Education Funding in the Great Recession: 
An Analysis of Virginia’s School Divisions from FY 2007-2009

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Abstract

The economic crisis that swept the nation from 2007-2009 drastically altered budgetary directives at all levels of government. Especially impacted was education spending, as it is dependent upon a combination of federal, state, and local funding. Though it fared better than most of the nation, the Commonwealth of Virginia stands on the brink of fiscal crisis after the 2009 federal ARRA stimulus money dries up. In order to avoid this fiscal disaster, it is necessary to fully understand the forces that shape budgetary expenditures for Virginia’s 134 school divisions. This paper utilizes a regression analysis of Virginia’s school divisions from 2007-2009 in order to determine the impact of interest group advocacy and fiscal stress upon spending. The results indicate that elderly populations and unemployment rates have the greatest impact upon per pupil spending and federal, state, and local contributions to this total, though the multiplicative impact of these variables is still unclear.

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Introduction

Periods of fiscal stress often force policy makers to confront the difficult task of assigning precedence to a spectrum of priorities through funding choices. During the “Great Recession” of 2007-2009, states found themselves between a rock and a hard place, forced to continuously slash increasingly strained budgets. Virginia was no different. The resources that the state allocated to fund K-12 education programs and subsequent designations in district budgets reflected the educational priorities of those tasked with crafting and implementing educational policy. Those programs remaining after difficult decisions have been made naturally reflect the pressures of key interests in the educational policy process.

Especially relevant are these budget cuts made in a climate of fiscal scarcity and uncertainty. What internal and external forces influence Virginia school divisions’ budgetary decisions during periods of economic distress? A study that measures the extent to which key political constituencies influence division budget priorities during times of fiscal stress is a useful approach for answering this question. The proliferation and growing influence of interest groups upon this process coupled with federal stimulus efforts to plug economic leaks present an interesting and relevant lens to study this topic. The state of Virginia is a compelling subject for such a study in light of its financial history and current heterogeneous political and demographic composition.

The economic crisis that swept the nation from 2007-2009 drastically altered budgetary directives at all levels of government. During the course of the recession, education spending was especially impacted, with unprecedented cuts made to programs across the board. Attempting to forestall further havoc of the recession, Congress passed The American Recovery and Reinvestment Act on February 13, 2009, and President Obama signed it into law four days later (Recovery.gov, 2010). While the aid that this federal spending provided was able to stave
off fiscal disaster by funneling federal monies directly to local school districts, the stimulus is best characterized as a temporary fix that will run out after the 2010-2011 school year. Once the external effects of federal money are no longer felt in school districts, many predict that the subsequent state budgetary shortfalls will amount to a “fiscal tsunami” or “A train wreck about to happen” (Guthrie & Peng, 2010, p.19; Regimbal, 2009, p.1). The impending crisis demonstrates the vital importance of realizing potential efficiencies within school districts in order to best negotiate the uncertain fiscal path ahead. In order to determine these efficiencies in light of external economic conditions, it is necessary to first examine the internal forces in play within states and school districts that shape budgetary priorities.

The demographics of particular school divisions have the potential to influence the ways in which resources of that locality are distributed. Because education expenditures comprise a sizeable piece of local government spending for most school divisions, it stands to reason that the constituencies of that locality would be more intimately connected to the allocation of those funds. It has been suggested that demographic changes have a significant impact on government spending where age is involved (Preston, 1984) and that local education spending is in fact subject to greater influence by interested parties (Miller, 1996, p.183). Virginia is a fascinating subject to observe this potential effect, in light of the fact that it has “not granted fiscal independence to local school boards” but instead vests “full fiscal control in the county and independent city governing bodies” meaning that “local school boards, whether elected or appointed, are required to submit annually their budgets for approval to their respective local governing bodies” (Salmon, 2009, p.150). This governing dynamic places education spending in a broader public context, thereby creating a more obvious focus for constituency attention and action.
Virginia’s education finance history also makes the state an especially compelling subject of inquiry, particularly during the current economic recession. The present system’s current fiscal strain reflects vestiges of Virginia’s Southern heritage, which in its heyday was marked by sharp funding divisions among localities shaped by an “inadequate foundation base, variations in local fiscal capacity and tax effort…and the parallel system of public schools that provided fewer resources for black children” (Salmon, 2009, p.148). While alterations to the funding regime in the 1960’s and 1970’s produced a more equitable and stable result, the current economic downturn has resulted in an overreliance federal stimulus dollars (Salmon, 2009, p.161). Thus, the state’s overreliance on “one-time” funding coupled with a meager fiscal effort for education overall has created an uncertain fiscal future for Virginia’s school districts once federal funding runs dry.

Theory

This paper integrates theories of agenda setting, education finance, and economics to develop a lens for analyzing the internal and external forces that influence Virginia school divisions’ budgetary decisions during periods of economic distress. Due to the varying strengths of these factors in individual school divisions, different outcomes of these dynamics are observed across the state. Thus, each division reflects a different balancing act between policy goals and fiscal advantages and constraints that ultimately shape allocation decisions.

