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# County Level Economic Voting in U.S. Presidential Elections

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# County Level Economic Voting in U.S. Presidential Elections

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## ABSTRACT

This thesis seeks to understand the relationship between county level economic voting and county level economic voting by demographic group on county level vote shares for U.S. presidential elections. Using an entity and time fixed effects regression model, I study the effects that county level growth in real per capita personal income and unemployment rate change have on county level two-party vote share for the Democratic Party. Additionally, I observe the responsiveness of a county's voting behavior due to the demographic makeup of that specific county. I then compare my initial results to those of Eisenberg and Ketcham (2004) for the 1992-2000 presidential elections. I utilize the same models for the 2004-2012 elections to compare these results to those from the 1992-2000 elections. Additionally, I rerun my model for the 1992-2000 presidential elections, after restricting my economic data to non-outliers, to study the effects that outliers in economic conditions have on my original results.

# 1. INTRODUCTION

"The economy, stupid." Looking back on the words of Bill Clinton's campaign strategist, James Carville, it seems as if truer words have never been spoken (Matalin, Mary, and James Carville, 461). US presidents know that the state of the economy will have a significant impact on their reelection chances, regardless of whether or not they actually have control over economic events. Economic research on presidential elections (including work by such individuals as Gerald Kramer, Ray Fair, Edward Tufte, and Nate Silver) have supported this notion by finding that voters see presidential elections as referenda on the incumbent party. If the incumbent party oversees a period of growth, it will be more likely to spend the next four years in the White House. On the other hand, if the incumbent party is in power during an economic downturn, voters will tend to favor an opposition candidate in the next election.

While it is well established in academic research that economics matters in presidential elections, little research, comparably, has been done on how local economic conditions affect presidential vote shares. This lacuna could be due to the lack of county-level data readily available before the 21st century, and because of the fact that presidential elections, in the end, depend on Electoral College votes at the national level (which makes counties seem redundant in the face of the wider state).

Nevertheless, studying voting behavior at the county level does provide some noteworthy insights. Major media outlets have increasingly focused on grassroots campaigning in presidential. This makes county level data all the more valuable for campaign strategists who might wonder what affects the vote share of a given local

region. Additionally, with such a wide variety of economic and demographic characteristics across the 3,144 counties and county equivalents in the US, looking at county voting behavior provides a case study to see how well national level prediction models fit at the county level. Simply put, does the local economy even matter to voters at the county level?

For the purpose of this thesis, I study county level economic voting and county level economic voting by demographic group using county and state-year fixed effects regression models. First, I review relevant literature covering economic voting models at the national and subnational (state and county) levels. Second, I explain my methodology, including my data sources, variable selection, and entity fixed effects regression model. Third, I compare my results to those of Eisenberg and Ketcham (2004) for the 1992-2000 elections. Then I run the same model for the 2004-2012 elections to see how the results of my model compare to the results of the 1992-2000 elections.[1] Finally, I run the model with 1992-2000 elections data after taking out outliers that make county level economic data run contrary to Okun's Law.

[1] The reason I choose to run the 2004-2012 elections is to compare the 1992-2000 results with another similar sample period.

# 2. LITERATURE REVIEW

Economic conditions affect American presidential elections; however, most of the research on these effects has focused on the national level. Subnational (state and county) level research is quite sparse, especially at the county level. While national level research is not a perfect parallel for the economic effects on voting at the subnational level because of the sheer number of counties (more than 3,000) and the differences in economic conditions among counties, it does provide a noteworthy background. It also raises the question of whether national effects of economic conditions on voting behavior hold true at a local level. Therefore, after addressing some of the seminal research in this field at the national level, I will look over the literature at the subnational level.

## 2. 1. NATIONAL MODELS

The first seminal paper on the topic of how economics affects voting behavior in presidential elections was Kramer (1971). Kramer's results demonstrated that, between 1896 and 1964, there was a positive correlation between increases in real per capita personal income and the incumbent candidate's party vote share. (Leighley, 2010; 375).

Kramer's (1971) model included growth of per capita personal income (both adjusted and not adjust for the cost-of-living index), unemployment, and inflation as economic independent variables. In his results, Kramer concluded that real per capita personal income was the most important of these variables. When per capita real personal income was held constant, changes in both the unemployment rate and inflation were not

statistically significant. Kramer's findings that election vote shares are significantly affected by economic changes during the incumbent's presidency strongly suggest that economic conditions matter in presidential elections (Kramer, 1971).

Fair's research on presidential elections has supported the findings of Kramer (1971). Fair has regularly updated his model for predicting presidential vote shares since Fair (1978), with his last major model adjustment occurring in Fair (1996) and latest iteration with updated data being published in Fair (2014). The main economic independent variables in Fair's newest model include growth rate of real per capita GDP, inflation, and good news quarters. All of Fair's economic variables are multiplied by a binary variable named *DemIncumbent*. This binary variable denotes whether or not the Democrats are the incumbent party for a certain election. The logic behind the inclusion of this variable is that voters will punish or reward the incumbent party for the economic performance of the nation during their term. Consequently, *DemIncumbent* equals 1 when the Democratic Party is the incumbent or -1 if the incumbent is the Republican Party.[2] Fair's variables are irregular in their definition, so his results are not a perfect parallel to similar papers from other academics. Growth rate of real per capita GDP is represented in Fair's model by the "growth rate of real per capita GDP in the first three quarters of the on-term election year (annual rate)" (Fair, 2014). The inflation variable is the "absolute value of the growth rate of the GDP deflator in the first 15 quarters of the administration (annual rate)" (Fair, 2014). The good news quarters variable is calculated by the "number

[2] This binary variable is inspired from the findings of Kramer (1971) regarding the referendum effect observed in presidential elections.

of quarters in the first 15 quarters of the administration in which the growth rate of real per capita GDP is greater than 3.2 percent at an annual rate" (Fair, 2014).

**Table 2.1-1: Ray Fair 2014 Presidential Vote Share Model (Fair, 2014)**

| **Dependent Variable** | **Coefficient (Change in Democrat Vote Share)** | **t-stat** |
|---|---|---|
| Growth*DemIncumbent | 0.676 | 7.37 |
| Inflation*DemIncumbent | -0.717 | -3.56 |
| GoodNews*DemIncumbent | 0.958 | 5.03 |

As seen in Table 2.1-1, Fair finds that all three of his economic variables are statistically significant. An increase in either growth rate or good news quarters shows a positive effect on national vote share for the Democratic candidate when the Democratic Party is the incumbent, while an increase in inflation results in a decrease in the same vote share. Taken together, Fair's results indicate that economics affects voting, which supports Kramer's findings (1971).

Alan Abramowitz created a presidential election prediction model that has successfully predicted the popular vote winner in every US presidential election since 1988 within two percentage points or less. Abramowitz's model, named "Time for Change," originally only had three independent variables - the net approval rating of the incumbent president in June of the election year (*NETAPP*), change in growth rate of real GDP in the second quarter of the election year (*Q2GDP*), and the presence or absence of a first-term incumbent in the presidential race (*TERM1INC*) – to predict the major party

vote for the party of the incumbent president. Importantly, all three independent variables carry statistically significant coefficients. Model 1 describes both models (Abramowitz, 2012).

**Abramowitz's Time for Change Prediction Models**[3]

**(Pre-2012)** *PV = 47.3 + (.107*NETAPP) + (.541*Q2GDP) + (4.4*TERM1INC)* (2.1-1)

**(2012)** *PV = 46.9 + (.105*NETAPP) + (.635*Q2GDP) + (5.22*TERM1INC) – (2.76*POLARIZATION)* (2.1-2)

For the 2012 election, Abramowitz added a fourth independent variable, polarization, to reflect what he saw as an increase in the polarization of the US political landscape. Looking back at the elections since 1996, Abramowitz noticed a trend in recent elections towards smaller victory margins and lower inter-election vote swings when compared with earlier elections in the 20th century. As seen in model 2.1-2, the addition of the statistically significant polarization variable decreases the advantage of a first term incumbency by a little less than half (Abramowitz, 2012). When comparing the predictions of the adjusted model to the previous one in elections from 1996 onwards, Abramowitz found that the adjusted model improved the accuracy of the prediction by reducing the forecasted winning margin by half (Ripton, 2012). This result indicates that the electorate in recent elections has, in fact, become more polarized.

The adjusted model also shows a greater emphasis on the impact of the change in second-quarter GDP. Specifically, the coefficient grows by almost .1 percentage points,

[3] As of the writing of this thesis, Abramowitz has not published accompanying regression data (standard errors, R-squared, SER, etc.) for his latest Time for Change Prediction models.

while staying statistically significant. As seen below in Table 2.1-2, the percentage change in second quarter real GDP has a noteworthy impact on the predicted popular vote (Abramowitz, 2012). This supports the national-level academic literature outlined above, which contends that economics has a statistically significant effect on voting behavior.

**Table 2.1-2: Conditional forecast of Obama's share of the major party vote (Abramowitz)**

| % Change in 2nd Quarter Real GDP | Predicted Obama Popular Vote (%) |
|---|---|
| -3 | 47.7 |
| -2 | 48.3 |
| -1 | 48.9 |
| 0 | 49.6 |
| +1 | 50.2 |
| +2 | 50.8 |
| +3 | 51.5 |

There has been some notable research into other variables that might influence voting, such as the demographic makeup of the electorate, which is helpful to correct for any omitted-variable bias that may be present when studying economic conditions and voting at the county level. While demographics of at the national level might change only gradually, demographic makeup across counties can vary wildly. For example, as seen in my summary statistics in Appendix Figure A and B, the percentage of black non-Hispanics as part of the total county population can vary from 0% to 86.6%. This means that, at the county level, demographic makeup could potentially matter in the outcome of the county level vote share for a given presidential candidate. Since most of the research on voting across demographic groups has been done at the national level, it is useful to be

aware of potential demographic-specific voting preferences when one studies economic voting at the county level.

The belief that different groups respond heterogeneously to economic conditions is well established. As Leighley (386) notes "group evaluations are either or both more personally relevant than national evaluations and more politically relevant than personal circumstance" (Leighley, 2010; 386). Seltzer and Hutto (2013) supported this idea, finding a racial difference in the perception of how the U.S. national economy was doing depending on who was the president at that time. Specifically, they observed a racial difference before the 2008 election, where whites were more likely than blacks to say that the national economy was doing, which switched once Obama was elected (Seltzer and Hutto, 2013).

Hibbs et. al. (1982) studied how certain groups heterogeneously evaluate the economic performance of a president. When investigating how different occupation/labor force groups judge presidential economic performance, they find that blue-collar workers "exhibit relatively greater sensitivity to sustained movements in unemployment and real income growth and relatively less sensitivity to the inflation rate than white-collar workers or retirees" (Hibbs et. al., 1982). These results link up with their findings that the support of Democratic presidents is more sensitive to changes in unemployment and real income, as blue-collar workers typically vote for the Democratic Party. Similarly, the support of Republican presidents is more sensitive to changes in inflation, which is consistent with the fact that a noteworthy amount of their support base made up of white-collar workers and retirees. Hibbs states that these evaluations and subsequent party

alignments “are not simply formations of voters united by psychological affinities long removed from concrete events; rather, they also may be realistically viewed as cleavage formations reflecting diverging objective interests over major political and economic issues” (Hibbs et. al., 1982).

Ansolabehere et. al. (2014) also observed evidence that groups evaluate the economy heterogeneously. They discover that “individuals from groups that experience more unemployment report the national unemployment rate is higher” (Ansolabehere et. al., 2014; 381). Breaking this finding down into more specific groups, they note that ethnic minorities with lower educational attainment and individuals from states with higher unemployment rates perceive that there is a higher rate of national unemployment (Ansolabehere et. al., 2014; 381).

