

THE EFFECT OF DEMOGRAPHIC COMPOSITION ON EDUCATION SPENDING:
GENERATIONAL COMPETITION AND THE CONCEPT OF THE SELFISH ELDERLY
REVISITED

A Thesis

submitted to the Faculty of the

Graduate School of Arts and Sciences

of Georgetown University

in partial fulfillment of the requirements for the

degree of

Master of Public Policy

By

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Washington D.C.

April 19, 2021

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ABSTRACT

The world countries are increasingly becoming “gray” societies in which the share of elderly in the population is bigger than the rest. This is argued to have adverse implications on education spending due to generational competition stemming from the selfish behavior of the elderly. This thesis explores ways in which demographic composition affects K-12 education spending in 31 OECD countries by revisiting Poterba’s influential work and using updated data.

Keywords: education spending, old-age, population, demographic composition, education policy, K-12 education, social policy

ACKNOWLEDGEMENTS

Dedicated to the memory of my grandfather, Adnan Erdogdu, who always believed in my ability to be successful in the academic arena and was excited to see me move to the United States. You may be gone but I know that you are proud of me for keeping my promise.

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INTRODUCTION

The concept of “generational competition” and the influence of the elderly on budgetary decisions, mediated through political processes have been a popular research area in the fields of political economy and public policy. Despite the conflicting views on the extent of influence of the elderly on public spending on education, the question remains a relevant one and it is likely to come up in the foreseeable future. To expand, education is simply one of the most vital policy areas involving many stakeholders and it is critical for policymakers for a myriad of reasons.

Scholars have put forth sound arguments based on their research outcomes about the importance of education spending. For instance, a 21.7% increase in per-pupil spending for children with poor families translates into the eradication of the educational attainment gap because the amount of spending percentage change is substantial. (Baker 6). Similarly, increasing education spending paves the way for improved student outcomes, enhances student success, and contributes to more fair school finance (Martin et al.). It is also possible to find further evidence for increased education spending such as the effect of increased spending on high-school graduation rates. Baker notes that a 10% increase in per-pupil spending in all 12 school-age years increases high-school graduation by 7% (Baker 6).

When the evidence in the literature indicates to such improvements and positive effects achieved by increased spending levels, the impediments to education are well worth discussing. The most critical concern among academics have been the “generational competition”. In other words, the tension between senior citizens and the younger population is believed to have the potential to halt education spending.

This thesis aims to explore how demographic composition affects education spending by drawing influence from Poterba's influential work in 1997 while modifying the model by including variables other than demographic composition that may be affecting spending on education. More specifically I determined K-12 education as the primary education spending area and while exploring the question, this paper also aims to contribute to the literature by re-visiting the generational competition and looking at the interaction through an updated lens via using recent available open data from 31 OECD countries.

The countries of interest in this study are all OECD members. Even though there are other research in the literature which pre-dominantly looks at European countries and the U.S, there is not much out there that looks at Turkey. As a Turkish, I wanted to include Turkey in my research with an expectation to find differences compared to other "Western" countries in the study which can pave the way for me to pursue further research in this field. Owing to its geographical location and culture that puts significant emphasis on the community as opposed to individualism, these differences can emerge. The next section delves into "age" and generational competition and briefly discusses the implications of each.

BACKGROUND

Before analyzing the complex nature of the relationship between demographic composition and education spending, as well as the parameters surrounding the research question thoroughly, it is necessary to understand why the elderly matter in the case of budgetary preferences. Firstly, the scarcity of public funds has always triggered some type of competition just like in the case of almost all governmental redistributive programs. This competition is further exacerbated by ever-changing demographic composition around the world. A part of the literature pertaining to generational competition shows that elderly is less likely to support education spending in general (Poterba 48; Tosun et al. 25; Sorensen 259; Busemeyer and Lober 425; Jager and Schmidt 145). For example, an increase in the number of elderly residents in a jurisdiction can be linked to a significant reduction in per-child educational spending (Poterba 48). This is partially due to the elderly's political influence in determining government expenditures (Poterba).

Slalov states that because the elderly is more politically sustainable, the government prioritizes them first in cases of spending. This stems from the discrepancies in benefit distribution that result in popular support for social transfers to the elderly (Slalov qtd. in Tosun et al. 26). Others argue that the elderly are in essence "selfish" and the selfish elderly do not want the government to fund these programs because they have little to no gain from it (Sorensen 260).