In their work Agendas and Instability in American Politics, Baumgartner and Jones expand upon the agenda setting capacity of interest groups. They begin by noting the explosion in the number of groups in recent decades and argue that these groups set policy agendas by structuring “the incentives and possibilities of policymakers seeking to expand or contract participation” and playing “an important role in formulating questions affecting public opinion, and defining terms of debate” (Baumgartner & Jones, 2009, pp.189-90). The democratic system
of education governance provides a uniquely attractive institutional context for these interest
groups to influence policy agendas. Chubb and Moe contend that because public schools “are
controlled by democratic authority and administration…public education is shaped by larger
social purpose as defined by larger constituencies” (1988, p.1067). A large and diverse
assortment of constituencies and the inherent dissension therein results in greater pressure put
upon policymakers by interest groups to ensure that specific goals are reflected in the agenda
over others (Chubb and Moe, 1988, pp.1069-1070). This dynamic is reflected in battles over
budgetary priorities, which are likely won by the most powerful interest groups that are best able
to exert their influence.

The literature surrounding interest groups in education suggests the profound influence of
certain demographic constituencies upon education finance and budgetary outcomes. The first of
these groups are the elderly. Samuel Preston presents the potential impact of age demographics
upon spending patterns, contending that changes in the nation’s birthrates over the course of the
past century might ultimately result in a competition for resources by America’s dependent
policymakers, he writes, “While the redistribution toward the elderly is clearly a decision that a
free society should be able to make, the re-distributions away from children seem to be less
defensible” (1984, p.452). Indeed, because the ballooning elderly population presents such a
powerful constituency relative to their young counterparts, the political demographic of those
over 65 has been dubbed a “grey peril” to education funding (Rosenbaum & Button, 1989). This
hypothesis is largely grounded in research regarding elderly homeownership and property taxes
as a school funding mechanism. It would stand to reason that the elderly would be opposed to
school spending because they are taxed on a fixed income for government spending that does not
benefit them directly (Berkman & Plutzer, 2005, p.129). Thus, elderly populations might be a drain on school funding rather than an asset.

Teachers unions represent an additional group with the potential to broadly impact education politics and spending. Terry Moe argues that teachers’ unions might have a negative impact upon education governance from a democratic perspective in that the power to direct and shape policy may be concentrated in one interest group (comprised of school division employees) at the expense of a variety of other interests. Moe conceptualizes this problem as “the power of the agent” in which elected officials designate “agents to carry out policy directives in the public interest” (2005, p.255). He argues that because these agents are able to take a part in the electoral process from which they derive their authority “democratic authority is turned on its head, with the authorities doing the bidding of employees rather than the other way around and government run for the benefit of vested interests rather than society at large” (2005, p.255). Thus, based on Moe’s theoretical arguments, we would also expect teachers’ unions to have a significant impact upon education finance as a key interest vested in the policy process.

The body of literature surrounding interest groups and education finance extends Chubb and Moe’s theories of the impact of democratic education governance by arguing that variation in the influence levels of these interest groups is a function of institutional constraints specific to local, state, and federal funding regimes. In his discussion of the politics of education reform as it relates to federalism, Kenneth Wong argues that states are primarily focused upon inter-district fiscal disparity rather than broader inequalities, while the federal government directs resources based upon social targeting (1999, p.16). He further contends that local school divisions under the purview of democratically elected school boards are largely concerned with the distribution
of resources (teachers, for example) between schools within the division (1999, p.17). These disparate functions are a significant in that they structure the institutional opportunities and constraints that dictate the ways in which aggregated interests may pursue their agendas regarding education finance and reform. By establishing the general funding “rules of the game” for each level of government, Wong’s analysis provides an instructive institutional framework for analyzing the internal and external factors impacting education spending.

Berkman and Plutzer round out these theories of agenda setting and institutional constraints by examining policy responsiveness to group activity within school districts across the nation. The two argue that the political influence of interests “can only be understood within the context of the state funding regime,” which is integral to any detailed analysis of local school division budgetary analysis (Berkman & Plutzer, 2005, p.15). Essential to their theoretical framework is the importance of individual school divisions to this funding dynamic. Since spending in local school divisions is partially a function of property taxes, many wealthier communities fight hard to preserve their role in funding their schools. Berkman and Plutzer contend that “this localism is a distinguishing feature of American public education” with American school districts serving as “a diverse and theoretically rich set of political institutions” (2005, p.15). Their study offers an instructive lens for viewing the influence of interest group advocacy upon Virginia school division funding, as it emphasizes the importance of considering the layers of funding regimes shaping this dynamic.