The national level literature reviewed above is by no means an exhaustive list of research on the topic of voting for presidential elections in the U.S. Nate Silver’s book, *The Signal and the Noise: Why So Many Predictions Fail – But Some Don’t*, is one notable piece of literature that has been making headlines due to the accuracy of Silver’s prediction model for recent presidential elections (he accurately predicted the outcome of every state plus the District of Columbia in the 2012 election) (Branwen, 2012). Popularity functions are another noteworthy area of research, which study the economic effects on the approval rating of the current president.

## 2.2 SUBNATIONAL MODELS

The research on the economic effects on voting behavior at the subnational level, by comparison to the national level, is sparse. The question of this research is, essentially: do subnational level economic conditions have an effect on presidential election voting behavior? At the county level this question is especially intriguing as one can study the economic effects on voting in over 3,000 counties, each with its own economic and electoral story. Additionally, as is always the case with statistical research, more observations will give more accurate results, all other things being equal. Unfortunately, the amount of research done at the county level is quite limited; therefore, it is helpful to also review those papers that study the economic effects on voting at the state level as their models can be adapted to the county level.

Blackley and Shepard (1994) studied state-level economic effects on state presidential vote shares. They used a weighted least squares (WLS) model to predict the state vote shares in the 1992 election between George H.W. Bush and Bill Clinton. The state level economic variables in their model included the state level unemployment rate in September 1992 and state level growth rate in real per capita personal income for the one year period ending in the second quarter of 1992. The other variables incorporated in their model are: Bush's vote share in the 1988 election, change in voting population, binary variables for the home states of the president and vice president, and a further three binary variables for regions in the US. In their results, Blackley and Shepard found that the variables for state-level unemployment rates and per capita income have a statistically significant effect on the three-party vote share. As seen in Table 2.2-1, an

increase in the unemployment rate increased the vote share for the Democratic Party candidate, Bill Clinton, by 1.1 percentage points. Additionally, an increase in the growth of real per capita personal income decreased the same vote share by .9 percentage points (Blackley and Shepard, 1994).

**Table 2.2-1: Vote-share coefficients for the 1992 Election – Blackley and Shephard (2004)**

| Independent Variable | Clinton Vote-Share (WLS) |
|---|---|
| Unemployment Rate (92) | 1.126** (0.288) |
| Income (91-92) | -0.872* (0.432) |

**(*) coefficient is significantly different from the null value at the 0.1 (0.5) level for a one-tailed test

**Table 2.2-2: Vote-share coefficients for the 1992 Election – Abrams and Buskewitz (1995)**

| | Independent Variable | Bush's Vote-Share (OLS) | Bush's Vote-Share |
|---|---|---|---|
| Model A | Unemployment Rate (92) | -0.76 (3.2) | -0.72 (5.1) |
| | Income (91-92) | -0.02 (0.2) | 0.80 (5.7) |
| Model B | Unemployment Rate (92) | -0.62 (2.8) | -0.33 (1.5) |
| | Income (91-92) | 0.23 (2.7) | 0.50 (8.8) |

t-statistics in parentheses

Abrams and Butkiewicz (1995) supported the findings of Blackley and Shephard (1994) as they found that economic conditions at the state level have a statistically significant effect on voting. Abrams and Butkiewicz also studied the 1992 election; however, there are some noteworthy differences in their methodology when compared to Blackley and Shephard (1994). While their model included state-level unemployment rates in September 1992, Abrams and Butkiewicz incorporated change in real per capita

personal income growth over the four-year period ending in the second quarter of 1992 *and* the one-year period used by Blackley and Shephard. Abrams and Butkiewicz's other independent variables include the previous vote share of Bush in 1988, the vote share of third-party candidate Ross Perot, a binary variable for Arkansas, and unexpected growth in the state's real per capita income. Additionally, Abrams and Butkiewicz used two models, OLS and WLS, to find the effects of their independent variables on the three-party vote share in an effort to compare the results of each model. As seen in Table 2.2-2, they found that both the change in unemployment rate and real per capita income have statistically significant effects on Bush's vote share (Abrams and Butkiewicz, 1995). The coefficient signs for their WLS results are the same as Blackley and Shephard's, which supports the conclusion that an increase in unemployment rate will increase the vote share for a Democratic candidate while an increase in growth of real per capita personal income will decrease that same vote share.

Eisenberg and Ketcham (2004), the paper on which this thesis is based, compared the effects of economic conditions - between the county, state, and national levels - on vote shares at the county level. When contrasting the effects of economic conditions at the county level with those at the state and national levels, they found that the county-level conditions, while significant, have the weakest effect on voting behavior of the three (Leighley, 2010; 388). While their main focus was on comparing these levels, Eisenberg and Ketcham also studied economic voting solely at the county level. Their two models, for economic voting and economic voting by demographic group, are seen below.

**County Level Economic Voting with State*Year Fixed effects (Eisenberg and Ketcham, 2004; 4)**

$$Dem_{rt} = \alpha + \beta_1 g_{rt} I_t + \delta I_t + \varphi C_r + \gamma S_{rt} + \varepsilon_{rt} \quad (2.2\text{-}1)$$

**County Level Economic Voting by Demographic Group (Eisenberg and Ketcham, 2004; 12)**

$$Dem_{rt} = \alpha + \beta_1 g_{rt} I_t + \beta_2 g_{rt} I_t D_{rt} + \delta I_t + \varphi C_r + \gamma S_{rt} + \varepsilon_{rt} \quad (2.2\text{-}2)$$

$Dem_{rt}$ denotes the two-party presidential vote share for the Democratic Party. $g_{rt}$ represents either the growth in per capita personal income or unemployment rate change. $I_t$ denotes incumbency, 1 if the incumbent is a Democrat or -1 if the incumbent is a Republican. $D_{rt}$ represents a certain demographic group (for the purposes of this thesis, I will look at the results of their models with blacks and males). $C_r$ and $S_{rt}$ are both vectors of dummy variables that control for county or state-year fixed effects. Specifically, the two variables estimate "economic voting from the observations in which voting or economic performance in a given county-year deviates from that which would be expected in that county on average and in that state-year on average" (Eisenberg and Ketcham, 2004; 4).

In their first set of results, as seen in Table 2.2-3, Eisenberg and Ketcham found that, when looking at the past year, only unemployment rate change had a statistically significant effect at the 10% level on the vote share of the Democratic presidential candidate.

**Table 2.2-3: County Level Economic Voting for Past Year (Eisenberg and Ketcham, 2004; 9)**

| VARIABLES | Real Per Capita Income Growth (%) (1972-2000 Elections) | Unemployment Rate Change (1992-2000 Elections) |
|---|---|---|
| Incumbent | 0.0887*** | |
| | (0.0004) | |
| Econ * | 0.0001 | 0.0009* |
| Incumbent | (0.0001) | (0.0005) |
| Observations | 24,422 | 9,324 |
| R-squared | 0.924 | 0.969 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Eisenberg and Ketcham's (2004) second set of results, as seen in Table 2.2-4, they found various variables to be statistically significant. For blacks over the past year, they found that counties "with higher proportions of black residents have greater changes in voting behavior as a result of county income," (Eisenberg and Ketcham, 2004; 13) but not county unemployment. Furthermore, for males, they found there was no significant effect on voting from either income or unemployment over the past year (Eisenberg and Ketcham, 2004; 13).

**Table 2.2-4: County Level Economic Voting by Demographic Group for Past Year (Eisenberg and Ketcham, 2004; 14)**

| | Black | | Male | |
|---|---|---|---|---|
| VARIABLES | Real Per Capita Income Growth (%) (1972-2000 Elections) | Unemployment Rate Change (1992-2000 Elections) | Real Per Capita Income Growth (%) (1972-2000 Elections) | Unemployment Rate Change (1992-2000 Elections) |
| Incumbent | 0.0835*** | | 0.0176*** | |
| | (0.0010) | | (0.0003) | |
| % Demographic Group | 0.7091*** | 0.3947*** | -0.2373*** | -0.1901*** |
| | (0.0468) | (0.0535) | (0.0545) | (0.0405) |
| Econ * Incumbent | 0.0002 | 0.0013 | 0.0014 | -0.0065 |
| | (0.0001) | (0.0013) | (0.0014) | (0.0088) |
| Econ * Incumbent * % Demographic Group | 0.0021** | -0.0011*** | -0.0022 | 0.0157 |
| | (0.0009) | (0.0037) | (0.0029) | (0.0188) |
| Observations | 21,363 | 6,216 | 21,363 | 6,216 |
| R-squared | 0.931 | 0.982 | 0.927 | 0.982 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Taken together, Eisenberg and Ketcham (2004) found that only unemployment rate change over the last year has any statistically significant effect on presidential voting, unless one is looking at the responsiveness of blacks to their local county economy.

Lacombe and Shaughnessy (2007) studied the results of the 2004 presidential election at the county level to see what affected the vote share for the Republican incumbent, George W. Bush. The used both an OLS and spatial error model (SEM) to see if spatial error correlation is present. Specifically, they wanted to see if certain

independent variables that are statistically significant under an OLS model might not be significant when the model is corrected for spatial autocorrelation (Lacombe and Shaughnessy, 2007).

The independent variables used by Lacombe and Shaughnessy in both of their models included various demographic, political, and economic characteristics. The economic variables used included both log per-capita income and the unemployment rate at the county level. As seen in Table 2.2-5, their OLS results found that eleven demographic, political, and economic variables were statistically significant at the 1% level. When they adjusted to correct for spatial autocorrelation, they found that only eight variables were significant at the 1% level, with two being significant at the 5% level and one at the 10% level. While both log per-capita personal income and unemployment rate were statistically significant at the 1% level in the OLS model, log per-capita became less statistically significant (5% level) in the SEM (unemployment rate stayed at the 1% level) (Lacombe and Shaughnessy, 2007).

**Table 7: OLS and SEM Results (Lacombe and Shaughnessy, 2007)**

| | OLS | | SEM | |
|---|---|---|---|---|
| **Independent Variables** | **Popular Vote Percentage for Bush by County** | **t-statistics** | **Popular Vote Percentage for Bush by County** | **t-statistics** |
| Constant | 1.4827 | 8.86* | 0.5823 | 5.27* |
| % Black | -0.0006 | -1.47 | -0.0022 | -8.92* |
| % White | 0.0016 | 4.30* | 0.0037 | 18.64* |
| % Hispanic | -0.0002 | -0.57 | -0.0002 | -0.95 |
| % Urban Population | -0.0025 | -0.26 | -0.0073 | -1.26 |
| Female Population with Bachelor's | -1.1312 | -10.13* | -0.4436 | -6.26* |
| Male Population with Bachelor's | 0.8016 | 7.09* | 0.1262 | 1.88*** |
| Gay Marriage Dummy | 0.0221 | 5.61* | 0.0102 | 1.59 |
| % Veterans | 0.2432 | 3.42* | 0.2056 | 3.82* |
| % Religious Adherents | 0.0150 | 1.07 | 0.0267 | 2.71* |
| Churches per 10,000 People | 0.0017 | 7.06 | 0.003 | 1.56 |
| Texas State Dummy | 0.1171 | 15.22* | 0.0610 | 3.79* |
| Massachusetts State Dummy | -0.1690 | -8.23* | -0.0564 | -2.20** |
| Log Per-Capita Personal Income | -0.0901 | -5.34 | -0.0235 | -2.10** |
| Unemployment Rate | -0.0262 | -18.13 | -0.0096 | -9.11* |

*Significant at the 1% level. **Significant at the 5% level. ***Significant at the 10% level.