Moreover, beyond the selfishness of the elderly, exogenous shocks and critical junctures also have a substantial role to play in shaping these budgetary decisions. Economic crises and wars in particular, are argued to have affected the elderly's attitudes towards education spending. During the second World War and the reconstruction years following the war introduced a new

civic culture and solidarity narrative and the elderly were perceived as “deserving” of social programs relative to the young population (Sorensen 261). This is evident in Baum and Seitz’s work in which they note that when public finances are constrained an increase in one public spending area due to unemployment, economic crisis etc.) automatically translates into a reduction in the funds made-ready for other areas of spending (Baum and Seitz qtd. in Grob and Walter 281).

On the other hand, it is also possible to come across views that finds evidence for why the elderly might be in favor of supporting spending on education. This means that under some circumstances, the extra tax burden set to be spent on education becomes acceptable for the elderly based on their belief systems and world views. A comprehensive review of the literature which is discussed in the next section reveals several phenomena that explain this positive attitude: capitalization of school spending, altruism, utility derivation, social trust and positive externalities.

The elderly can gain from increased levels of school spending because more appealing neighborhoods can be capitalized into the value of their homes meaning that education spending can increase the value of properties (Poterba 51; Brunner and Balsdon qtd. in Sorensen 260). In fact, there is a positive relationship between the quality of schooling and housing price which leads to elderly to support spending on education since it helps them maintain the value of their property (Grob and Wolter 281; Busemeyer and Lober 428; de Mello et al. 5; Brueckner and Joo qtd. in Brunner and Balsdon 372; Alejandra and Wolter 226; Ladd and Murray 350).

“Altruism” suggests that the elderly may be interested in supporting spending on education when such policies benefit their offspring hence indirectly benefiting them (de Mello et al. 5). Ladd and Murray find that this altruism can take the form of “caring” for the life

chances of future generations which may have spillover benefits (Ladd and Murray 350). Utility derivation acts as a judgement criterion for the elderly. Older people have self-interests where they are willing to accept additional public investments in education since it increases their utility through strengthening the long-term competitiveness of their country's economy which positively affects the welfare state they depend on (Boldrin and Balsdon qtd. in Busemeyer and Lober 428).

Lastly, social trust and positive externalities affect preferences of education spending. Likki and Staerklé note that people who are in favor of social solidarity within a society do not fear the concept of "free-riding", owing to their higher interpersonal trust. That interpersonal trust makes the elderly feel like they are not being exploited (Likki and Staerklé qtd. in Busemeyer and Lober 429)). Understanding the briefly mentioned effects of the elderly on education spending is further discussed in the next section.

LITERATURE REVIEW

The primary focus of this thesis is to uncover how demographic composition affects education spending in OECD countries. There exists a considerable body of literature on demographic composition and the concept of generational competition. Poterba is one of the first scholars to start this research field by looking at the U.S state-level data on education and how it was affected by demographic composition. Poterba finds that an increase in the number of elderly population is associated with a significant reduction in educational spending (Poterba 48). Similarly, one of the outcomes of an aging population is the increased fiscal pressure on reallocating funds towards social security, healthcare and other types of welfare programs that benefit the elderly while cutting the budget for social services for the young population (Tosun et al. 25). Sørensen states that people have different priorities at different moments in their lifetime about public expenditure. To exemplify, young parents may want to see day-care centers and education spending prioritized by the government, however as they get older that preference may change to healthcare services, nursing homes, and more pensions with the sacrifice of education spending (Sørensen 259).

For this thesis I am expanding the concept of generational competition to 31 OECD countries with the goal of adding updated views to the literature. Within this framework, it is critical to identify these very effects stemming from demographic composition, hence triggering a generational competition.

The existing literature shows that the heightened generational tension which is a tug-of-war between social security and other public programs boils down to people's preferences and the society's willingness to pay (Poterba 52; Sørensen 260). As argued by Jager and Schmidt, the increase in the number of elderly in populations has led to the decline of public investment rates;

hence raising making it difficult to achieve public spending beyond social security and other programs that the elderly rap direct benefits from in “graying democracies” (Jager and Schmidt 145). From the elderly perspective, the literature presents rather conflicting explanations that hard to generalize given the difference in location, culture, percentage of young/old people, political processes etc. However, there are some commonalities and shared arguments in the literature.