Cynthia Miller offers an additional insight consistent with this theory of localism in her study of demographics and their impact upon spending for public education. By examining group influence at an aggregate state and level and a disaggregated local level, Miller comes to the conclusion that state and county results of the study differed, and that this might largely be the
product of local spending for education being subject to greater influence by interested parties (1996, p.183). Thus, while both of these authors suggest that the significance of the institutional context in which groups pursue their goals relative to education spending, each is careful to highlight the importance of the local context within the larger state framework in impacting this process.

The role of external economic factors in deriving school district budgetary outcomes is an additional facet of the literature that must be considered, especially when examining spending through the lens of the current recession. During the second half of the past century, public schools have generally been the beneficiary of periods of economic growth, yet were also able to remain insulated from economic downturns as compared to other public policy areas (Guthrie & Peng, 2009, p. 24). Guthrie and Peng theorize that this insulation is a partially a function of the “decentralized operation of the United States’ system of public education, political protection by groups vested in the system, and multiple sources of revenue” (2009, p.29). The insulating capacity of certain groups invested in this process is of particular relevance. Guthrie and Peng suggest a general public indifference to education spending because there are high transaction costs for average, disorganized citizens to challenge many of these budgetary decisions (2009, p.30). Thus, organized, interested groups are better able to capitalize on the political disadvantage of the others and impose their will upon the electoral and subsequent budgetary process. This activism ultimately acts as an insulating force for proponents of education spending if they are able to outweigh competing interests opposed to such spending.

Competition between interests is only one economically-based challenge to sustaining education funding. The current fiscal constraints borne out of the recession appear to have the capacity to persist into the future, especially in light of the specific effects of the recession upon
federal, state, and local funding regimes. Guthrie and Peng argue that local school funding based on property taxes was in part what kept funding steady during periods of national economic distress (2009, p.43). State revenues, on the other hand, were the product of income and sales taxes, which are much more prone to economic fluctuations. Due to the recent push for inter-district funding parity, the onus of funding public schools has shifted from a local prerogative to that of the states, and during the current economic crisis, the federal government. This shift in funding responsibilities means that education spending “finds itself in competition with added sectors for scarce resources, and is more vulnerable to the vagaries of the larger economy” (Guthrie & Peng 2009, p.43). Thus, the impact of the recession upon education funding is to in essence create a chain reaction of resource scarcity and fiscal instability at all levels of government. A more nuanced look at the literature surrounding the impact of federal grants is essential in fully understanding education finance in economic recession.

Economic theory is helpful in augmenting predictions of government spending during recession. In her analysis of Title I and the potential of federal grants to increase school spending, Nora Gordon examines what economists have labeled the “flypaper effect” or the empirical regularity that suggests that “the marginal propensity to spend an intergovernmental grant on the targeted government service is higher than the marginal propensity to spend other income on that service” (Gordon, 2004, p.1791). While the theory suggests targeting problems with some intergovernmental grants, it is useful to the framework of this paper because it establishes expectations for funding linkages between levels of government and suggests that federal grant money for education may not be as efficacious in mitigating inequities between school divisions as originally imagined.
Theories of agenda setting, education policy and finance, and economics are all instructive in establishing a framework for exploring the internal and external forces that influence Virginia school divisions’ budgetary decisions during periods of economic distress. From this we can expect budgetary outcomes to be shaped by the goals of more powerful interests in a division and also influenced by economic stress within a school division. The literature also suggests that the collective impact of these variables upon funding might likely result in a heightened influence of group advocacy during periods of fiscal stress, due to a heightened incentive to fight for increasingly limited resources.

**Data and Methods**

The following hypotheses stem from theories of agenda setting, education finance, and economics. Key internal forces of a school division include interest groups and demographics, and the external force economic conditions. This study tests three major hypotheses in order to ascertain the linear relationship of these variables, as well as their multiplicative impact upon funding.

- **Hypothesis 1**: Interest group advocacy has an effect on Virginia school division expenditures.
- **Hypothesis 2**: Economic stress has an effect on Virginia school division expenditures.
- **Hypothesis 3**: Interest group advocacy and economic stress have a multiplicative effect upon Virginia school division expenditures.

In order to test these hypotheses, I will utilize an OLS (ordinary least squares) regression with robust standard errors, which allows for variances to differ across variables by correcting for heteroscedasticity. The regression analysis will generally describe the relationship between the variables to determine the potential significance of the internal and external forces that shape
budgetary decisions in Virginia’s 134 school divisions. Virginia is an excellent fit for an analysis of the internal and external forces impacting education finance decisions, as the state is politically heterogeneous, providing a wide spectrum of potential sources of interest advocacy. The state is also an interesting economic subject of study due to its high level of federal employment and the inability of the state and its localities to deficit spend during times of fiscal duress (Salmon, 2010; Regimbal, 2009). The years analyzed in this paper are fiscal years 2007-2009. This choice is borne out of the official time period of the Great Recession, as well as data availability constraints.

