837102.4       Skewness       7.146267
99%     109872.4         980579       Kurtosis        259.798
```

Our further analysis for 100th percentiles, Fairfax County's (\$98,000–\$100,000) mean income maintain or exceed parental income levels, indicating maintenance or slight growth, while national as well as state means falls short. Higher SD's at the 100th percentile for VA and the US reflect increased disparities because of broader demographics. At the 100th percentile, the focus is on children from the very highest-income families. The smaller spread in our tract indicates that even among the wealthiest families, outcomes are more consistent and downward mobility is limited**.** Further on, factors such as economic stability, access to quality education, and proximity to MNC's help high-income children retain their socioeconomic status into adulthood.

Part c: Differences in the Patterns between the Percentiles

The data indicates that families of 25% percentile income have the relative advantage over other percentile families. This shows that Fairfax provides substantial opportunity for families starting near the bottom of the income ladder compared to the whole of Virginia and the US. These resources are spread evenly all socioeconomic households. We also observe mean steadily increase with higher parental incomes. It indicates that children from higher economic strata tend to have higher incomes later on in their adult lives. This is understandable as they have access to a greater level of access to resources. They also have the freedom to experiment and try out diverse fields. We also observe lesser variation between the percentiles for Virginia and US. Overall, Fairfax County demonstrates a

equitable mobility profile wherein low-income families have a better chance to climb, while high-income families face less risk of falling. This balance of upward and downward mobility underscores the county's strong economic environment, quality public institutions, and uniform access to opportunity. We believe the ability to establish uniformity is the significant edge Fairfax provides for its residents. And children growing up in this tract tend to have an advantage over children growing up elsewhere in VA or the US.

References:

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