Lacombe and Shaughnessy's SEM results contradicted the findings of Eisenberg and Ketcham (2004), as Lacombe and Shaughnessy showed that county-level data were applicable and appropriate when estimating national voting models. Furthermore, they

found that both unemployment *and* per-capita income over the past year, not just unemployment rate change, are statistically significant independent variables.

# 3. METHODOLOGY

For the purposes of thesis, I will use a county and state-year fixed effects regression model to determine the effects of county level economic conditions on county level presidential two-party vote share.

## 3.1 BUILDING AN ENTITY AND TIME FIXED EFFECTS MODEL

When creating a model to study county level economic voting, we must keep in mind one crucial difference between data at the national and county level. Namely, counties have significantly different characteristics relative to a national average, which, by definition, is only a single number. The data set used in this thesis contains 3,049 counties observations, and some of the variation in the data is extraordinarily large. For example, in 2010, Arthur County, NE, had a population of only 465 with a real per capita personal income of $25,164 and an unemployment rate of 4.6%, compared with over 9.8 million people living in Los Angeles County, CA with a real per capita personal income of $40,668 and an unemployment rate of 16.9%.

Although, in general, we prefer more variation for statistical reasons (precision of estimators), the type of differences observed here have the potential to create a significant problem. Consider a consistently high (low) income county. It is likely that small percentage changes in income growth will be dominated by the level-income effect when it comes to party preferences. Alternatively, consider a county with a small labor

force/population. A single change in its economic environment, such as a single firm shutting down its business, could have a drastic effect on real per capita personal income or unemployment. For example, the smallest county population observed in the election years studied in this thesis numbered just 40 people (including any children under 18 who are ineligible to vote). This minuscule population size has a disproportional impact on how the counties react to changes in its economic characteristics. To use an example, a bus driving into this county and dropping off 20 new migrant workers would change the county's real per capita personal income level and unemployment rate in a significant matter. Since OLS is sensitive to outliers, counties of this type can significantly impact results.

## 3.2 FIXED EFFECTS REGRESSION MODEL: COUNTY LEVEL ECONOMIC VOTING

To correct for the some of the effects generated by outliers, I use a county (entity) fixed effects regression model. Stock and Watson (2015) describe fixed effect regression models as "a method for controlling for omitted variables in panel data when the omitted variables vary across entities … but do not change over time" (Stock and Watson, 2015; 396). Fixed effects control for omitted variables such as party preference due to persistent economic conditions or irregular population characteristics that have a singular effect on presidential voting in a single county across different elections.

Similar to the models used by Eisenberg and Ketcham (2004), my regression specifications include both state-year and county entity fixed effects.

$$Dem_{rt} = \beta_0 + \beta_1 incumbent_t + \beta_2(Econ_{rt} * incumbent_t) + \beta_3 S_{rt} + C_r + \varepsilon_{rt} \quad (3.2\text{-}1)$$

$$Dem_{rt} = \beta_0 + \beta_1 incumbent_t + \beta_2 Demog_{rt} + \beta_2(Econ_{rt} * incumbent_t) + \beta_4(Demog_{rt} * Econ_{rt} * incumbent_t) + \beta_5 S_{rt} + C_r + \varepsilon_{rt} \quad (3.2\text{-}2)$$

The dependent variable $Dem_{rt}$ denotes the two-party presidential election vote share of the Democratic Party for a specific county, *r*, in a certain election year, *t*.

The variable $incumbent_t$ is an indicator of the party of the incumbent president for a given election year *t*. As is standard in the literature, $incumbent_t$ equals 1 if the incumbent is a Democrat and (-1) if the incumbent is a Republican in the election year. The inclusion of this variable is necessary because, as first suggested by Kramer (1971), voters see elections as referenda on the economic performance of the incumbent party. Therefore, incumbency is multiplied by the county level economic variables $Econ_{rt}$ for that given county, *r*, and year, *t*, to extract the referendum effect.

To study the legacy of the economic conditions at the county level for a given incumbent party, I multiply growth in real per capita personal income and unemployment rate change (separately) by the incumbent binary variable. Multiplying these variables will account for the referendum effect of presidential elections, where voters punish (reward) an incumbent party for their poor (good) economic legacy in the previous presidential term. For example, an increase in growth of real per capita personal income will contribute to the sense of a positive economic legacy for the incumbent party. Therefore, an increase in growth of real per capita personal income (*gpci*) during the term of a Democratic president will increase the vote share of the Democratic candidate in the next election as voters attribute the improvement in their county's economic conditions to

said incumbent party. On the other hand, an increase in unemployment rate change (meaning, higher unemployment) will have a negative effect on the economic legacy of the incumbent party. Consequently, an increase in the change in the unemployment rate (*cur*) during the term of a Democratic president will decrease the vote share of a Democrat candidate in the next election as voters punish the Democratic Party for its poor economic legacy. This expectation assumes that economic conditions affect both Democrat and Republican incumbents symmetrically. Consequently, county and state-year fixed effects are necessary as some counties might have a proclivity to vote for a certain party due to their specific economic conditions.

$S_{rt}$ is a vector that includes binary variables for each state-year combination. For example, the state of Alabama for the election year of 1992 would become AL×1992. The variable $C_r$ denotes a binary variable for each county (numbering 3,048 from the 1992-2000 elections and 3,049 from the 2004-2012 elections), which controls for omitted variables that may vary *across* different counties but not *within* a county over time. The impact of the state-year and county binary variables is to control for the changes in voting behavior from those observations in which economic performance or voting deviates from what is usually expected in that county and state-year combination on average. Therefore, one can run a regression across counties that vary in any number of characteristics across different elections without having the results muddied by outliers due to persistent county or state-time characteristics.[4]

[4] Just to clarify, this means that my model is *both* an entity and time fixed effects model.

The variable $Demog_{rt}$ stands for a demographic mix variable for county *r* in election year *t*. It is interacted with the incumbent party-economic variable to determine whether or not counties with high or lower proportions of a specific demographic group are more or less responsive to changes in economic conditions. These results give evidence on the characteristics of economic voting for a specific demographic group.

## 3.3 VARIABLE SELECTION

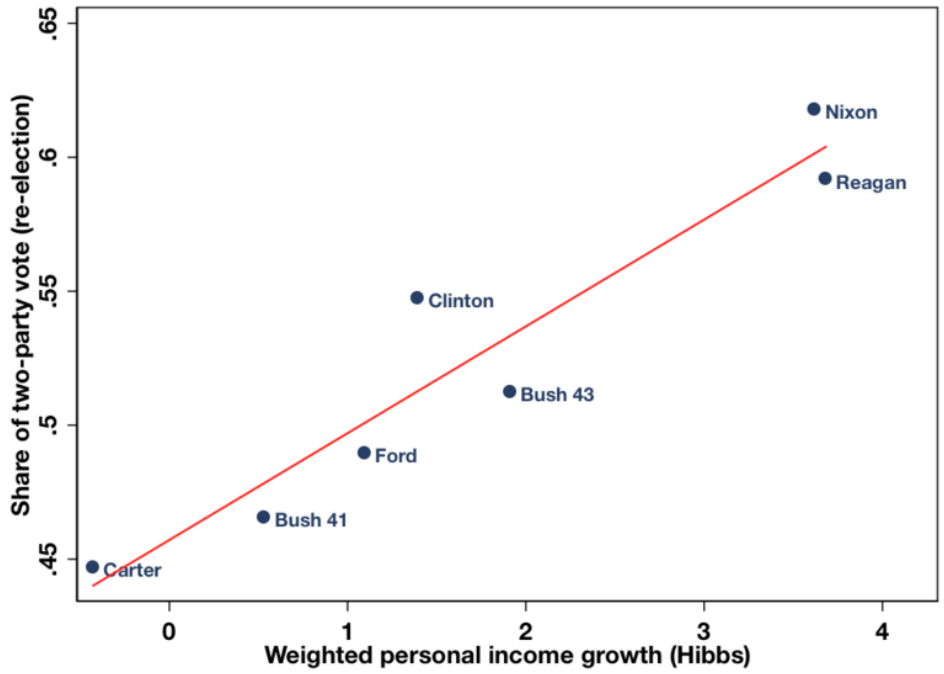
For the purpose of this thesis, data are collected entirely at the county level. In many ways, this thesis attempts to check whether Eisenberg and Ketcham's (2004) county level result can be used to explain county level voting behavior beyond their sample period. For the election years of 1992-2000, these data includes 3,048 of 3,143 counties/county equivalents in the United States. For the election years of 2004-2012, this data covers 3,049 of 3,144 ("United States Census Bureau", 2012) counties/county equivalents in the United States due to the establishment of Broomfield County, Colorado in 2001 (Miller, 2012).

Presidential vote share data is found from the online Congressional Quarterly Press's Voting and Elections Collection. The two-party vote share only takes into account the total popular vote for the Democratic and Republican parties. Third parties are not included because they do not typically threaten the hegemony of the main two parties with just a few percentage points of the national popular vote in presidential elections. Using the two-party vote share is the standard approach of the literature on this topic.

The change in the unemployment rate at the county level is one of the two main economic independent variables. Unemployment rate data at the county level from 1990 to 2013 were downloaded from the Bureau of Labor Statistics' website. Studying the 1992-2000 elections, Eisenberg and Ketcham (2004) found that interacting unemployment rate change with the incumbency variable in the past year had a statistically significant (at the 10% level) effect. Changes in the unemployment rate in the past two, three, or four years prior to the election had no statistically significant effects on voting (Eisenberg and Ketcham, 2004).

The growth rate of real per capita personal income at the county level is the second main independent economic variable. Per capita personal income by county data from 1969 to 2013 was downloaded from the Bureau of Economic Analysis' website. Per capita personal income was adjusted for inflation by using the Federal Reserve of St. Louis (FRED) national GDP deflator. Eisenberg and Ketcham (2004) found that economic voting based on real per capita personal income growth did not have a statistically significant effect on vote share. Changes in growth of real per capita personal income over the past two, three, and four years, however, all had a statistically significant effect in changing the two-party vote share at the 1% level (Eisenberg and Ketcham, 2004). As seen in Graph 3.3-1, these results are consistent with Fair (1978), which tracked how an increase in real per capita personal income growth increases the two-party vote share of the incumbent party.

**Graph 3.3-1: Weighted Personal Income Growth vs. Share of Two-Party Vote (Re-Election)**




*Source:*

*http://www.brendan-nyhan.com/.a/6a00d83451d25c69e2013483a24f07970c-popup*

Similarly to Eisenberg and Ketcham (2004), I include a few demographic independent variables in my model. These include: percent of blacks (non-Hispanics) and females as part of the total county population. Demographic data for this thesis were downloaded from the Missouri Census Data Center for the years 1992-2011.[5]

While Kramer (1971) established that economic variables had a significant effect on president elections, demographic variables are also important. Mutz and Mondak (1997) note that, "in studies of American political behavior it is axiomatic that groups matter" (Leighley, 2010; 386). These groups can be created from any set of criteria, from race to religion to special interests. As shown by Hibbs, *et al*. (1982), these groups view

[5] I address my adjustment to allow me to run regressions for the 2012 election in my Data Modifications section below.

elections heterogeneously. This means that each group will have a different preference for which party they choose to vote for.