Broadly speaking, school division expenditures are the dependent variable of this analysis. In order to measure these outcomes in relation to the independent variables of interest group activity and economic stress, I have utilized figures for each division’s per pupil spending, which is simply the total education budget of that division divided by the number of students enrolled. This measure is firmly rooted in the interest group literature relative to education spending (Berkman & Plutzer, 2005, pp.119, 137; Ladd & Murray, 2001). The measure is an especially helpful one to this analysis as it is able to highlight funding disparities between Virginia’s school divisions, and as a result provide a more nuanced view of the diverse funding dynamics in play within the state during this period of fiscal crisis.

In order to analyze the relationship between federal, state, and local funding regimes during periods of fiscal stress, I have also employed the percentage contributed by each level of government to total per pupil spending in each school division. While an extension of the previous total per pupil expenditure measure, this combines other empirical strategies in the literature, which have largely sought to measure functional responsibility among the levels of government (Wong, 1999, p.7). This additional measure is an asset to this study as it illustrates
degrees of overlap in these funding regimes and the extent to which they are impacted by interest
group activity and economic stress.

The data for each of these four dependent variables is selected from the Superintendent
Reports for each school year provided by the Virginia Department of Education. Analyzing these
variables from 2007 through 2009 required that I choose the reports from school years 2006-
2007, 2007-2008, and 2008-2009 respectively. The per pupil expenditure data is derived from
“Table 15: Sources of Financial Support for Expenditures, Total Expenditures for Operations,
and Total Per Pupil Expenditures for Operations,” which includes totals for each of Virginia’s
134 school divisions. The data used in this analysis only uses the information provided for the
school divisions themselves as recognized by the state, and does not included data from regional
programs, governor’s schools, or alternative education programs. This data set was preferable as
it provided the most comprehensive total of expenditures delineated by federal, state, and local
sources. Additionally, because the purpose of this analysis is to determine how interest group
advocacy and fiscal stress influence money spent, expenditure data proved a better source rather
than data of funding received by each division.

Interest group support comprises one category of independent variables in this analysis.
In their study of policy responsiveness relative to group influence, Berkman and Plutzer
designate older citizens and teachers’ unions as two prominent interests with the ability to shape
education policy and funding through their advocacy (2005, pp.13-14). This analysis builds upon
their empirical framework by including these two groups as the specific variables representing
interest group advocacy. Demographic data from the U.S. Census (base year 2000) was used to
derive the percentage of the population represented by those over 65 years of age in each of
Virginia’s school divisions for 2007, 2008, and 2009. The literature suggests that the coefficient
for the elderly impact upon all spending measures would be negative due to this demographic’s competition for resources with other groups (Miller, 1996; Poterba, 1997; Rosenbaum & Button 1989; Preston 1984). Thus, I predict that the percentage of elderly residents in a division to be negatively correlated with funding for per pupil spending. This effect will likely be more pronounced in 2009 as compared to 2007 as a result of the heightened competition for diminishing resources.

The fact that collective bargaining is illegal in Virginia meant that it was impossible to obtain membership records for each school division. Instead, data on the number of teachers employed by each school division was derived from the VDOE’s Superintendent Reports for 2007-2009 (Table 17: Total Instructional Positions and Instructional Positions Per 1,000 Students) and implemented to serve as a proxy for this potential interest advocacy. Much of the literature surrounding the influence of this group predicts that they would likely have a positive impact on education funding (Moe, 2005). Berkman and Plutzer contend that although decisions regarding teacher salaries and benefits are made at the local and state level, “when the funding regime relies heavily on local resources, the effects of local unions’ overall spending should be most pronounced” due to the fact that specific contract provisions are hammered out at that level (Berkman & Plutzer, 2005, p.116). Although the organization and political clout of a union would certainly enhance teachers’ role in the funding process, I would still expect to see a significant positive correlation coefficient between teachers and the local percentage per pupil spending, especially since the resources allocated for their salaries and benefits are included in the sum total of expenditures used to derive this figure. Much like the influence of the elderly, I would expect this effect to be more pronounced in 2009 versus 2007, due to the increased incentive for the mobilization of this group.
Economic stress is a second category of independent variables in this analysis and is measured through the percentage of the workforce that is unemployed in each school division. The unemployment rate is a widely used indicator of macroeconomic stress, and is adjusted seasonally in order to calibrate the yearly averages for each Virginia locality. The Bureau of Labor Statistics is my primary source of indicators of fiscal stress as they delineate Virginia’s unemployment rates by county and city, which matches up perfectly with each school division. The figures used in this analysis are derived from the Bureau of Labor Statistics yearly average unemployment rate for each of these localities. I would predict that a division’s unemployment rate is negatively correlated with its per pupil spending. I also anticipate the unemployment rate to be negatively correlated with local per pupil spending and positively correlated with state and federal per pupil spending, as the latter funding regimes must compensate for the former in times of fiscal crisis.

