156project

Summarizing the Paper's Research Question and Its Answer

The paper *The Wrong Side(s) of the Tracks: The Causal Effects of Racial Segregation on Urban Poverty and Inequality* seeks to explore how residential segregation by race affects the economic inequality between the white and black populations in the United States. While other papers have attempted to measure the effects of segregation, there has been a lot of skepticism about the reliability of the results due to omitted variable bias and endogenous migration.

In this paper, Ananat seeks to remedy the problem of omitted variable bias by instrumenting for a city's level of segregation by using a city's railroad configuration. The author presents evidence that supports the choice of instrumentation by showing the requirements necessary for a valid instrument. It is shown to be strongly and robustly to predict metropolitan segregation and does not separately predict confounding metropolitan outcomes. By using this instrument, the paper is able to examine the effect of segregation on a cities' income distributions by race.

The paper finds that exogenously increasing segregation causes cities to have African American populations with higher poverty rates and white populations with lower poverty rates. Segregation also increases the inequality between the two populations as it finds that it lowers average outcomes within a city's black community while reducing inequalities within a city's white community.

Finally, the paper seeks to better understand how segregation has led to city-level differences in poverty and inequality by looking at the way migration patterns and youth educational attainment differ according to segregation. This is done to help clarify whether differences in populations are a result of the causal treatment ment effect of segregation on individual-level or on a group-level. The results for this aspect of the paper are not conclusive but are most consistent with the hypothesis that both effect (individual and group) are at work. t are most consistent with the hypothesis that both effect (individual and group) are at work.

Datasets Used to Answer the Research Question

The paper utilizes data from various sources to investigate the effects of racial segregation on urban poverty and inequality.

1. **U.S. Census Bureau Reports:** These reports provide data on metropolitan demographics. The author uses these reports to gather information on poverty rates, median rent, and crowding, categorized by race.
2. **Integrated Public Use Microdata Series (IPUMS):** Individual Census microdata from IPUMS.org, covering years from 1890-1940, is incorporated into the analysis. This dataset analyzes individual-level characteristics like income, education, and labor force participation.
3. **Cutler/Glaeser/Vigdor Segregation Data:** This pre-compiled dataset, made available online by Jacob Vigdor, includes measures of metropolitan segregation from various decades, covering the nineteenth and twentieth centuries. The dataset also contains metropolitan characteristics used in prior research by Cutler and Glaeser (1997) and Cutler, Glaeser, and Vigdor (1999). This data is used to analyze historical trends and compare the study's findings with previous research.
4. **Nineteenth-Century Maps:** A collection of historical maps from the Harvard Map Library is analyzed to extract information on railroad configurations in 121 cities. These maps, created by the U.S. Geological Survey starting in the 1880s, detail elevation, bodies of water, roads, railroads, and building locations. These maps provide the basis for constructing the Railroad Division Index (RDI), a key variable in the study.
5. **Proximity to Former Slave States:** The study considers the distance of each city to the nearest former slave state as a proxy for potential demand for segregation during the Great Migration. Cities closer to former slave states experienced more significant inflows of African Americans, potentially increasing the demand for segregation in those areas.

Summary Statistics Table

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Replicate the Main Results (Daisy)

In an ideal situation, we would run an experiment on two initially identical cities in such a way:

1. At time zero, one city is assigned perfect segregation, the other is assigned perfect integration.
2. Each city would be randomly assigned black residents from the initial black skill distribution and white residents from the initial white distribution.
3. The relationship between segregation and the income distribution of the offspring generation would be measured.
4. Finally, residents would be allowed to move, and aggregate demand for cities (rent, migration) by race and skill would be measured to determine tastes for segregation and its consequences.

However, in reality we will have to approximate this ideal experiment empirically by providing plausibly exogenous variation using our instrumental variables.

In reality, the randomized experiment was approximated by using a measure of a city's railroad-induced potential for segregation denoted "railroad division index" or RDI which quantifies the extent to which the city's land is divided into smaller units.

$$RDI = 1 - \sum_i \left(\frac{area_{neighborhoodi}}{area_{total}}\right)^2$$

Another important variable to be captured was the amount of segregation, which is captured by a dissimilarity index defined by:

Index of dissimilarity $= \frac{1}{2}\sum_{i=1}^{N} \left|\frac{black_i}{black_{total}} - \frac{nonblack_i}{nonblack_{total}}\right|$

where $i = 1...N$ is the array of census tracts in the area.