The three main racial/ethnic voting groups in the US over the time period covered by this thesis are: Blacks (Non-Hispanic), Hispanics, and Whites (Non-Hispanic). Non-Hispanic blacks[6] typically vote for the Democratic Party. Polls conducted by the *New York Times* have found that 82% or more of blacks at the national level have supported the Democratic presidential candidate since they began polling blacks as a specific group in 1972 (*New York Times*, 2008). At the county level, the results of these polls are maintained by the findings of Lacombe and Shaughnessy (2007). They observed that an increase in the percentage of blacks in the total county population resulted in a statistically significant decrease in the vote share for the Republican Party (Lacombe and Shaughnessy, 2007). Eisenberg and Ketcham (2004) found that counties with a higher proportion of blacks are more responsive to changes in voting due to changes in real per capita personal income growth.

Gender differences are another noteworthy voting determinant. The Rutgers's Center for American Women and Politics has found that women, as an overall voting group, have historically (from 1984-2014) supported the Democratic Party presidential candidates by a larger proportion than men. In addition, women typically approve the performance of Democratic presidents more favorably than men and vice versa for

[6] To clarify, Hispanics are defined by the Census Bureau as "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race" (US Census Bureau, 2010). This means that non-Hispanics, of any race, are those individuals who are do not have a Hispanic et background. The benefit of using this more specific data is to focus specifically on blacks as a voting group, without those who might consider themselves Hispanic (a definition that can span across racial groups).

Republican presidents (Center for American Women and Politics, "The Gender Gap", 2014). Therefore, one would expect that a county with a higher proportion of women would see an increase in the vote share for the Democratic Party. This hypothesis is supported by Lacombe and Shaughnessy (2007), who find that an increase in the percentage of females with a bachelor's degree will result in an increase in the Democratic Party vote share (Lacombe and Shaughnessy, 2007). Eisenberg and Ketcham (2004) did not include the share of females as a demographic group in their paper.

The reason I choose to include females instead of males in my regression models is due to the importance of females as a voting group in presidential election. Since 1980, the Center for American Women and Politics found that females consistently vote at a higher rate and in greater numbers than males in presidential elections (Center for American Women and Politics, "Gender Differences in Voter Turnout", 2014). Therefore, it seems reasonable to focus on females instead of males as a voting group.

It is worth noting that, when looking more in depth into the gender gap in voting, the Democratic voting tendencies of women is less clear-cut. Breaking down the "gender gap" into a "gender and marital status gap," one finds that 46% of married women, compared to 67% of single women, voted for Obama in 2012[7] (MSNBC, 2012). Taking into account the fact that women typically live longer than men,[8] the growing number of those 65 or over in the U.S.,[9][10] and the fact that married women are more likely to vote

[7] This gap is also seen in the voting tendencies of men, with 38% of married men compared with 67% of single men voting for Obama in 2012. (MSNBC, 2012)
[8] In 2011, there was a ratio of 131 women to 100 men for individuals 65 or over.
[9] The US Department of Health and Human Services predicts individuals over the age of 65 to make up 21% of the population by 2040, compared to 13.3% in 2011 (U.S. Department of Health and Human Services, 2012).

Republican (only 4% of women over 65 in 2012 were never married), one could potentially see an increase in the percentage of women voting Republican in the future. (U.S. Department of Health and Human Services, 2012). However, at the moment, this postulation is based on speculation. Since my data set does not include statistics for the marriage status nor age group of females at the county level, I will not address this caveat in my results.

Polls are imperfect indicators for county level characteristics since all polls mentioned so far are conducted at the national level. It is also possible that there might be inconsistencies in the way that groups view political parties due to sampling bias. For example, while women may strongly support the Democratic Party at the national level, their voting tendencies might not be as strong in certain counties due to specific circumstances such as the local political culture or age. Second, the polls mentioned above do not take into account voter turnout. Some counties might see a greater proportion of supporters of one party voting for their candidate on Election Day while the other party supporters stay at home, regardless of what characteristics define the county. Taken together, all of the polls that support the hypotheses above should be taken as a rough indicator of what to expect, while not being conclusive proof of voting behavior.

[10] Only 44% of individuals 65 or over voted for Obama in 2012 (MSNBC, 2012).

## 3.4 OTHER DATA MODIFICATIONS AND LIMITATIONS

The data set does include some noteworthy modifications. Alaska was eliminated from the set because its boroughs do not align with voting districts. The District of Columbia was also excluded because it does not have counties. Certain independent cities and counties in Virginia were also left out (the list of counties is found in Appendix Figure L) because the Bureau of Economic Analysis' per capita income data combines independent cities that had a population of less than 100,000 in 1980 with a neighboring county. Since estimates for these individual cities/counties are not available, I decided to leave them out instead of scrapping the variable altogether. Thankfully, all of the exclusions mentioned above are of regions with relatively small populations; therefore, one would expect that their exclusion would not have a significant impact on the results from the other 3,049 counties. Unfortunately, the demographic data from the Missouri Census Data Center - including percentage black, percentage female, and total population - only included observations until 2011. Consequently, I duplicated the 2011 data into 2012 as a rough estimate of county level demographic makeup for that year.

## 3.5 SUMMARY STATISTICS

Summary statistics for the election years from 1992-2000 appear in Appendix Figure A, and those for the elections from 2004-2012 are found in Appendix Figure B. The Democratic Party two-vote share for the 1992-2000 presidential elections consists of 9,147 observations with a mean of 46.7%. For the years 2004-2012 elections, there are

9,148 observations with a mean of 40.0%. The change in the unemployment rate for the 1992-2000 elections has 9,345 observations with a mean of -0.05 percentage points, and, for the 2004-2012 elections, there are 9,325 observations with a mean of -0.08 percentage points. The growth in real per capita personal income for the 1992-2000 elections has 9,345 observations with a mean of 4 percentage points, and for the 2004-2012 elections it has 9,325 observations with a mean of 3 percentage points.

There are some noteworthy extraordinary outliers in the data for change in unemployment rate and growth in real per capita personal income. For the 1992-2000 election years, the minimum change in unemployment rate was -13.9 percentage points and the maximum was 12.7 percentage points. For the 2004-2012 election years, the minimum change in unemployment rate was -4.3 percentage points and the maximum was 8.3 percentage points. In the 1992-2000 election years, the minimum growth in real per capita personal income was -85 percentage points and the maximum was 39 percentage points. For the 2004-2012 election years, the minimum growth in real per capita personal income was -48 percentage points and the maximum was 54 percentage points. These figures indicate just how much diversity there is in county level data, which makes an entity and time fixed effects model all the more essential for my regression analysis.

# 4. RESULTS

My results consist of three different parts. First, I replicate the models from Eisenberg and Ketcham (2004) for the 1992-2000 elections, with separate models for county level economic voting and county level economic voting by demographic group. Second, I use the same model for the 2004-2012 elections to test how the results compare with the 1992-2000 elections. Third, I use Okun's Law to identify outliers in the economic data. I then run a similar model to compare my results to the original 1992-2000 elections.

While one might argue that it is redundant to put emphasis on statistical significance at the county level, I want to stress that my model is not looking solely at the population of the county. Instead, I am studying the presidential elections in counties across time, which is why I have time fixed effects (in addition to entity fixed effects). Additionally, data collected at the county level is, by nature, imperfect (including my population data, which is estimated between decennial census years). This means that statistical significance is still relevant, as the data does not perfectly represent the county's characteristics.

## 4.1 1992-2000 ELECTIONS RESULTS

I first run model 3.2-1 for the 1992-2000 presidential elections to compare my results to those of Eisenberg and Ketcham (2004).

**Table 4.1-1: County Level Economic Voting for the 1992-2000 Elections[11]**

| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change |
|---|---|---|
| Incumbent | 3.372*** | |
| | (0.946) | |
| Econ * Incumbent | -0.590 | 0.0224 |
| | (0.808) | (0.0283) |
| Constant | 49.82*** | 46.11*** |
| | (0.458) | (0.0494) |
| Observations | 9,147 | 9,147 |
| $R^2$ | 0.810 | 0.810 |
| Number of Counties | 3,048 | 3,048 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen in Table 4.1-1, neither real per capita personal income growth nor unemployment rate change over the past year has a statistically significant effect on presidential voting. This finding deviates from the results of Eisenberg and Ketcham (2004), who found that unemployment rate change (over the past year) had a statistically significant effect on vote share at the 10% level. The *Econ*Incumbent* coefficients have the same signs as the results of Eisenberg and Ketcham (both positive). The *Incumbent* variable is statistically significant at the 1% level and positive, just like in Eisenberg and Ketcham (2004). It is also worth noting that Eisenberg and Ketcham (2004) had higher regression $R^2$ values in their results (.979 versus .81). These results indicate that, in the elections of 1992-2000, neither growth in real per capita personal income nor unemployment rate changes over the past year had a statistically significant effect on vote shares. These data do not support the idea that the state of the county level economy

[11] Note that the decimal places are different between the real per capita personal income growth and unemployment rate change data (see the Summary Statistics in Appendix Figures A and B). Additionally, I abbreviate real per capita personal income growth to real per capita income growth for the sake of space.

affects the county level presidential vote choice, at least not for the economic variables considered here.

I then run model 3.2-2 for county level economic voting by demographic group for the 1992-2000 elections. These results examine how responsive the county level vote share is due to the percentage of a certain demographic group as part of the total county population.

Two notable differences between my models and Eisenberg and Ketcham's are: I specify the demographic group "black" as black non-Hispanic, thereby removing black Hispanics, and I use the variable female instead of male. The reason I specify black non-Hispanics is to focus specifically on the voting patterns of black voters, and not have the data affected by the voting patterns of those who identify as both black and Hispanic.

**Table 4.1-2: County Level Economic Voting by Demographic Group for the 1992-2000 Elections**

| | Black (Non-Hispanic) | | Female | |
|---|---|---|---|---|
| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change | Real Per Capita Income Growth (%) | Unemployment Rate Change |
| Incumbent | 3.504*** | | 3.489*** | |
| | (1.071) | | (1.090) | |
| % Demographic Group | 0.659*** | 0.659*** | 0.259*** | 0.258*** |
| | (0.0491) | (0.0493) | (0.0589) | (0.0592) |
| Econ * Incumbent | -1.525* | 0.0169 | -36.24** | 0.369 |
| | (0.820) | (0.0335) | (16.68) | (0.645) |
| Econ * Incumbent * % Demographic Group | 0.463*** | -0.000347 | 0.712** | -0.00680 |
| | (0.0584) | (0.00147) | (0.332) | (0.0127) |
| Constant | 46.05*** | 39.92*** | 37.72*** | 33.45*** |
| | (0.729) | (0.427) | (3.070) | (3.001) |
| Observations | 9,072 | 9,072 | 9,072 | 9,072 |
| $R^2$ | 0.819 | 0.817 | 0.812 | 0.812 |
| Number of Counties | 3,023 | 3,023 | 3,023 | 3,023 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen above, *Incumbent* and *% Demographic Group* are statistically significant variables at the 1% level across all four models. This is similar to the results of Eisenberg and Ketcham (2004). Unlike the results of Eisenberg and Ketcham (2004), the black non-Hispanic model finds *Econ*Incumbent* for real per capita personal income growth to be statistically significant at the 10% level with a negative coefficient.

Similarly to Eisenberg and Ketcham (2004), *Econ*Incumbent*% Demographic Group* results for the black non-Hispanic real per capita personal income growth model is found to have a statistically significant at the 1% level (instead of the 5% level), meaning

that counties with higher proportions of black residents will experience a greater change in voting behavior due to changes in county-level real per capita personal income growth. Unemployment rate change is not found to have a statistically significant effect on voting for black non-Hispanics at the county level, which is similar to the results of Eisenberg and Ketcham (2004).