Explanatory variables for this analysis include race and gender (see Poterba, 1997). These variables are instructive controls for the political composition of a district, as it is not possible to accurately measure a division’s political leanings. Race is measured by the percentage of the total population in each division who identify themselves as black or African American, and the percentage of the total population in each division identifying themselves as Hispanic. Due to the spectrum of potential racial designations, including various multi-racial categories, these racial variables were included in the regression and the presence of both categories reduced the possibility of collinearity between these variables. The number of women in each division as a percentage of the total population for 2007-2009 was also used as a control in this analysis, as gender is also an indicator of potential political views and policy priorities (see Shapiro & Mahajan, 1986). All of this data was derived from the U.S. Census base year
2000. By accounting for these variables in the analysis I am able to employ a more complete statistical model for assessing the extent to which interest groups and economic stress impact funding decisions.

The multiplicative implications of the interest group and economic stress variables are largely straightforward. Because we expect the elderly to have a negative impact upon all per pupil spending categories, it follows that this effect would be greater when combined with economic stress, as there is a greater incentive for this group to fight for increasingly limited resources. We would expect the opposite to be true for teachers, who would have every incentive to fight to increase or keep steady education spending, especially when it is largely instructional positions that are cut during periods of fiscal uncertainty. This impact should be especially profound at the local level, as it is local school boards that are responsible for managing the instructional positions within a school division.

A more thorough statement of my regression models is included below.

Model 1:

In this model, DV stands for each dependent variable (total per pupil spending, %federal per pupil spending, %state per pupil spending, % local per pupil spending). A separate regression will be run for each, and completed for 2007, 2008, and 2009, for a total of 12 regressions. In this equation, u is an independent identically distributed error term.

$$DV = \beta_0 + \beta_1(\%\text{population65+}) + \beta_2(\#\text{teachers}) + \beta_3(\%\text{popfemale}) + \beta_4(\%\text{popblack}) + \beta_5(\%\text{pophispanic}) + \beta_6(\text{unemployment rate}) + ... + u$$

Model 2:
In this model DV stands for each dependent variable (total per pupil spending, % federal per pupil spending, % state per pupil spending, % local per pupil spending). A separate regression will be run for each, and completed for 2007, 2008, and 2009, for a total of 12 regressions. In this equation, u is an independent identically distributed error term. This model includes two multiplicative variables, added to evaluate hypothesis 3 regarding the multiplicative impact of interest group advocacy and fiscal stress.

\[
DV= \beta_1(\% \text{population65+})+\beta_2(\# \text{teachers})+\beta_3(\% \text{popfemale})+\beta_4(\% \text{popblack})+\beta_5(\% \text{pophispanic})+
\beta_6(\text{unemployment rate})+\beta_7(\text{unemployment rate} \times \# \text{teachers})+\beta_8(\text{unemployment rate} \times \% \text{pop65+})+u
\]

**Results**

The initial focus of this section discusses the findings of my regression model designed to calibrate the correlation between interest group advocacy and division spending and economic stress and division spending (model 1). These results evaluate the extent to which hypotheses 1 and 2 are supported by the data. The secondary focus describes the shift in these effects once multiplicative variables (teachers*unemployment rate and elderly population*unemployment rate) are included in the regression equation (model 2). It became necessary to preserve the distinct results from the two models and describe them individually, as the multiplicative variables were of mixed significance and diminished the significance of the linear variables contained in the first regression model. Thus, the results from both models will be discussed in this section, as the differences in significance likely have implications regarding the ability of each to accurately evaluate the hypotheses.

*Interest Groups*
The first hypothesis in this analysis predicts that interest group advocacy has an effect on education funding in Virginia’s school divisions. The ability of the results of this analysis to confirm the hypothesis is largely mixed. Recall the predicted impact of elderly residents in a school division upon per pupil spending and the federal, state, and local contributions to this figure. The “grey peril” hypothesis laid out earlier in the paper suggests that a substantial elderly population would diminish education spending in a division, as it represents a funding category that does not benefit this group. Therefore, the elderly would have an incentive to advocate against this type of spending in favor of spending that directly corresponds to their interests. The results of this analysis indicate that the opposite is true.

**Insert Figure 1 Here**

The column in this table detailing the impact of the elderly upon total per pupil spending in Virginia’s school divisions is especially illustrative of this group’s overall positive effect on total spending. The data for 2007 indicates that for every 1% increase in a division’s population of adults over the age of 65, spending per pupil increases by $107.73. This result is statistically significant, as its p-value is less than .05, indicating that this result is indicative of a relationship between the two variables and is not the product of chance. In 2008 that figure remained nearly the same at $110.48 before dropping back down to $83.24 in 2009 (a less significant result, with p<.10). This difference between 2007 and 2009 is more likely the product of decreased spending across the board (rather than an indication of decreased influence by the elderly), as per pupil spending as it relates to other variables also followed this pattern.