With this setup, we can now assume that if RDI-induced segregation is randomly assigned, then we can capture the relationship between segregation and outcomes using a classic endogenous regressor affecting outcomes at the metropolitan statistical area (MSA) level

$$Seg = \alpha_1 RDI + \alpha_2 X + \mu$$

$$Y = \beta_1 Seg + \beta_2 X + \epsilon$$

where Seg represents an MSA's current level of segregation and X is a vector of control variables that includes total railroad length and other specifications.

Table 1—Testing RDI as an Instrument

```
t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)    
(Intercept)  0.29356    0.06407  4.5818 1.152e-05 ***
herf         0.35731    0.08779  4.0700 8.534e-05 ***
lenper      18.51449   10.73123  1.7253   0.08709 .  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)  
(Intercept)   18.4096     8.6123  2.1376  0.03701 *
herf          -3.9926    11.9865 -0.3331  0.74033  
lenper      -574.4010   553.6690 -1.0374  0.30407  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.97688    0.92719  1.0536   0.2942
herf          0.66575    1.36296  0.4885   0.6261
lenper       75.55319  134.81490  0.5604   0.5763


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)  
(Intercept)  0.238493   0.121372  1.9650  0.05547 .
herf         0.076499   0.185463  0.4125  0.68191  
lenper      15.343030  53.248500  0.2881  0.77453  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

              Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.048343   0.051346  0.9415   0.3514
herf          0.026653   0.070170  0.3798   0.7058
lenper      -12.438846  17.288261 -0.7195   0.4755


t test of coefficients:

               Estimate  Std. Error t value Pr(>|t|)    
(Intercept)  0.00655580  0.00725493  0.9036   0.3680    
herf        -0.00063348  0.00998175 -0.0635   0.9495    
lenper       9.23642359  0.64964442 14.2177   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value Pr(>|t|)  
(Intercept)  0.27489    0.13535  2.0310  0.06969 .
herf        -0.13211    0.18321 -0.7210  0.48740  
lenper       3.36059   20.50737  0.1639  0.87310  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:
```

```
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.0021728  0.0058688 -0.3702   0.7119
herf         0.0131740  0.0090546  1.4550   0.1483
lenper       9.1187058  0.6153344 14.8191   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value Pr(>|t|)
(Intercept) 0.920311   0.024335 37.8177  < 2e-16 ***
herf        0.052575   0.030279  1.7363  0.08512 .
lenper      0.179937   0.879880  0.2045  0.83831
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.401393   0.018348 21.8760  < 2e-16 ***
herf         0.028369   0.023958  1.1841  0.23875
lenper      -3.426924   1.500112 -2.2844  0.02413 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.115919   0.066751  1.7366  0.08507 .
herf        -0.080325   0.093662 -0.8576  0.39285
lenper      -0.151642   2.909673 -0.0521  0.95852
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.30747    0.10227  3.0066 0.003229 **
herf         0.19053    0.13699  1.3908 0.166889
lenper      18.40027   10.91114  1.6864 0.094366 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.055146   0.050550  1.0909   0.2775
herf        -0.073849   0.068134 -1.0839   0.2806
lenper       1.591711   2.428310  0.6555   0.5134


t test of coefficients:
```

```
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.195698   0.025116  7.7916 6.25e-11 ***
herf         0.032326   0.032185  1.0044   0.3189
lenper      -2.503764   1.626029 -1.5398   0.1284
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Table 2—The Effects of Segregation on Poverty and Inequality among Blacks and Whites

```
t test of coefficients:

             Estimate Std. Error  t value Pr(>|t|)
(Intercept) -0.869787   0.020909 -41.5988  < 2e-16 ***
dism1990    -0.079402   0.036977  -2.1473  0.03379 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error  t value  Pr(>|t|)
(Intercept) -1.101809   0.061197 -18.0043 < 2.2e-16 ***
dism1990     0.459484   0.092814   4.9506 2.466e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
(Intercept)  0.135918   0.012327 11.0257 < 2.2e-16 ***
dism1990    -0.072789   0.019492 -3.7344 0.0002903 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept) 0.160727   0.028792  5.5824 1.519e-07 ***
dism1990    0.181778   0.045335  4.0097 0.0001065 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


Call:
ivreg(formula = lngini_w ~ dism1990 | herf, data = aej_maindata)

Residuals:
     Min       1Q   Median       3Q      Max
-0.15407 -0.02944  0.00158  0.03444  0.27167

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.74284    0.05383 -13.799  < 2e-16 ***
dism1990    -0.30263    0.09420  -3.213  0.00169 **
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.05833 on 119 degrees of freedom
Multiple R-Squared: -0.3088,    Adjusted R-squared: -0.3198
Wald test: 10.32 on 1 and 119 DF,  p-value: 0.001693