Firstly, I want to start off by listing why the elderly are selfish and may want to favor social security and welfare programs at the expense of education spending. In theory, social programs that are used by young people can be subject to more disputes and public discussion compared to the programs for the elderly. This is due to the “selfish elderly” and their cost-benefit analysis mindset in which the elderly usually do not benefit from such programs (Sorensen 260). Aging population has the power to put pressure on the public budget allocation; favoring more health expenditure to be spent which results in intergenerational competition (Button qtd. in Arvate and Zoghbi 1165). Furthermore, higher public spending on education means larger tax wedges and has a disincentivizing effect on the elderly. The selfish elderly will favor and manipulate public policies that they gain the most out of (Martin qtd. in Sorensen 260; Galasso and Profeta qtd. in Sorensen 260).

A potential backlash from the elderly is more likely when people hold beliefs pertaining to the idea that programs may be in favor of those who lack or have not paid contributions. The rationale behind this idea is that the elderly should come first. The justification for this set of thinking comes from the completion of social security contributions by a remarkable number of retirees (Svallfors qtd. in Sorensen 261). Government expenditures are more likely to be spent towards the elderly which makes a favor bias emerge in policymaking because elderly is easier

to sustain (Slavov qtd. in Tosun et al. 26). Likewise, on the basis of political influence and the power of voting, the voting power of senior citizens are becoming increasingly influential; placing them in an advantageous policy position compared to the rest of the population because senior citizens' voter turnout rates are higher (Jager and Schmidt 148; Larcinese qtd. in De Mello et al. 3)

The political process matters because voters with children enrolled in public schools would rather see the government increase education spending but on the other hand voters who do not have or expect children are unlikely to support increased education spending (Rubinfeld qtd. in Brunner and Balsdon 371). Also, there is a lack of interest in public healthcare spending by people who have obtained higher education compared to those who have not (Sorensen 267).

Another reason why the elderly favors programs that benefit themselves but not the youth is rooted in history and upbringings of that generation. Critical junctures such as economic crises, World War II, and the restoration years later are believed to have created a narrative of increased solidarity and a society characterized by civic duty (Sorensen 261). In a similar line of thinking, Baum and Seitz's work showcases the importance of crises by indicating that when public finances are troubled, a stark increase in any public expenditure curtails the resources for other expenditure areas (Baum and Seitz qtd. in Grob and Wolter 281). Hence, the elderly will not agree with educational spending over social security unless the marginal benefits derived from other government activities such as education which will be discussed in the next part.

The previous section delved into why the elderly might not want to favor education spending over welfare programs and social security. This part is about why the elderly may favor education spending and their willingness to make concessions.

Increasing number of dependent elderly may favor training programs for young workers to not only raise the pool of resources that can be used for social services but also increase the quality of care (Richman and Stagner qtd. in Poterba 49). Public education spending can reduce crime rates hence increasing the utility of the elderly, the children -as beneficiaries- and their parents who do not have to worry about turning into private resources (Poterba 51). In addition, Grob and Wolter finds that there is a positive correlation between the quality of education and housing market in which education spending increases the property value owing to; decreased crime rates and high employment numbers in that given proxy (Grob and Wolter 281; Brunner and Blasdon 372). It is also argued that the willingness to make concession and support other public programs that benefit others is related with social distance so in essence, family ties and interactions matter. This interaction with the elderly increases young people's support for old-age benefits and elderly people tend to favor public childcare and education when they have grandchildren (Silverstein and Parrott; Bowles and Gintis; Alesine et al; Goerres and Tepe qtd. in Sorensen 260). This can be linked to "altruism" and social trust which are relevant themes in the research field. More specifically Wilkoszewski draws our attention to the difference between dynastic altruism and societal altruism. Former can be identified as a motivation to favor public spending by parents and grandparents who do not derive any direct benefit, yet it addresses the needs of their children and grandchildren (Wilkoszewski 10). The latter refers to the idea that individuals with offspring tend to advocate spending for the younger generation (Wilkoszewski).

CONCEPTUAL FRAMEWORK

For this study I look at Country-year level data from 31 OECD member countries. While the study enjoys qualitative research methods through literature review, it also quantifies arguments via proposing evidence-driven from regression and statistical analysis, more specifically, multiple linear regression constructs the main statistical framework of the analysis. I identified the population over the age of 65 in the above-mentioned countries as the independent variable because I want to see if a change in the percentage of elderly results in cutbacks in education spending. The other independent variables are per-pupil education spending, enrollment, health spending as a share of GDP and pension spending as a share of GDP. For the control variables, I chose household income and gross national income. Despite having different models with other dependent variables (health expenditure and pension expenditure), the main dependent variable in this study remains as percentage of education spending.