While the results of the elderly impact on the federal percentage of per pupil spending are not statistically significant (with the exception of 2009, which indicates a slight positive
relationship), the results for state percentages indicate a negative trend. In 2007, for example, a 1% increase in a division’s elderly population is correlated with a .991% decrease in the state percentage of per pupil spending. In 2008 a 1% increase in the elderly population in the division was correlated with a .869% decrease in state per pupil spending. The fact that this effect is not present in 2009 might best be explained through the fact that federal stimulus money ultimately ended up substituting for state funds, and thus perhaps ameliorating the negative impact seen in this funding category. This effect is reversed at the local level, where a 1% increase in the elderly population in 2007 is correlated with a .997% increase in per pupil spending. The statistically significant correlation coefficients for 2008 and 2009 were .798 and .965 respectively.

The elderly also have a stronger impact upon state and local spending percentages relative to federal spending percentages. This is best accounted for through theories of funding regimes at each level of government, which suggest that the federal government is more likely to distribute funds based on social targeting (Wong, 1999). Because the elderly would not be a target group for education dollars, it makes sense that their positive impact would be less in this category relative to state and local percentages, where they comprise a more influential and relevant presence.

**Insert Figure 2 HERE**

What else might account for the generally positive trends (displayed in the scatterplots above) between elderly populations and per pupil spending? One counterargument to the “grey peril” hypothesis is found at the local level of school funding. Because the benefits required by the elderly are often addressed by other levels of government (Medicare benefits are the product of federal and state funding, for example) the elderly may in fact have less of a negative impact
on local per pupil spending than spending at the state level of government, which is more responsible for allocating their benefits (Berkman & Plutzer, 2005, p. 143). While helpful, this explanation still does not fully account for the positive trends observed at the local. Homeownership might be an additional explanation. While some scholars have argued that the high number of retirees that are property owners would likely negatively impact school spending because these citizens are opposed to property taxes, perhaps the opposite effect could be true (Berkman & Plutzer, 2005, p. 129). Perhaps some school divisions may be more desirable than others because of the quality of the public schools. In this instance, property values might increase as a function of school quality, ultimately proving advantageous to homeowners. A final explanation for this effect could be simple altruism. Perhaps the elderly simply do not see education spending and schools as a threat, but rather an asset to their local community that should be supported.

Teachers were a second interest group analyzed in this regression. Because the literature on teachers as an interest group largely points to the role of organized unions, it was expected that the influence of teachers would be less pronounced in Virginia, where collective bargaining is illegal. If any statistically significant correlations were observed, they were expected to be seen at the local level. The results of the regression analyses for teachers and spending variables from 2007-2009 are largely inconclusive, as displayed by the scatterplots below detailing the lack of influence of teachers upon total per pupil spending in 2007 and 2009. Teachers did not have a significant impact on any of the spending variables during any of the years studied, which does little to prove or disprove the hypothesis regarding their influence upon local per pupil spending percentages.

**Insert figure 3 HERE**
Virginia’s legal impediments to teacher organization and collective bargaining are perhaps the most instructive explanations for the complete statistical insignificance of this group. Because teachers are not able to organize and be represented by unions when crafting contract provisions, it follows that there would not be a relationship between the number of teachers in a school division and the amount of money spent on each pupil in that division. Thus, contrary to both the broad and specific hypotheses regarding this group, this group's advocacy (or lack thereof) did not have an effect on Virginia school division expenditures from 2007-2009.

Economic stress was the second category of independent variable in this analysis. The general hypothesis for this variable suggested that it had an effect upon spending in Virginia’s school divisions. I initially hypothesized that unemployment rates would be negatively correlated with the total per pupil spending in each division, with this effect mirrored in the local percentage of per pupil spending. I expected unemployment rates to be positively correlated with state and federal percentages of per pupil spending in each division. The results borne out of the first regression indicate that these hypotheses were essentially correct, with statistically significant results.

**Insert Figure 4 HERE**

The relationship between a division’s unemployment rate and its total per pupil spending was negative for 2007-2008, confirming my hypothesis. In 2007, a 1% increase in a division’s unemployment rate correlated with $359.51 less being spent per pupil. This result had a p-value of less than .05, meaning that the correlation coefficient is statistically significant. The same trend can be seen in 2008 and 2009, where a 1% increase in a division’s unemployment rate correlates significantly with -$3.62 and -$178.23 less being spent per pupil. It is interesting that
the correlation coefficient for 2008 differs so drastically from 2007 and 2009. While an infusion of federal stimulus dollars may have impacted the figure for 2009 by reducing the amount of stress felt by individual localities, it is unclear what caused such a dramatically different coefficient for 2008. This may be a function of outliers in the data rather than an indication of a significant economic or political factors, especially since political indicators such as race and gender were controlled for in the regression equation. The scatterplots below detail the relationship between unemployment rates and total per pupil spending in 2007 and 2009. Note the heightened effect of this variable between these two years and the greater range of unemployment rates in 2009 compared to 2007, perhaps an indication of the overall impact upon the recession.