Call:
ivreg(formula = lngini_b ~ dism1990 | herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max
-0.639386 -0.074655  0.004675  0.097568  0.392609

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  -1.3118     0.1471  -8.920  6.7e-15 ***
dism1990      0.8288     0.2573   3.221  0.00165 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1593 on 119 degrees of freedom
Multiple R-Squared: 0.05149,    Adjusted R-squared: 0.04352
Wald test: 10.37 on 1 and 119 DF,  p-value: 0.00165


Call:
ivreg(formula = povrate_w ~ dism1990 | herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max
-0.069777 -0.024144 -0.002442  0.023779  0.105029

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.20389    0.03412   5.975 2.45e-08 ***
dism1990    -0.19231    0.05971  -3.221  0.00165 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.03697 on 119 degrees of freedom
Multiple R-Squared: -0.138, Adjusted R-squared: -0.1476
Wald test: 10.37 on 1 and 119 DF,  p-value: 0.001648


Call:
ivreg(formula = povrate_b ~ dism1990 | herf, data = aej_maindata)

Residuals:
     Min       1Q   Median       3Q      Max
-0.15319 -0.04358 -0.01011  0.04000  0.26335

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.13268    0.07054   1.881   0.0624 .
dism1990     0.23110    0.12343   1.872   0.0636 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.07643 on 119 degrees of freedom
Multiple R-Squared: 0.08813,    Adjusted R-squared: 0.08047
Wald test: 3.505 on 1 and 119 DF,  p-value: 0.06362


t test of coefficients:

             Estimate Std. Error  t value Pr(>|t|)
(Intercept) -0.833568   0.033741 -24.7052   <2e-16 ***
herf        -0.110421   0.065829  -1.6774   0.1054
lenper       3.630380  28.053791   0.1294   0.8980
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
(Intercept)  -1.05955    0.23014 -4.6039 9.562e-05 ***
herf          0.16650    0.42437  0.3924    0.6980
lenper      -20.97796  163.03980 -0.1287    0.8986
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
(Intercept)  0.124555   0.016081  7.7457 3.224e-08 ***
herf        -0.036078   0.034974 -1.0316    0.3118
lenper      10.948640  20.104772  0.5446    0.5907
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
(Intercept)  0.275441   0.041536  6.6314 4.929e-07 ***
herf        -0.136242   0.093838 -1.4519    0.1585
lenper      80.445959  48.508019  1.6584    0.1093
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept) 0.208678   0.054894  3.8014 0.0002284 ***
dism1990    0.111120   0.086270  1.2880 0.2002289
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
```

```
(Intercept) -0.097944   0.159034 -0.6159    0.5392
dism1990     1.295175   0.249427  5.1926 8.669e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept)  2.12209    0.17968 11.8105 < 2.2e-16 ***
dism1990     1.17185    0.28241  4.1494 6.288e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.011354   0.077148 26.0715  < 2e-16 ***
dism1990    -0.234441   0.131000 -1.7896  0.07606 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


Call:
ivreg(formula = ln90w90b ~ dism1990 | herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max
-0.504649 -0.083827  0.001965  0.090971  0.442302

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.3350     0.1409   2.378    0.019 *
dism1990     -0.1109     0.2465  -0.450    0.654
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1526 on 119 degrees of freedom
Multiple R-Squared: -0.03014,   Adjusted R-squared: -0.03879
Wald test: 0.2025 on 1 and 119 DF,  p-value: 0.6535


Call:
ivreg(formula = ln10w10b ~ dism1990 | herf, data = aej_maindata)

Residuals:
     Min       1Q   Median       3Q      Max
-0.99996 -0.29586 -0.02606  0.22347  1.20237

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  -0.7979     0.4028  -1.981 0.049922 *
dism1990      2.5259     0.7049   3.584 0.000492 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4364 on 119 degrees of freedom
Multiple R-Squared: 0.01551,    Adjusted R-squared: 0.007233
Wald test: 12.84 on 1 and 119 DF,  p-value: 0.0004922
```

```
Call:
ivreg(formula = ln90w10b ~ dism1990 | herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max
-1.107440 -0.212875  0.001563  0.195718  1.253435

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.8345     0.3957   4.636 9.17e-06 ***
dism1990      1.6775     0.6924   2.423   0.0169 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4287 on 119 degrees of freedom
Multiple R-Squared: 0.1008, Adjusted R-squared: 0.09326
Wald test:  5.87 on 1 and 119 DF,  p-value: 0.01691



Call:
ivreg(formula = ln90b10w ~ dism1990 | herf, data = aej_maindata)