While the results for females cannot be perfectly compared to Eisenberg and Ketcham (2004), they indicate that both *Econ*Incumbent* and *Econ*Incumbent*% Demographic Group* for real per capita personal income growth to have a statistically significant on vote share at the 5% level. Counties with higher proportions of females will experience a greater change in their voting behavior because of changes in the county-level real per capita income growth. Unemployment rate change is not found to have a statistically significant effect on voting for females at the county level. This observation is similar to the results for males of Eisenberg and Ketcham (2004).

It is difficult to postulate why exactly the results from this model differ from Eisenberg and Ketcham (2004). Most likely, it is due to differences in data. While both data sets drew the unemployment numbers from the Bureau of Labor Statistics, there are noteworthy differences in how Eisenberg and Ketcham created their real per capita income growth data when compared with my equivalent variable. According to Eisenberg and Ketcham, "real income and real disposable income is constructed using personal income, personal disposable income, and the Consumer Price Index from the Bureau of Economic Analysis, and is measured on a per capita basis using Census population data" (Eisenberg and Ketcham, 2004; 4). In contrast, my data for growth of real per capita

personal income came from per capita personal income data from the Bureau of Economic Analysis, and was adjusted for inflation using the national GDP deflator from the Federal Reserve Bank of St. Louis. In addition, Eisenberg and Ketcham run their model for real per capita personal income growth for the election years between 1972-2000, instead of 1992-2000 (although their unemployment rate change regression only ran from 1992-2000, due to county-level unemployment rate data being available from 1990 onwards). The reason I chose to run my model for real per capita personal income growth for 1992-2000 was to allow for more accurate comparison between the election years of 1992-2000 and 2004-2012.

## 4.2 2004-2012 ELECTIONS RESULTS

The first set of results, as seen in Table 4.2-1, replicate the first model but for the 2004-2012 elections years.

**Table 4.2-1: County Level Economic Voting for the 2004-2012 Elections**

| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change |
|---|---|---|
| Incumbent | 7.783*** | |
| | (0.991) | |
| Econ * Incumbent | -0.0238 | -0.0479 |
| | (0.818) | (0.0660) |
| Constant | 33.39*** | 39.43*** |
| | (0.738) | (0.0627) |
| Observations | 9,148 | 9,148 |
| $R^2$ | 0.530 | 0.530 |
| Number of Counties | 3,049 | 3,049 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen above, neither the real per capita personal income growth or unemployment rate change over the past year has a statistically significant effect on presidential voting. These results are similar to those in Table 4.1-1. Note that the *Econ*Incumbent* coefficients do not share the same signs as the results of Eisenberg and Ketcham (2004) and Table 4.1-1, as they are negative.[12] The Incumbent variable is statistically significant at the 1% level and positive, just like in Table 4.1-1 and Eisenberg and Ketcham (2004). Note that the regression $R^2$ value drops from 81% to 53% for the 2004-2012 elections, meaning that the same model accounts for less of the variation in vote share for these elections. It is unclear why this value drops so much, but, presumably, there are some omitted variables that either appeared or became more important in the 2004-2012 elections.

The second set of results, as seen in Table 4.2-2, replicates the model of county level economic voting by demographic group for the elections years of 2004-2012.

[12] Since the variables are not statistically significant, it is a moot point to explain this sign change.

**Table 4.2-2: County Level Economic Voting by Demographic Group for the 2004-2012 Elections**

| | Black (Non-Hispanic) | | Female | |
|---|---|---|---|---|
| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change | Real Per Capita Income Growth (%) | Unemployment Rate Change |
| Incumbent | -0.487 | | -1.335 | |
| | (1.133) | | (1.146) | |
| % Demographic Group | 0.527*** | 0.501*** | 0.151** | 0.109* |
| | (0.0506) | (0.0505) | (0.0623) | (0.0633) |
| Econ * Incumbent | -1.530* | 0.256*** | -17.00 | 2.862*** |
| | (0.858) | (0.0722) | (13.75) | (0.854) |
| Econ * Incumbent * % Demographic Group | 0.368*** | -0.0264*** | 0.346 | -0.0577*** |
| | (0.0568) | (0.00274) | (0.277) | (0.0169) |
| Constant | 34.48*** | 35.31*** | 32.34*** | 33.80*** |
| | (0.916) | (0.451) | (3.229) | (3.176) |
| Observations | 9,073 | 9,073 | 9,073 | 9,073 |
| $R^2$ | 0.540 | 0.544 | 0.529 | 0.530 |
| Number of Counties | 3,024 | 3,024 | 3,024 | 3,024 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note that *Incumbent* is not statistically significant for either demographic group in the real per capita personal income growth model. *% Demographic group* is statistically significant for each black non-Hispanic model at the 1% level, just like in Table 4.1-2. The same variable carries a statistically significant coefficient in both female models, but at lower levels (5% level for real per capita personal income growth and 10% level for unemployment rate change). *Econ*Incumbent* is statistically significant for both black non-Hispanic models, unlike in 1992-2000 when the same variable was only statistically significant for the real per capita personal income growth model. *Econ*Incumbent* is only statistically significant for the unemployment rate change model for females, unlike

in 1992-2000 when the same variable was only statistically significant for the real per capita personal income growth model.

The above results find *Econ*Incumbent*% Demographic Group* for the real per capita personal income growth model to be statistically significant for black non-Hispanics at the 1% level, just as in the 1992-2000 elections. Counties with higher proportions of black residents will experience a greater change in voting behavior due to changes in county-level real per capita personal income growth. Unemployment rate change has a statistically significant effect, and a negative coefficient, on voting for black non-Hispanics at the county level, which is different to the results of Eisenberg and Ketcham (2004) and my own results for the 1992-2000 elections. Since this data set covers two elections when the incumbent was a Republican, it is unclear why this coefficient changed sign. As explained by Fair (1978) in the literature review (section 2.1), it would be understandable if the coefficient changed sign due to the Great Recession, but only if there was a Democrat incumbent.

For the 2004-2012 elections, *Econ*Incumbent*% Demographic Group* for the real per capita personal income growth model is not found to be statistically significant for females. This contradicts the results from the 1992-2000 elections, which found the same variable to be statistically significant at the 1% level. *Econ*Incumbent*% Demographic Group* for the unemployment rate change model is found to be statistically significant for females at the 1% level. This indicates that counties with higher proportions of females will experience a greater change in voting behavior due to changes in the unemployment rate at the county level. In contrast, for the 1992-2000

elections, the same variable was not statistically significant. It is possible that this change in voting responsiveness might be due to the Great Recession. As primary caretakers of the homes of the majority of the population, (Council of Economic Advisers) females would seem likely to have a greater change in their voting behavior in response to their spouse becoming unemployed due to the recession.[13] This data set covers two elections when the incumbent was a Republican, so it is unclear if the after-effects of the Great Recession are the only reason why the coefficient changed signs.

Note that the regression $R^2$ value drops from around 81% in Table 4.1-2 to around 54% for the 2004-2012 elections (in Table 4.2-2), meaning that the same model accounts for less of the change in vote share for these elections. It is unclear why this value drops so drastically, but there might be some omitted variables that are not being captured in the model that either appeared or became more important in the 2004-2012 elections.

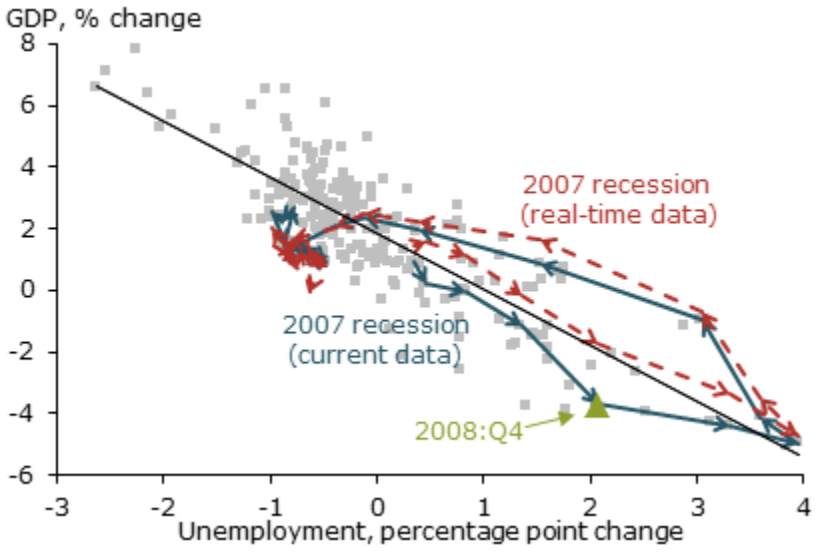
## 4.3 OKUN'S LAW AT THE COUNTY LEVEL

As discussed previously, working with county data brings a whole host of problems due to the differing economic conditions of each county. These conditions require not only the creation of a fixed effects regression model, but also create an opportunity to study the effects these outliers have on regression model results.

[13] Even if the female population is older in certain counties, I postulate that the negative effect of a spouse becoming unemployed would persist. As I mentioned in my methodology section, only 4% of women 65 or over have never been married. It is unlikely that a large percentage of women get married after they're 40, so one can still expect the majority of "older" women (even if we bring down the age to 40) to experience a negative effect from a spouse becoming unemployed.

I will use Okun's law here to act as a check for the robustness of my results. Okun's Law tells us to expect a consistent relationship between growth of real GDP and the change in the unemployment rate. Okun's Law has been strongly supported by historical economic data in the US. As seen in Graph 4.3-1, this relationship continued to hold at the US national level even during the Great Recession as a decrease in growth of real GDP resulted in an increase in the change in unemployment the rate. Given that the regression $R^2$ at the national level is typically of the order of 75%, which is quite strong given that the LHS variable is in changes and not levels, we would expect the relationship to hold for the county level data set. If it does not, then this could be taken as an indicator of some sort of data inconsistencies.

**Graph 4.3-1: Okun's Law as observed during the Great Recession (Daly et. al., 2014)**




As seen in Graph 4.3-2 and Table 4.3-1 (Test 1), this relationship does not hold true at the county level across the 1992-2012 election years. This is because there are some notable outliers in the data. For example, the data set contains a cluster of counties

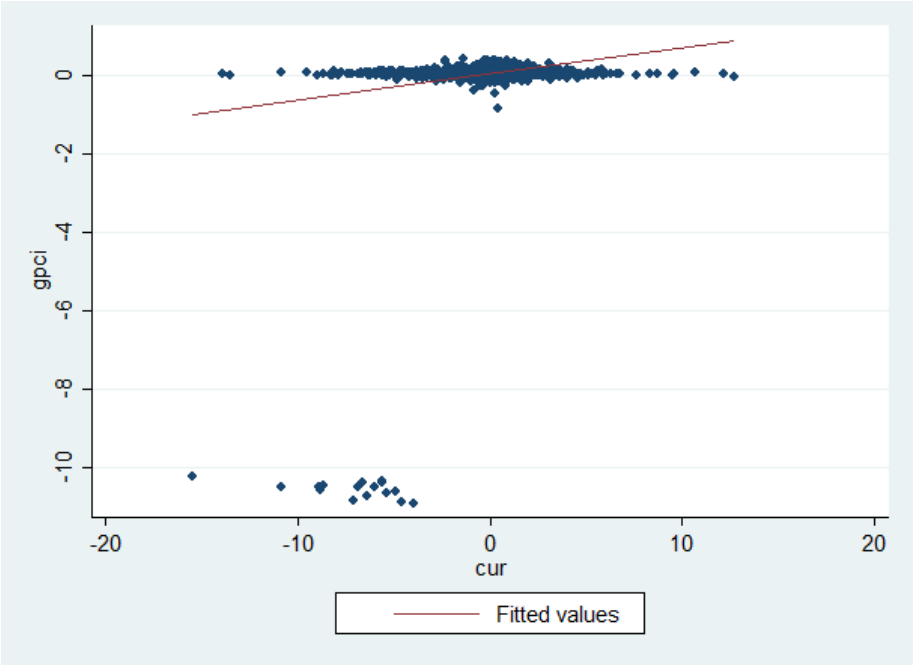
that experienced negative growth in real per capita personal income of more than 10 percentage points *and* a decrease in the unemployment of around 10 percentage points. Clearly, these counties were going through hard economic times and their specific county characteristics meant that their economic downturn had a dramatic effect on the county's economic indicators. To go back to the example of Arthur County, NE, this county experienced an extraordinary decline in growth of real per capita personal income from 1995 to 1996 of -85 percentage points**.** While I was unable to discover the source of this decline due to lack of information on the county's happenings in 1996 available online, one can hypothesize, for example, that a change in the crop yield of a county with around 430 people (at the time) would have a great effect on the real per capita personal income of those living there. However, there are many other possibilities, including sampling errors for the unemployment rate.