**Insert figure 5 HERE**

The correlations between unemployment rates and the federal percentage of per pupil spending is significant and positive from 2007-2009, a result that supports my hypothesis for that dependent variable. In 2007 a 1% increase in a division’s unemployment rate was positively correlated with a 1.439% increase in the percentage of federal dollars included in per pupil spending. This trend can also be seen in the data for 2008 and 2009, which show a 1% increase in a division’s unemployment rate accounting for a .008% and .375% increase in federal funding. Much like the results for each division’s total per pupil spending, we see the federal percentage of funding decreasing between 2007 and 2009, with a sharp dip in 2008. The implications of this trend are two-fold. First, it appears that the full shock of the recession was likely not fully realized until 2008, with federal stimulus money buoying the figures for 2009. Secondly, while the results increase from 2008 to 2009, the effect of the unemployment rate is markedly
The coefficients of unemployment rates relative to the state percentage of per pupil spending were also significantly positive, confirming my hypothesis for this variable. For 2007, a 1% increase in the unemployment rate for a school division is correlated with a whopping 6.49% increase in the state percentage of per pupil spending. In 2008 this coefficient was .049% and in 2009, 3.084%. Once again the effect observed in 2008 is much less than those observed in 2007 and 2009. This is likely the result of the fact that, as of 2008, the nation had absorbed the initial shock of the recession. It is more instructive to view the contrast between 2007 and 2009, which demonstrates the lessened overall effect of unemployment rates upon the state percentage of per pupil spending. Finally, it is especially interesting to view the difference between the percentage of federal and state spending accounted for by local unemployment rates. The larger state numbers demonstrate a finding consistent with the literature, suggesting that the percentage of state per pupil spending would be more positively correlated with unemployment rates in localities than federal per pupil spending, as the state role has traditionally been to mitigate fiscal inequities between school divisions.

The results of this regression analysis illustrate a significantly negative correlation coefficient between unemployment rates and the percentage of per pupil spending accounted for by local sources. This confirms the earlier hypothesis for this regression, which predicted that higher unemployment rates in each locality would result in negative per pupil spending percentages at the local level. In 2007, a 1% increase in the unemployment rate is correlated with a 7.96% decrease in the percentage of per pupil spending from local sources. Again we see the same trends illustrated by the other unemployment results, which show a large dip in 2008 and a
markedly diminished effect between 2007 and 2009. While both results were significant, a 1% increase in a division’s unemployment rate results in a .058% decrease in local funding percentages in 2008 and a 3.47% decrease in 2009. These general trends between years mirror the patterns seen in federal and state funding percentages. The negative coefficients observed in local per pupil spending percentage results are especially interesting relative to the positive coefficient results in state and federal per pupil spending percentages. This pattern fits with the overall funding dynamic theories between levels of government, which suggest that increasing unemployment rates for each locality would result in increased need in those localities for federal and state funding. The negative relationship between the variables on the local level fits with this pattern, especially since unemployment rates are an indicator of economic stress for a locality, and localities under fiscal strain will have less money to contribute to education funding.

In the third hypothesis for this analysis, I predicted that interest group advocacy and economic stress have a multiplicative impact upon Virginia school division expenditures. As the table below indicates, the results of these multiplicative variables were mixed and mostly insignificant, with only a few p-values less than .05. Interestingly, the individual linear variables were only significant when these multiplicative variables were dropped from the analysis. Since the multiplicative variables were mostly statistically insignificant (with most p-values equal to or greater than .10), I cannot completely prove or imply that a multiplicative impact between economic stress and the number of teachers and percentage of elderly in a division exists. As the previous analysis suggests, the percentage of elderly in a division and that division’s unemployment rate has a linear impact upon per pupil spending. The few statistically significant results contained in this model will are worth discussing, if only for the funding trends between federal, state, and local governments that they reflect.
Note that the only statistically significant multiplicative variable reflected in these results combines the effects of unemployment rates and the percentage of elderly in a division. In 2007 and 2008, an increase in a division’s elderly population and unemployment rate was correlated with a .126% and .075% decrease in the percentage of per pupil spending accounted for by federal dollars. Interestingly, this effect is not present with regard to the federal percentage of per pupil spending in 2009, but can be seen impacting the state percentage of per pupil funding. In 2009, a combined increase in a division’s elderly population and unemployment rate was correlated with a .167% decrease in the state percentage of per pupil spending.

This pattern is best accounted for through the presence of federal stimulus dollars in school divisions in 2009, and their absence and 2007 and 2008. Due to an increased federal presence in school division funding, the combination of an elderly population and high unemployment rate might less of a negative impact than they would otherwise. Thus, federal dollars to school divisions would cushion the blow of the negative pull of this variable. The significant negative impact of this variable at the state level in 2009 fits with the larger pattern seen in the elderly results for the percentage of state per pupil spending in the previous regression model. Perhaps the coupling of an increased unemployment rate and elderly population would result in a negative impact at the state level in 2009 because of the state role in providing benefits for the elderly and the increased fiscal strain placed on Virginia by the recession.