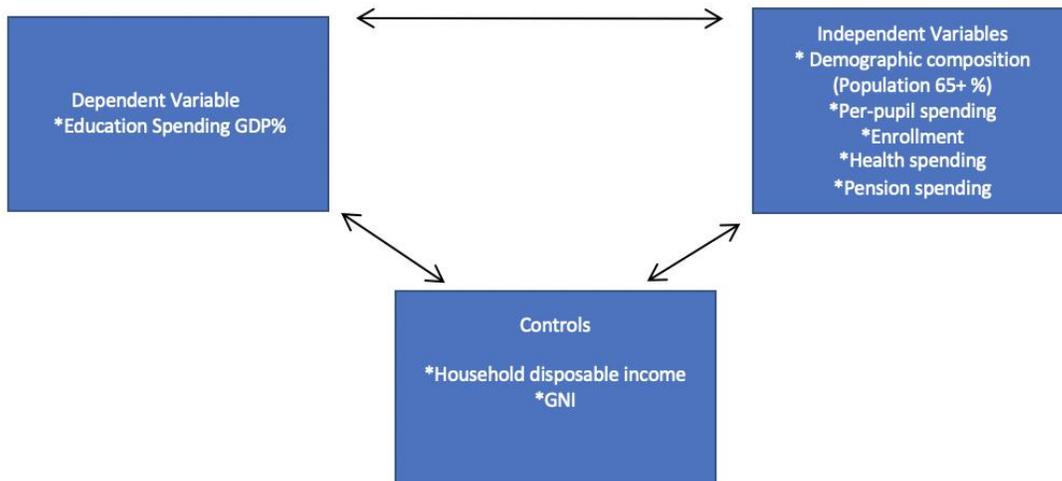


Figure 1: Conceptual Framework

DATA AND METHODOLOGY

My analysis uses the current country-level data from 2015 for education spending in 31 OECD countries. All the data was accessed through the OECD's library which is publicly available. In the case of education spending, the data covers expenditure on schools, universities and other public and private educational institutions. Spending includes instruction and additional services for students and families provided through educational institutions and spending is shown in USD per student and as a percentage of GDP (OECD 2020). To look at this study's independent variable of interest, which is demographic composition, the OECD data offers a ratio. The share of the dependent population is estimated as total elderly and youth population divided by the total population (OECD 2020). Health and pension spending are also calculated using the same share of GDP approach. Further explanation of variables and the summary statistics are presented in the next chapter.

DESCRIPTIVE STATISTICS

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
%GDP Education	31	1.418	.421	.64	2.131
Education Per Pupil	31	8709.226	3387.034	2874.47	20892.094
GNI	31	39071.728	12165.357	17978.182	67597.586
HHDI	31	27786.449	7844.676	16040.538	47531.844
%GDP Health	31	8.793	2.495	4.139	16.711
%Enrollment	31	91.821	8.11	59.368	100
%Elderly	31	17.403	3.83	6.764	26.648
%GDP Pension	31	8.638	3.609	2.231	16.775

In my dataset I look at 8 variables observed in 31 OECD countries in total. Education as a share of GDP has a mean of 1.41%. The minimum and maximum values are .64 and 2.13 percent respectively. Education per pupil spending has an average of 8709 USD and the minimum/maximum values are 2874 and 20892 USD. Next, I look at gross national income which I used for control purposes. OECD defines gross national income in this dataset as gross domestic product and net receipts from abroad of compensation of employees, property income and net taxes less production subsidies (OECD 2020). The mean value for GNI stands at 39071 USD per capita and the minimum and maximum values are 17978 and 67597 USD per capita. Another control variable in this study is household disposable income. According to OECD, household disposable income is explained as measure of the income households such as wages, salaries,

self-employed income, income from unincorporated enterprises etc. after considering net interest, the payment of taxes and dividends received (OECD 2020). Household disposable income has a mean value of 27786 USD per capita. The minimum and maximum values for household disposable income are 16040 and 47531 USD per capita. Health spending as a share of GDP averages around 8.7% while the minimum and maximum values are 2.5% and 16%. The enrollment is defined as enrollment rates in second and tertiary education is calculated by dividing the number of students of a specific age enrolled in these education levels by the population size of that specific age group (OECD 2020). The mean value for enrollment rate is 91% with a minimum value of 60% and a maximum value of 100%. Elderly as a share of population is 17% on average with a minimum value of 6.7% and a maximum value of 26%. Lastly, I look at pension spending as a share of GDP and the mean value is 8% and the minimum/ maximum values are 2.23% and 16.7% respectively.