Residuals:
     Min       1Q   Median       3Q      Max
-0.52089 -0.12989 -0.01431  0.10856  0.91301

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.2974     0.1912  12.017   <2e-16 ***
dism1990     -0.7375     0.3345  -2.204   0.0294 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2071 on 119 degrees of freedom
Multiple R-Squared: -0.09306,   Adjusted R-squared: -0.1022
Wald test:  4.86 on 1 and 119 DF,  p-value: 0.02941



t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept)  0.55121    0.12330  4.4706 0.0001359 ***
herf        -0.44329    0.21693 -2.0435 0.0512572 .
lenper      39.95233   90.96575  0.4392 0.6641439
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1



t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.32666    0.32375  1.0090   0.3223
herf         -0.13508    0.53192 -0.2540   0.8015
lenper       97.43497  282.18260  0.3453   0.7327



t test of coefficients:
```

```
             Estimate Std. Error t value  Pr(>|t|)
(Intercept)   2.62890    0.33853  7.7656 3.075e-08 ***
herf         -0.44874    0.55760 -0.8048    0.4282
lenper      160.07624  290.06024  0.5519    0.5857
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept)  1.75103    0.14380 12.1769 3.028e-12 ***
herf         0.12963    0.24849  0.5217    0.6063
lenper      22.68890   95.68759  0.2371    0.8144
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Replicate Robustness Checks/Extensions (Sai)

1. Robustness Check: Controlling for 1920 City Characteristics

This robustness check replicates the main two-stage least squares (2SLS) estimates of the effect of segregation on the Gini index and poverty rates while controlling for city characteristics in 1920. This is the period when the Great Migration had just begun.

Controlling for 1920 characteristics helps address a potential concern that characteristics present at the beginning of the Great Migration might confound the relationship between RDI and segregation and, subsequently, between segregation and poverty and inequality. For example, imagine a city with a high RDI with a particularly large or highly-skilled Black population in 1920. The larger Black population might lead to a stronger demand for segregation, and the greater skills might protect the Black population from some of the negative effects of segregation. If those factors were not controlled for, the analysis might understate the effect of RDI-induced segregation on poverty and inequality.

The specific 1920 city characteristics used as controls are:

- Population: The total population of the city.
- Percent black: The percentage of the city's population that is Black.
- Literacy: The percentage of the city's population that is literate.
- Share employed in manufacturing: The percentage of the city's employment in manufacturing.
- Labor force participation: The percentage of the city's population in the labor force.

The results of this robustness check show that the estimated effects of segregation on poverty and inequality are highly stable when controlling for these 1920 city characteristics. All estimates remain statistically significant, and their magnitudes are similar to those in the primary analysis.