Implications

Conclusions
Though this analysis is unable to provide a comprehensive explanation for all forces influencing Virginia school division expenditures some broad conclusions than can be reached, and they center on the results detailing the impact of the elderly and unemployment rates upon spending. This evidence makes clear that the elderly had a generally positive impact on per pupil spending, but that this trend was reversed at the state level, perhaps because this is the level of government upon which the elderly are most dependent for specific benefits. Thus, they might have an increased incentive to fight for the limited resources of this funding stream.

Unemployment rates had a positive effect upon the federal and state percentage of per pupil spending and a negative effect upon the local percentage during the course of the recession, suggesting that fiscal stress in school divisions may call for an increased federal and state fiscal presence to compensate for strain at the local level. The fact that unemployment rates had a negative impact upon total per pupil spending speaks to the overall impact of the recession upon education funding.

The multiplicative impact of the elderly and fiscal stress is largely uncertain. While it appears that this variable has a negative effect upon federal and state per pupil spending during specific years, this trend is not reflected significantly in total per pupil spending or the local percentage of per pupil spending. This lack of significance across the board suggests that this model may need to be enhanced in order to provide a clearer picture of potential multiplicative results and their impact upon Virginia school division expenditures.

Suggestions for Future Research

Future research could improve upon the shortcomings of the paper by remedying some of the data limitations in this study. First, and most superficially, data from fiscal year 2010 could be included in order to provide a more thorough context for the analysis. This extended timeline
would provide a fuller picture of the ultimate impact of federal stimulus dollars. Unfortunately, data availability constraints limited this type of extended analysis for this paper. Additionally, data from the 2010 census could be used to augment or correct the estimations from the census data in this study, which utilized a formula with base year 2000. This would provide for more accurate data and thus more precise statistical results.

While the quantitative models employed in this study were able to provide a broad illustration of general trends in Virginia’s school districts, time constraints prevented the execution of more thorough qualitative analyses of the variables in play. This blend of quantitative and qualitative methods could provide a more complete answer to the empirical puzzle of the study. Although the regression analysis can generally describe the relationship between the variables, a case study of selected divisions could provide specific examples of these interactions by illustrating the implications of those trends in specific districts. The two methods would complement each other and provide a fuller picture of the dynamics in play in Virginia’s school divisions (such as the influence of business or average incomes in a division upon spending).

Statistically speaking, a more comprehensive model would likely be able to provide more complete results regarding all of the dynamics in play that impact budgetary decisions in Virginia’s school divisions. While this analysis specifically designated three such variables as objects of study, others would certainly come into play, such as the political composition of school divisions, the characteristics of their school boards, or the presence of certain types of industry. It also might be interesting to analyze the impact of race and gender rather than controlling for these variables. This model was also unable to specifically account for the amount
of federal stimulus money distributed to each division, which is an essential variable to consider in this type of analysis.

**Policy Implications**

The policy implications of this analysis are two-fold and center on the organization and parity of Virginia’s education policy. First, the trends in the data indicate a general decrease in funding over the course of the recession. This is unlikely to change, especially when federal stimulus dollars run out. This means that it is imperative that policymakers seek out efficiencies in education and tailor funding accordingly. Second, the analysis suggests that actions by certain groups (the elderly) have an impact on spending. This has implications for political mobilization relative to education funding, and emphasizes the importance of protecting funding sources for schools in order to promote equity. While the recession is technically over, its impact upon funding has just begun, and it is essential that policy makers are aware of the internal and external forces that are able to shape school division expenditures for years to come.
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**Figure 1. A “Grey Peril”? Elderly Impact upon Spending**

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<thead>
<tr>
<th>Independent Variable</th>
<th>Total Per Pupil Spending (in dollars)</th>
<th>Federal % Total PPS</th>
<th>State % Total PPS</th>
<th>Local % Total PPS</th>
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<tr>
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*=p<.10, **p<.05; N=134 (STATA command: regress DV teachers pop65+ black Hispanic female rate, robust)
Figure 2. The Elderly and Total Per Pupil Spending, 2007 and 2009

STATA command: graphics ➔ easy graph ➔ scatterplot
Figure 3. Teachers and Total Per Pupil Spending, 2007 and 2009

STATA command: graphics→easy graph→scatterplot
### Figure 4. Unemployment Rates and Spending

<table>
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<td>Unemployment Rate 2009</td>
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Figure 5. Unemployment Rates and Total Spending Per Pupil, 2007 and 2009

STATA command: graphics → easy graph → scatterplot
### Figure 6. Multiplicative Variables and Spending

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*=p<.10, **p<.05; N=134 (STATA command: regressDV teachers pop65+ black Hispanic female rate rateteachers rateelderly, robust)