**Table 4.3-1: Output of Regressions Testing Okun's Law at the County Level for the 1992-2000 Elections**

| VARIABLES | Test 1<br>Growth in Per Capita Income | Test 2<br>Growth in Per Capita Income (Big Population Counties) | Test 3<br>Growth in Per Capita Income (Without Outliers) |
|---|---|---|---|
| Change in Unemployment Rate | 0.0662***<br>(0.00316) | | |
| Change in Unemployment Rate (Big Population Counties) | | 0.0971***<br>(0.00900) | |
| Change in Unemployment Rate (Without Outliers) | | | -0.000382<br>(0.000252) |
| Constant | 0.0235***<br>(0.00442) | 0.0155<br>(0.0110) | 0.0313***<br>(0.000298) |
| Observations | 9,444 | 1,612 | 8,715 |
| R-squared | 0.044 | 0.067 | 0.000 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Graph 4.3-2: *gpci* vs. *cur* at the County Level for the Election Years 1992-2000**



Consequently, I change the sample period to see if the county data would support Okun's Law.

The first variable I generate is *bigcounty* and, subsequently, the economic variables *biggpci* and *bigcur*. The variable *bigcounty* represents a binary variable that equals 1 if the total population of the county is greater than or equal to 100,000 persons and 0 otherwise. The variables *biggpci* and *bigcur* denote the *gpci* and *cur* of counties with a population greater than or equal to 100,000 persons. Table 4.3-2 shows the number of observations of *bigcounty* for the election years studied. Population data is gathered from the Missouri Census Data Center[14]. Note that 500 counties are roughly 16% of 3,050 total counties.

**Table 4.3-2: *bigcounty* Observations Across Election Years**

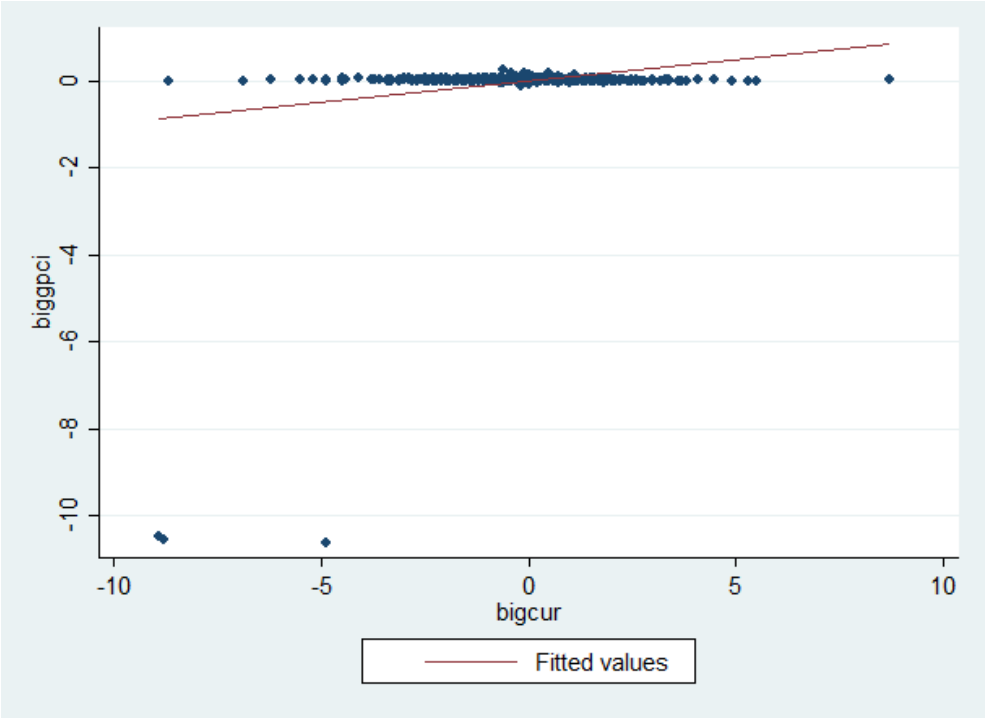
| Election Year | *bigcounty* Observations |
|---|---|
| 1992 | 484 |
| 1996 | 513 |
| 2000 | 530 |
| 2004 | 550 |
| 2008 | 572 |
| 2012 | 583 |

When controlling for *bigcounty*, as seen in Table 4.3-1 (Test 1), one still finds that there is a relationship between is positive, albeit very small, between growth in *biggpci*

[14] Since the county-level population estimates were only available until 2011, I replaced the missing 2012 data with the 2011 data. Of course, this is an imperfect fix, but it should not have a disastrous effect on the number of counties that might have otherwise passed the *bigcounty* population threshold between 2011 and 2012.

and *bigcur* for the election years from 1992-2000. This is because, as seen in Graph 4.3-3, there are some outliers in the data set that experienced growth in real per capita of less than -10 percentage points.

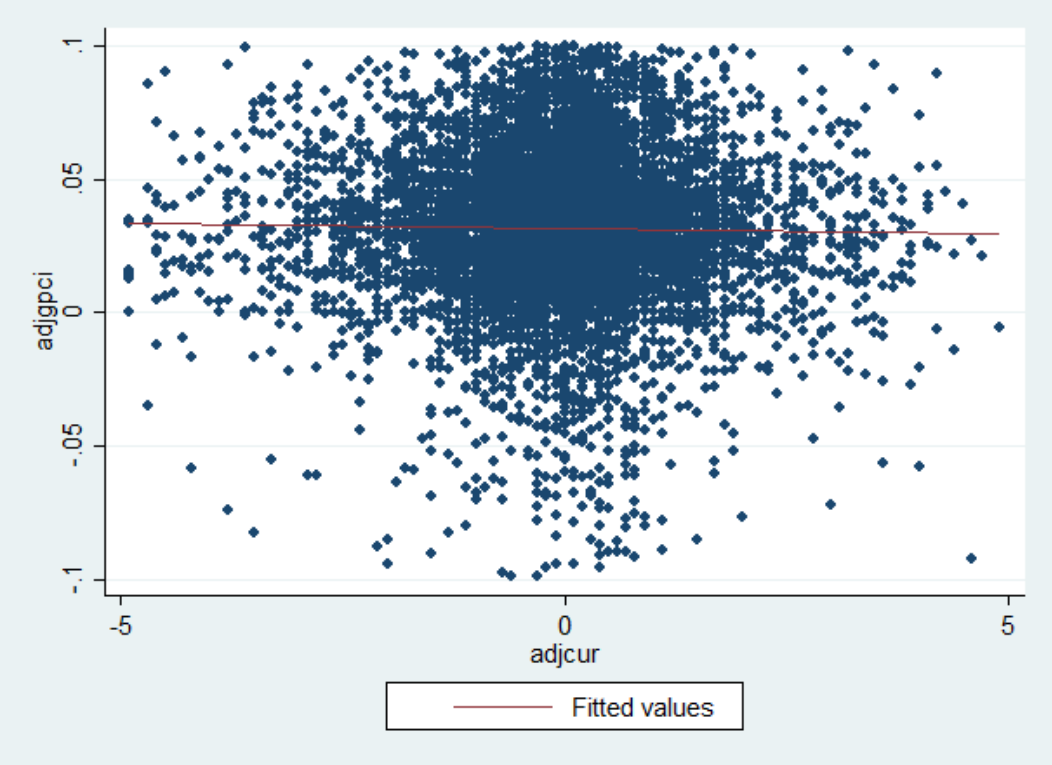
**Graph 4.3-3: *biggpci* vs. *bigcur* for the 1992-2000 Election Years**




These results indicate that Okun's Law does not hold true for counties with a population of greater than or equal to 100,000 because extraordinary outliers affect the regression results.

Because of the above results, I also created two variables that specifically took out outliers in both *gpci* and *cur*, regardless of population size. The variable *adjgpci* denotes *gpci* of greater than -10% and smaller than 10%. The variable *adjcur* denotes *cur* of greater than -5% and smaller than 5%. Graph 4.3-4 and Table 4.3-1 (Test 3) show that, when extraordinary outliers are taken out, Okun's Law fits with county-level data.

**Graph 4.3-4: *adjgpci* vs. *adjcur* for the Election Years 1992-2000**




When controlling for specific outliers, regardless of county population size, as seen in Table 4.3-1 and Graph 4.3-4, one finds that the relationship between growth in *adjgpci* and *adjcur* is negative for the elections year between 1992-2000. These results are in line with Okun's Law, and, subsequently, prove that it holds true when one takes out extraordinary county outliers.

Results for how Okun's Law holds for the election years 2004-2012 and 1992-2012 can be found in Appendix Figures E-K.

## 4.4 1992-2000 ELECTIONS RESULTS WHILE CONTROLLING FOR OUTLIERS

Using the adjusted variables that are consistent with Okun's law, *adjgpci* and *adjcur*, I run the same model as in the first set of results for the 1992-2000 to see how they compare. While the original model does control for entity fixed-effects, taking out outliers allows one to truly see if, and to what extent, it controls for all the extraordinary outliers that make the unadjusted county level data run contrary to Okun's Law.

**Table 4.4-1: Adjusted County Level Economic Voting for the 1992-2000 Elections**

| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change |
|---|---|---|
| Incumbent | 3.369*** | |
| | (0.945) | |
| Econ*Incumbent | -0.139 | 0.0404 |
| | (1.474) | (0.0337) |
| Constant | 50.02*** | 46.79*** |
| | (0.227) | (0.0508) |
| Observations | 8,530 | 9,052 |
| $R^2$ | 0.807 | 0.809 |
| Number of Counties | 3,023 | 3,048 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen above in Table 4.4-1, after adjusting for extraordinary outliers, the results are very similar to those in Table 4.1-1 for the 1992-2000 elections with respect to both which variables are statistically significant are the signs for each coefficient. Most of the coefficients are virtually unchanged when compared to those in the previous regressions result. Note that adjusting for outliers removes only 25 counties for the real per capita personal income growth model, and none for the unemployment rate change model.

There are, however, fewer observations in both models, meaning that some counties experienced extraordinary growth in per capita personal income or unemployment rate change during certain election year(s). Removing outliers has no noticeable effect on the regression models' $R^2$ value, indicating that the model continues to account for around 81% in the variation in Democratic vote share.