REGRESSION RESULTS AND DATA INTERPRETATION

In order to determine the effect of demographic composition on education spending, pension spending and health spending I use multivariate linear regression with eighteen models. The first model focuses on pension spending whereas the second model looks at education spending and the third model focuses on health expenditure. A portion of the regression models I used in this study looks like the following:

- $Y_i = \beta_0 + \beta_1\%Elderly + \beta_2GNI + \beta_3\%GDP\ Health + \epsilon_i$ where Y_i denotes education spending as a share of GDP %
- $Y_i = \beta_0 + \beta_1GNI + \beta_2\%Enrollment + \beta_3\%Elderly + \epsilon_i$ where Y_i denotes education spending as a share of GDP %
- $Y_i = \beta_0 + \beta_1\%Elderly + \beta_2\%GDP\ Health + \epsilon_i$ where Y_i denotes pension spending as a share of GDP %.
- $Y_i = \beta_0 + \beta_1HHDI + \beta_2\%Elderly + \beta_3Education\ per-pupil$ where Y_i denotes health spending as a share of GDP %

In the regression analysis, I am trying to see if there is an impact of elderly demographic variables on education spending. I first check to see if elderly demographics affect the most obvious fiscal spending measure: pension spending. To explore this, I run regressions on pension spending as percentage of gross national income (“% GDP Pension”) on the two measures of income first: gross national income (“GNI”) (regression 1.a) and household disposable income (“HHDI”) (regression 1.b) separately. Neither variable is significant. I then add our elderly demographic variable in regressions 1.c and 1.d, the percentage of elderly in the population

("%Elderly"), which comes to be significantly positive with either variable of income. This shows that all else being equal, a higher proportion of elderly in the population increases the pension spending. This may be an indication that there may be a correlation between elderly population's voting preferences and the spending on pensions. The coefficient for elderly percentage is around 0.570 which means that a unit increase in the percentage of elderly increases pension spending by 0.5 percent. I then added other measures of other spending priorities such as health spending as percentage of GNI ("%GDP Health") in regression 1.e and education spending as percentage of GNI ("%GDP Education") in regression 1.f to see if they had an impact on the results.

I then take the same modelling approach on education spending as measured by %GDP Education. Neither GNI (2.a) nor HHDI (2.b) was significant, but the GNI indicated some level of correlation. I kept GNI in the next set of regressions. Adding a measure of K-12 student enrollment ("%Enrollment) in regression 2.c, whose coefficient itself was not significant, improved the GNI's significance and the overall regression results. I then added %Elderly in regression 2. d, which shows a slight significance with a negative sign. Dropping "%Enrollment" in regression 2.e did not affect the results.

As a way to test the robustness of the impact of %Elderly, I add "%GDP Health" to the regression 2.f. Although "%GDP Health" itself is not significant, it significantly enhances the significance of "% Elderly" but makes GNI totally insignificant (which is due to significant correlations between these two variables as we will find out later). I then dropped GNI (which may have been highly correlated with %GDP Health) in regression 2.g, and regressed %GDP Education on %Elderly and %GDP Health only. The results show a significantly negative

correlation between education spending the elderly population percentage. More specifically, if we look at the models 2.f and 2.g; a unit increase in the percentage of elderly results in a 0.04 percent decrease in education spending as a share of GDP.

As a final model (2.h), I regressed %GDP Education on %Elderly and education spending per pupil (“Education Per Pupil”). This regression showed that the coefficient for %Elderly remained at the same significance level, supporting the view that elderly may not be as keen on funding education (when we control for the cost of education). Finally, I check to see if elderly demographics appear to be significantly correlated with the level of healthcare spending, another priority for the elderly. To explore this area, I start regressing %GDP Health on GNI or HHDI. As seen in regressions 3.a and 3.b, either measure of national income is significantly positively correlated with %GDP Health. As HHDI’s coefficient shows a higher level of significance than GNI’s I continue with HHDI. In regression 3.c, %Elderly enters the regression with a significantly negative coefficient, improves the overall fit and also the significance level of HHDI coefficient. Finally, I add the Education per pupil variable as a control for the cost of education (regression 3.d). It enters the regression 3.d with a statistically significant and but negative coefficient, improves the overall fit and enhances the significance of the other variables. This model also confirms the importance of the elderly demographic and their influence on healthcare spending. The cost of education (as measured by Education Per Pupil) has a significant and negative impact, indicating that in countries where education costs are high, healthcare spending gets a smaller part of the GDP.