These findings provide further evidence that RDI is primarily impacting poverty and inequality through segregation and not through some other channel. The results are stable even after accounting for differences in city characteristics present at the beginning of the Great Migration before segregation could have noticeable effects on human capital or city growth.

```
Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    count1920
 -7.258e-01   -3.742e-01    5.059e+00    1.006e-05


Call:
ivreg(formula = formula, data = aej_maindata)
```

```
Coefficients:
(Intercept)     dism1990       lenper    black1920
    -0.7192      -0.3643      -1.2617       0.8105


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
    (Intercept)         dism1990           lenper  ctyliterate1920
        -0.5970          -0.3122           5.1907          -0.1514


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
      (Intercept)           dism1990             lenper  ctymanuf_wkrs1920
          -0.7487            -0.4015             4.5046             0.1256


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper      lfp1920
    -0.5908      -0.3053       3.7767      -0.3674


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    herfscore
   -0.71782     -0.41208      4.46817      0.06585


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    count1920
 -1.333e+00    8.987e-01   -7.799e+00   -5.982e-06


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    black1920
    -1.3381       0.8956      -3.4122      -0.5564


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
    (Intercept)         dism1990           lenper  ctyliterate1920
        -0.4118           1.0292         -10.7723          -1.0478
```

```
Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
      (Intercept)           dism1990             lenper  ctymanuf_wkrs1920
         -1.32276            0.90361           -7.64998           -0.05353


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper      lfp1920
    -1.4543       0.8491      -6.5075       0.3265


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    herfscore
     -1.356        1.038       -5.785       -0.138


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    count1920
  2.071e-01   -2.141e-01    3.629e-01    4.649e-06


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    black1920
     0.2066      -0.1995      -0.2513       0.1011


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
    (Intercept)         dism1990           lenper  ctyliterate1920
        0.39974         -0.16313          0.03772         -0.22167


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
      (Intercept)           dism1990             lenper  ctymanuf_wkrs1920
          0.20031           -0.21340            0.31952            0.03309


Call:
ivreg(formula = formula, data = aej_maindata)
```

```
Coefficients:
(Intercept)     dism1990       lenper      lfp1920  
    0.24875     -0.18663      0.03902     -0.11491  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    herfscore  
   0.204319    -0.189355     0.692985    -0.005425  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    count1920  
  1.192e-01    2.812e-01   -4.483e+00   -5.779e-06  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    black1920  
     0.1084       0.2956       3.7250      -1.0081  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
    (Intercept)         dism1990           lenper  ctyliterate1920  
        0.18896          0.26971         -4.97545         -0.07695  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
      (Intercept)           dism1990             lenper  ctymanuf_wkrs1920  
          0.13523            0.30701           -4.00222           -0.09117  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper      lfp1920  
    0.04954      0.24329     -3.84810      0.19024  


Call:
ivreg(formula = formula, data = aej_maindata)

Coefficients:
(Intercept)     dism1990       lenper    herfscore  
    0.11448      0.30379     -4.13173     -0.03852  
```

```r
summary(model_lngini_w_count1920)
```

```
Call:
ivreg(formula = lngini_w ~ dism1990 + lenper + count1920 | lenper + 
    count1920 + herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.155103 -0.036506  0.002892  0.039800  0.240711 

Coefficients:
              Estimate Std. Error t value Pr(>|t|)    
(Intercept) -7.258e-01  6.100e-02 -11.899  < 2e-16 ***
dism1990    -3.742e-01  1.185e-01  -3.157  0.00203 ** 
lenper       5.059e+00  5.266e+00   0.961  0.33871    
count1920    1.006e-05  3.129e-06   3.215  0.00169 ** 
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.05903 on 117 degrees of freedom
Multiple R-Squared: -0.3178,	Adjusted R-squared: -0.3516 
Wald test: 4.289 on 3 and 117 DF,  p-value: 0.006546 
```

```r
summary(model_lngini_b_count1920)
```

```
Call:
ivreg(formula = lngini_b ~ dism1990 + lenper + count1920 | lenper + 
    count1920 + herf, data = aej_maindata)

Residuals:
     Min       1Q   Median       3Q      Max 
-0.64974 -0.07188  0.01023  0.09361  0.39445 

Coefficients:
              Estimate Std. Error t value Pr(>|t|)    
(Intercept) -1.333e+00  1.684e-01  -7.918 1.54e-12 ***
dism1990     8.987e-01  3.272e-01   2.747  0.00697 ** 
lenper      -7.799e+00  1.454e+01  -0.537  0.59263    
count1920   -5.982e-06  8.637e-06  -0.693  0.48993    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1629 on 117 degrees of freedom
Multiple R-Squared: 0.02494,	Adjusted R-squared: -6.029e-05 
Wald test: 4.179 on 3 and 117 DF,  p-value: 0.007521 
```

```r
summary(model_povrate_w_count1920)
```

```
Call:
ivreg(formula = povrate_w ~ dism1990 + lenper + count1920 | lenper + 
    count1920 + herf, data = aej_maindata)

Residuals:
       Min         1Q     Median         3Q        Max 
```

```
-0.0994692 -0.0232872 -0.0004628  0.0205997  0.1084953

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.071e-01  3.821e-02   5.421 3.23e-07 ***
dism1990    -2.141e-01  7.424e-02  -2.884  0.00468 **
lenper       3.629e-01  3.299e+00   0.110  0.91259
count1920    4.649e-06  1.960e-06   2.372  0.01932 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.03697 on 117 degrees of freedom
Multiple R-Squared: -0.119, Adjusted R-squared: -0.1477
Wald test: 4.035 on 3 and 117 DF,  p-value: 0.009022
```

```r
summary(model_povrate_b_count1920)
```

```
Call:
ivreg(formula = povrate_b ~ dism1990 + lenper + count1920 | lenper +
    count1920 + herf, data = aej_maindata)

Residuals:
      Min        1Q    Median        3Q       Max
-0.163894 -0.045700 -0.009892  0.037492  0.275884

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.192e-01  7.894e-02   1.510   0.1337
dism1990     2.812e-01  1.534e-01   1.833   0.0693 .
lenper      -4.483e+00  6.815e+00  -0.658   0.5120
count1920   -5.779e-06  4.049e-06  -1.427   0.1562
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.07639 on 117 degrees of freedom
Multiple R-Squared: 0.1043, Adjusted R-squared: 0.08138
Wald test: 1.212 on 3 and 117 DF,  p-value: 0.3086
```