**Table 4.4-2: Adjusted County Level Economic Voting by Demographic Group for the 1992-2000 Elections**

| | Black (Non-Hispanic) | | Female | |
|---|---|---|---|---|
| VARIABLES | Real Per Capita Income Growth (%) | Unemployment Rate Change | Real Per Capita Income Growth (%) | Unemployment Rate Change |
| Incumbent | 3.505*** | | 3.493*** | |
| | (1.064) | | (1.088) | |
| % Demographic Group | 0.708*** | 0.663*** | 0.280*** | 0.258*** |
| | (0.0508) | (0.0494) | (0.0651) | (0.0600) |
| Econ * Incumbent | -2.676* | 0.0324 | -87.01*** | 0.366 |
| | (0.820) | (0.0398) | (25.55) | (0.763) |
| Econ * Incumbent * % Demographic Group | 0.587*** | -0.000333 | 1.717*** | -0.00636 |
| | (0.0720) | (0.00180) | (0.506) | (0.0151) |
| Constant | 43.38*** | 40.26*** | 34.60*** | 31.29*** |
| | (0.475) | (0.422) | (3.308) | (3.032) |
| Observations | 8,458 | 8,978 | 8,458 | 8,978 |
| $R^2$ | 0.817 | 0.815 | 0.809 | 0.810 |
| Number of Counties | 2,998 | 3,023 | 2,998 | 3,023 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The second set of results in Table 4.4-2 are similar to those in the results from the previous model in Table 4.1-2. One noteworthy difference is that the coefficient for *Econ*Incumbent* for the real per capita personal income growth model for females more than doubles and becomes statistically significant at the 1% level instead of the 5% level.

There is a similar effect on the coefficient for *Econ*Incumbent*% Demographic Group*. When one controls for outliers, counties will higher proportions of female residents will have an even greater change in voting behavior as a result of growth in real per capita personal income. The change in number of counties is found to be the same as in the adjusted economic-only model. The number of observations, however, does decrease when compared to the adjusted economic-only model in Table 4.4-1. This is most likely due to a smaller number of observations for the demographic data. Note that taking out outliers does not have a noticeable effect on the models' regression $R^2$ value, indicating that the model continues to account for around 81% in the variation in Democratic vote share.

Taken together, one finds that, unless one is looking at the responsiveness of the presidential vote share in counties with higher proportions of females to growth in real per capita personal income, removing outliers does not have a noticeable effect on the results of the original model.

# 5. CONCLUSION

The goal of this thesis was to study if local economic conditions affect county level presidential voting. Building off the work of Eisenberg and Ketcham (2004), I used an entity fixed effects regression model to look at the effects of county level economic conditions on Democratic Party county level vote share in the election years of 1992-2000 and 2004-2012. In my results, I observed that neither growth in real per capita personal income nor unemployment rate change over the past has a statistically significant effect on county level voting. These findings run contrary to the results of Eisenberg and Ketcham (2004), which found that unemployment rate change over the past year had a statistically significant effect on voting for the election years of 1992-2000.

I also adjusted the same model to study economic voting at the county level by demographic group. Like Eisenberg and Ketcham, I observed that counties, for both the 1992-2000 and 2004-2012 elections, with a higher proportion of black (non-Hispanic) residents will have a greater responsiveness in voting behavior to changes in the growth of real per capita personal income. In the 2004-2012, I also found that counties with higher proportions of black (non-Hispanic) residents would display a greater responsiveness in voting behavior to county level unemployment rate change. I discovered that counties, for both the 1992-2000 elections, with a higher proportion of female residents will have a greater responsiveness in voting behavior to changes in the growth of real per capita personal income. In the 2004-2012, I found that counties with higher proportions of female residents will have a greater responsiveness in voting

behavior to changes in the unemployment rate. It is unclear why, unlike Eisenberg and Ketcham (2004), I observed economic voting by demographic group to be affected at a statistically significant level by unemployment rate change in the 2004-2012 elections. Clearly, there must have been some change in counties for these elections that caused the signs and statistical significances to change. But without further research, it is difficult to say exactly what caused this changed.

Finally, I adjusted my data to remove outliers in county level economic conditions that cause the data to give results contrary to Okun's Law for the election years of 1992-2000. However, once adjusted, the only change to be an increase in the responsiveness in voting behavior to changes in the growth of real per capita personal income for females. So, for the most part, the original model controls for the majority of outliers for the county level economic conditions.

All in all, these results indicate that the local economy does *not* matter in US elections. Nevertheless, the extent to which demographic groups react to changes in economic conditions does have a significant effect on voting at the county level. I would recommend that further research be done to replicate the results of Eisenberg and Ketcham (2004) that compared the economic effects of national, state, and county level conditions on county level voting to investigate which level of analysis has the greatest impact vis-à-vis the others. Future studies should also consider the voting gaps not just between genders, but also within genders according to marital status and age. This area of research is especially topical considering the correlation present between gender and age distribution. Additionally, county level economic variables, such as housing prices,

would provide an interesting addition for future county level presidential voting research. However, as of now, it seems as if, at the county level, it's "the demography, stupid."

# APPENDIX

**Figure A: Summary Statistics for 1992-2000 Elections**

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| psv | 9147 | 46.74 | 12.40 | 6.88 | 89.3 |
| cur | 9345 | -0.05 | 1.36 | -13.9 | 12.7 |
| gpci | 9345 | 0.04 | .05 | -0.85 | 0.39 |
| pctblacknh | 9250 | 8.69 | 14.44 | 0 | 86.6 |
| pctfemale | 9250 | 50.66 | 1.84 | 3.7 | 57.5 |
| total | 9250 | 86176 | 283454 | 64 | 9542578 |
| bigcounty | 6756 | - | - | - | - |
| biggpci | 1584 | 0.03 | 0.02 | -0.1 | 0.26 |
| bigcur | 1584 | -0.04 | 1.17 | -8.7 | 8.7 |
| adjgpci | 8728 | .03 | .03 | -.10 | .10 |
| adjcur | 9249 | -0.03 | 1.17 | -4.9 | 4.9 |

**Figure B: Summary Statistics for 2004-2012 Elections**

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| psv | 9148 | 39.97 | 13.93 | 3.47 | 93.98 |
| cur | 9325 | -0.08 | 1.04 | -4.3 | 8.3 |
| gpci | 9325 | 0.03 | 0.05 | -0.48 | 0.54 |
| pctblacknh | 9230 | 9.11 | 14.34 | 0 | 85.7 |
| pctfemale | 9230 | 50.19 | 2.10 | 25.1 | 57.7 |
| total | 9320 | 96908 | 312938 | 40 | 9885201 |
| bigcounty | 6806 | - | - | - | - |
| biggpci | 1760 | 0.02 | 0.03 | -0.15 | 0.27 |
| bigcur | 1760 | -.01 | 1.09 | -4.3 | 6.2 |
| adjgpci | 8695 | 0.02 | 0.03 | -0.10 | 0.10 |
| adjcur | 9320 | -0.09 | 1.02 | -4.3 | 4.6 |

**Figure C: Variable Abbreviation Definitions**

| Variable Name | Definition |
|---|---|
| *psv* | National two-party vote share for the Democratic Party |
| *cur* | Unemployment rate change over the past year |
| *gpci* | Growth in real per capita personal income over the past year |
| *incumbent* | Incumbent party: 1 if Democrat, -1 if Repbulican |
| *pctblacknh* | Black non-Hispanics as a percentage of the total population |
| *pctfemale* | Females as a percentage of the total population |
| *total* | Total population |
| *bigcounty* | County with population greater than or equal to 100,000 persons |
| *biggpci* | gpci restricted to counties with population greater than or equal to 100,00 person |
| *bigcur* | cur restricted to counties with population greater than or equal to 100,00 person |
| *adjcur* | cur if <= 5 or >= -5 |
| *adjgpci* | gpci if <= .10 or >=- -.10 |

**Figure D: Output of Regressions Testing Okun's Law at the County Level for the Election Years 1992-2012**

| VARIABLES | (1)<br>gpci | (2)<br>biggpci | (3)<br>adjgpci |
|---|---|---|---|
| cur | -0.000183 | | |
| | (0.000503) | | |
| bigcur | | -0.00592*** | |
| | | (0.000528) | |
| adjcur | | | -0.000952*** |
| | | | (0.000314) |
| Constant | 0.0272*** | 0.0151*** | 0.0218*** |
| | (0.000521) | (0.000573) | (0.000326) |
| Observations | 9,423 | 1,789 | 8,788 |
| R-squared | 0.000 | 0.066 | 0.001 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Figure E: *gpci* vs *cur* for the Election Years 2004-2012**