TABLES

Table 2: Pension Spending: Dependent Variable

VARIABLES	(1) Model 1a	(2) Model 1b	(3) Model 1c	(4) Model 1d	(5) Model 1e	(6) Model 1f
GNI	-1.82e-05 (5.50e-05)		-4.32e-05 (4.52e-05)			
HHDI		-2.07e-05 (8.53e-05)		-5.13e-05 (7.03e-05)		
%Elderly			0.570*** (0.143)	0.563*** (0.144)	0.582** *	0.486** *
%GDP Health					-0.125 (0.238)	
%GDP Education						-2.169 (1.301)
Constant	9.348*** (2.247)	9.212*** (2.461)	0.397 (2.900)	0.264 (3.047)	-0.389 (2.777)	3.256 (3.522)
Observations	31	31	31	31	31	31
R-squared	0.004	0.002	0.363	0.355	0.349	0.402

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

Table 3: Education Spending: Dependent Variable

VARIABLE	(1) Model 2a	(2) Model 2b	(3) Model 2c	(4) Model 2d	(5) Model 2e	(6) Model 2f	(7) Model 2g	(8) Model 2h
GNI	7.96e-06 (6.26e-06)		8.89e-06 (6.36e-06)	9.25e-06 (6.22e-06)	9.47e-06 (6.10e-06)	4.20e-06 (7.54e-06)		
HHDI		1.09e-05 (9.77e-06)						
%Enrollment			-0.00875 (0.00954)	0.00537 (0.0131)				
%Elderly				-0.0423 (0.0277)	-0.0343* (0.0194)	-0.0433** (0.0207)	-0.0446** (0.0203)	-0.0334* (0.0188)
%GDP Health						0.0462 (0.0393)	0.0592* (0.0312)	
Education per-pupil								4.14e-05* (2.13e-05)
Constant	1.107*** (0.256)	1.115*** (0.282)	1.874** (0.875)	1.300 (0.933)	1.645*** (0.392)	1.601*** (0.391)	1.674*** (0.364)	1.638*** (0.369)
Observations	31	31	31	31	31	31	31	31
R-squared	0.053	0.041	0.080	0.154	0.148	0.190	0.181	0.185

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

Table 4: Health Expenditure: Dependent Variable

VARIABLES	(1) Model 3a	(2) Model 3b	(3) Model 3c	(4) Model 3d
GNI	0.000123*** (3.05e-05)			
HHDI		0.000231*** (4.06e-05)	0.000220*** (3.75e-05)	0.000373*** (4.71e-05)
%Elderly			0.194** (0.0769)	0.195*** (0.0610)
Education per-pupil				-0.000454*** (0.000109)
Constant	4.002*** (1.247)	2.375* (1.171)	-0.707 (1.627)	-0.995 (1.294)
Observations	31	31	31	31
R-squared	0.357	0.527	0.615	0.766

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

CONCLUSION

The world countries are aging, and this change is triggering generational tension, shaping social policy preferences and budgetary decisions. Education has always been a vital policy interest for me which paved the way for this thesis. I wanted to question any barrier and inconvenience that might be affecting education adversely. In my opinion, though commendable the concept of “selfish elderly” lacks further research and carries a hefty allegation in itself; essentially scapegoating old people. This is the case, primarily because it is hard to generalize. As seen in the literature there are a myriad of reasons why elderly may be in favor of education spending. On the other hand, this study showed that the effect of the elderly on education spending does exist. In addition, the idea that the elderly shapes the “welfare state” expenditures owing to their priorities and preferences is evident in pension and healthcare spending regression models. On average, I find that a percentage increase in the elderly decreases education spending by 0.04% while increasing pension spending as a share of GDP by 0.5%. Lastly, a percentage increase in the share of elderly, results in 0.19% increase in health expenditure whereas the same percentage increase in the share of elderly decreases per-pupil education spending by 0.0004 USD. To conclude, drawing from Poterba’s 1997 work I find that the elderly has influence on education spending, but I would not conceptualize the phenomenon as “selfish elderly”. The generational competition will remain but that is the case for any other economic decision where one has to provide with scarce resources.

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