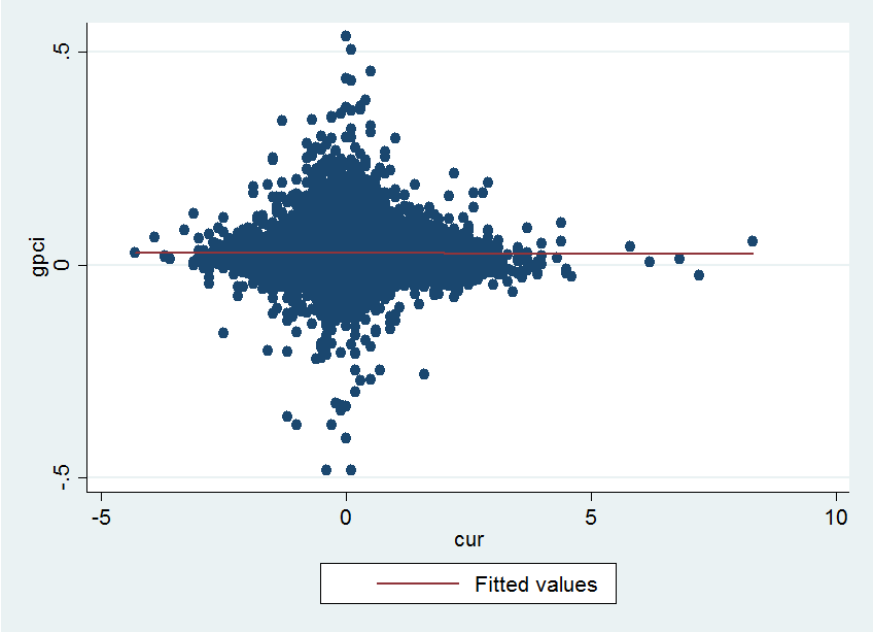


**Figure F: *biggpci* vs. *bigcur* for the Election Years 2004-2012**

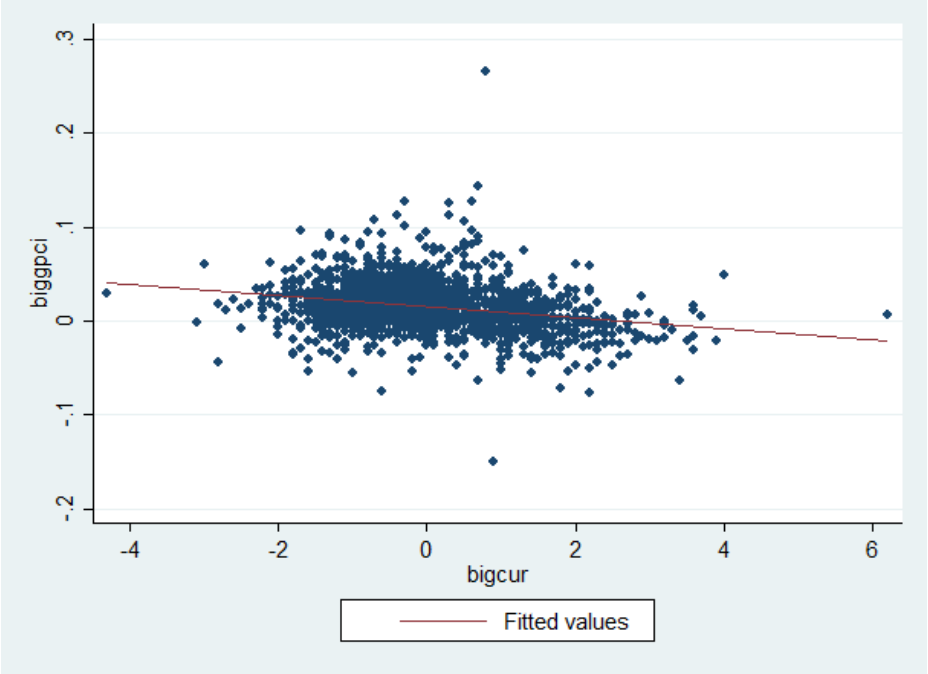



**Figure G: *adjgpci* vs. *adjcur* for the Election Years 2004-2012**

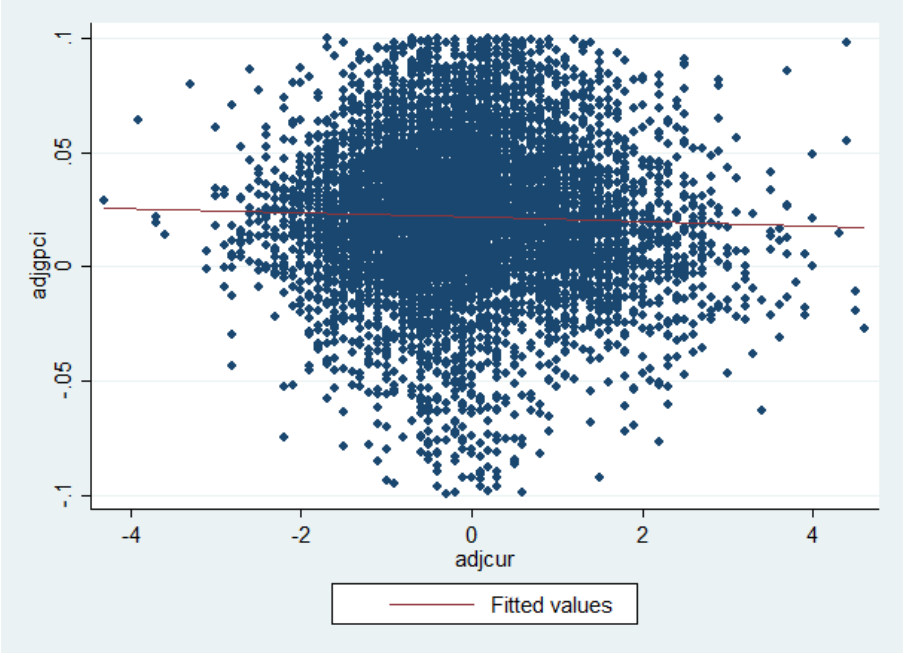


**Figure H: Output of Regressions Testing Okun's Law at the County Level for the Election Years 1992-2012**

| VARIABLES | (1)<br>gpci | (2)<br>biggpci | (3)<br>adjgpci |
|---|---|---|---|
| cur | 0.0427***<br>(0.00182) | | |
| bigcur | | 0.0490***<br>(0.00462) | |
| adjcur | | | -0.000519***<br>(0.000201) |
| Constant | 0.0264***<br>(0.00225) | 0.0145***<br>(0.00532) | 0.0266***<br>(0.000224) |
| Observations | 18,867 | 3,401 | 17,503 |
| R-squared | 0.028 | 0.032 | 0.000 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Figure I: *gpci* vs. *cur* for the Election Years 1992-2012**

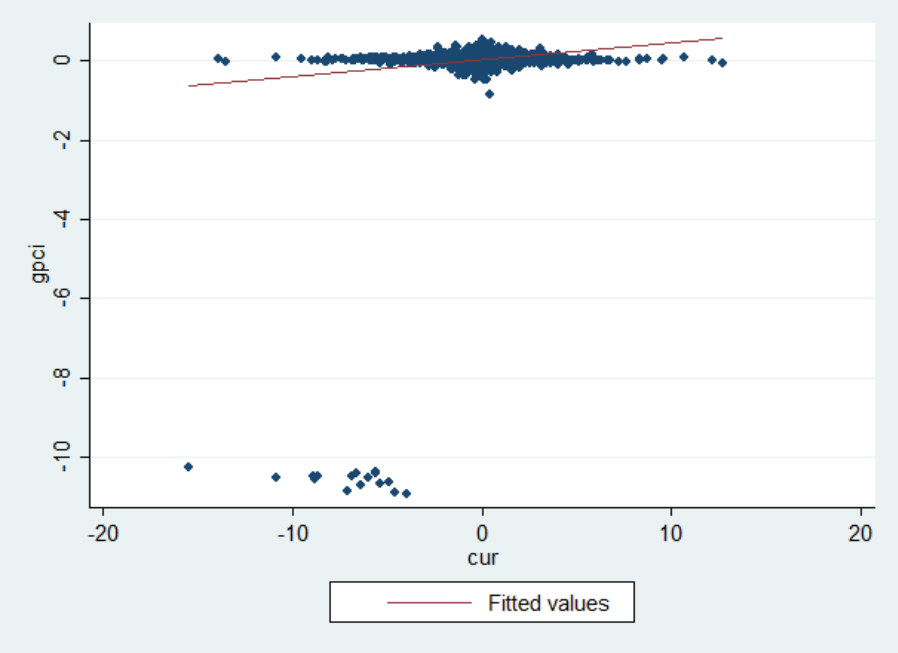


**Figure J: biggpci vs. bigcur for the Election Years 1992-2012**

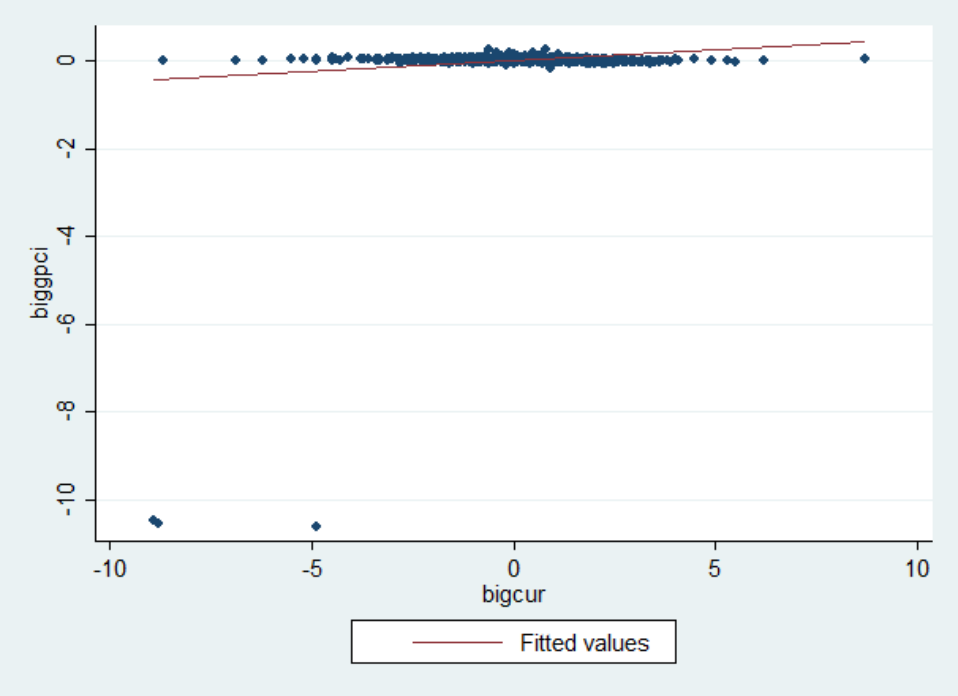



**Figure K: *adjgpci* vs. *adjcur* for the Election Years 1992-2012**

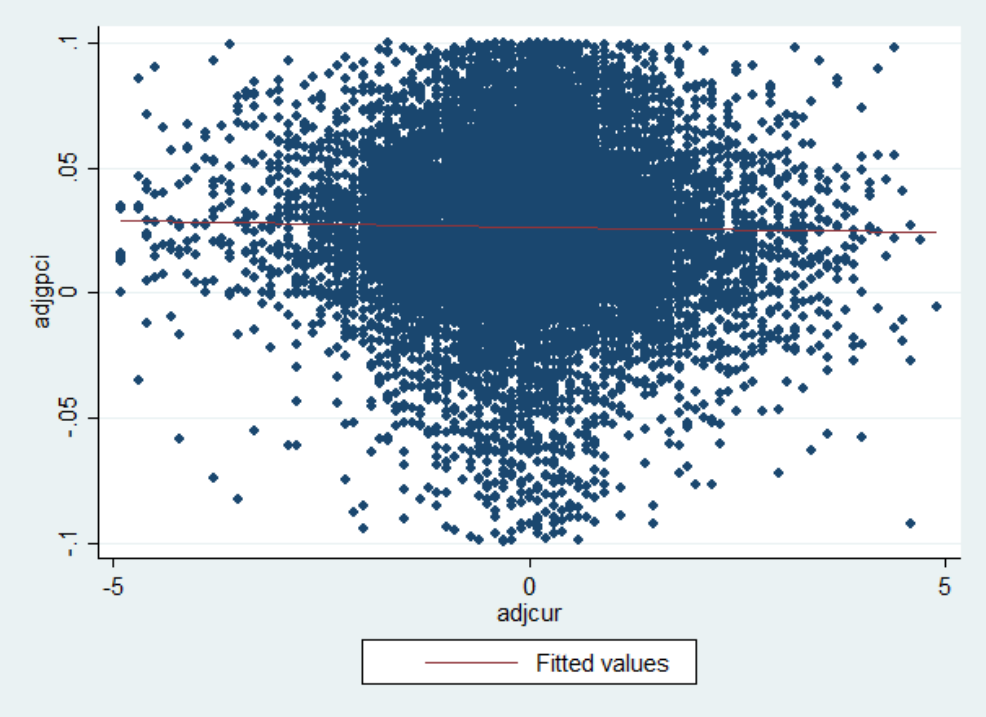


**Figure L: List of Missing Counties/County Equivalents (VA unless otherwise noted)**

| | | | | | |
|---|---|---|---|---|---|
| Albermarle | Alleghany | Augusta | Bedford | Bedford city | Bristol city |
| Buena Vista city | Campbell | Carroll | Charlottesville | Clifton Forge city | Colonial Heights city |
| Covington city | Danville city | Dinwiddie | Emporia city | Fairfax | Fairfax city |
| Falls Church city | Franklin city | Frederick | Fredericksburg city | Galax city | Greensville |
| Harrisonburg city | Henry | Hopewell city | James City | Lexington city | Lynchburg city |
| Manassas Park city | Manassas city | Martinsville city | Montgomery | Norton city | Petersburg city |
| Pittsylvania | Poquoson city | Prince George | Prince William | Radford city | Roanoke |
| Rockbridge | Rockingham | Salem city | South Boston city | Southampton | Spotsylvania |
| Staunton city | Washington | Waynesboro city | Williamsburg city | Winchester city | Wise |
| York | Abbeville (SC) | | | | |

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