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What accounts for the variations in educational outcomes?: A Quantitative Analysis

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A Quantitative Analysis

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Abstract

High quality educational outcomes are a coveted item throughout the advanced industrialized world. This paper is a quantitative analysis of the educational outcomes of thirty-seven Organization for Economic and Cooperative Development (OECD) member countries. The overarching goal is to determine what variables account for this variation. Causes investigated include the type of party system, wealth, inequality, health of democracy, government spending on education, access to affordable healthcare, and student-teacher ratios. Socioeconomic variables, including wealth and income inequality, and the level of political freedom have the greatest impact on quality of education. Other more bureaucratic factors, including access to healthcare, student-teacher ratios, and government spending, show a smaller, less significant impact.

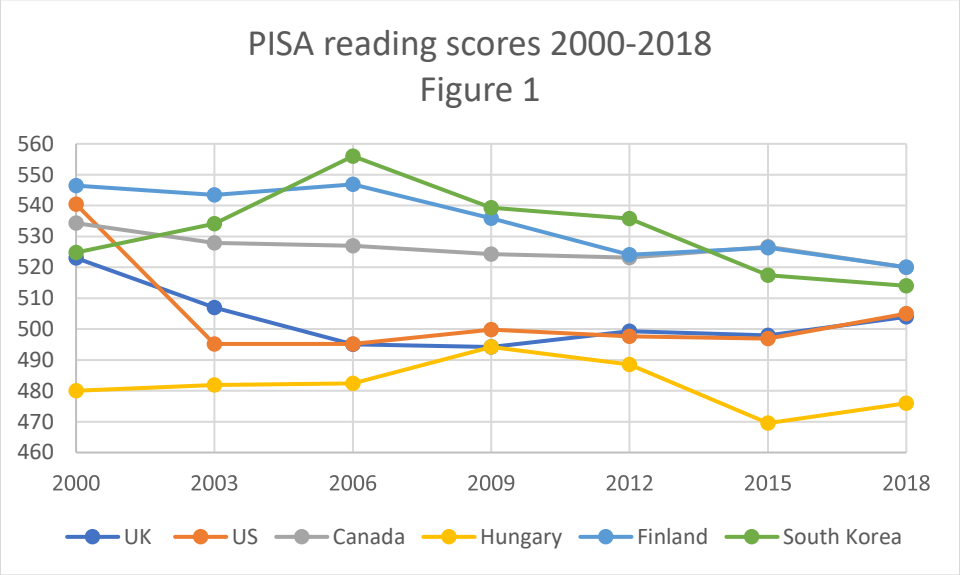
"One child, one teacher, one pen, and one book can change the world."

- Pakistani education activist, Malala Yousafzai (Husain, 2015)

Introduction

It is no surprise that education is of great importance throughout the world. Attainment of quality education is held in high regard by educators, parents, policymakers, and world leaders alike. Education has been lauded as a pathway out of poverty (Montecel, 2013). But like a double-edged sword, poverty and inequality often lead to poorer educational outcomes as well (Verner, 1979). We see that low-income countries where there is a greater extent of poverty and inequality have much poorer educational outcomes than high- or middle-income countries (Cigano, 2014). While education can help people attain knowledge and skills to lift them out of poverty, a level of financial support and investment into these educational institutions is necessary to reach that point. Even more personally, hunger and malnourishment contribute to toxic stress, limiting students' cognitive bandwidth, reducing their ability to concentrate because they are too hungry to focus on anything else (Chilton & Rabinowich, 2012). Beyond this, education is important not only in low-income, developing countries, but in industrialized and developed economies, especially within the competitive, globalized economy of the 21st century. As are most topics within the social sciences, education exhibits a great deal of nuance and encompasses a large swath of information. The lines between what quality education creates and what creates quality education are often blurred by their reciprocal nature. From the perspective of policymaking, there is a keen interest in understanding exactly what can help bolster an educational system to produce high quality outcomes. I will specifically investigate the factors that account for cross-national

variation in educational outcomes[1] in Organization for Economic Cooperation and Development (OECD) member countries. Figure 1**Error! Bookmark not defined.** illustrates the variation in outcomes in a small sampling of six OECD member countries. The outcomes vary both between countries and over time.



Because policymakers, who are often elected or appointed by elected officials, have such clear and direct influence over the creation, prioritization, and funding of educational policy, research into the institutional effects of the systems that elect these policymakers may play a role in shaping their educational goals. Specifically, this paper's novel inquiry involves the possible effects of the two main types of political party systems, two-party and multi-party systems. Considering the complexity of comparative educational policy and in line with the existing literature on the subject, several other determinants will be analyzed in tandem. These important casual factors including health of democracy, wealth, income inequality, public education expenditure per student, affordability of healthcare, and student-teacher ratios.

[1] Represented by reading scores from the Programme for International Student Assessment (PISA).

Examining the structure of political and educational systems will give insight to the goals of our leaders. The results of this paper can help inform what actions must be taken by elected officials within OECD member countries in order to improve our educational outcomes. These actions may include taking measures to reduce income inequality, to bolster economic growth, to discover more efficient ways to spend public funds on education, to create policy to reduce the number of students in classrooms, or to push leaders to make broad systemic changes in structures such as party systems. Ultimately, I seek to discover the conditions conducive to the best possible educational outcomes through a cross-national study.

The Influence of Political Party Systems

In liberal democracies, there are two main types of political party systems: two-party systems and multi-party systems. Single party systems do exist in some democratic states, but for the purpose of this paper I am focusing specifically on two- and multi-party systems. According to Duverger's Law, the root difference between these two systems is in the structure of their elections (Lijphart, 1999). The manner in which officials are selected by the people is inextricably linked to the type of party system present. Countries that have first past the post (FPTP) voting for single member districts where only a plurality of votes is required to win, like the United States, tend to result in two-party systems (Lijphart, 1999). Several other electoral systems, like ranked choice voting or multi-member districts, are referred to as proportional representation (PR) systems and often result in multi-party systems (Lijphart, 1999).

There is considerable debate about the supposed merits of each system in practicality and their respective abilities to represent democracy. FPTP systems are often deemed less fair

because seats are awarded disproportionately compared to the vote share won by each party. They are often extremely competitive and lead to vote-seeking, where the primary goal of officials is to win votes (Nishikawa, 2012). This contrasts with PR systems that are less competitive due to their reliance on building coalitions to govern (Nishikawa, 2012). Because of this, PR systems are able to make policy the primary focus of elections, at least to a higher degree than FPTP systems, theoretically (Strøm, 1990). Due to these features, it is intuitive that to participate in a meaningful way, knowledge of policy, especially the ability to differentiate parties' policies from one another, is key to a party's success within a multiparty system. Furthermore, in FPTP systems parties tend to cluster around the center of the political spectrum, contrasting with PR systems whose parties tend to be more spread out ideologically (Nishikawa, 2012). Elites in these different parties within multiparty systems would benefit from a politically educated electorate that could determine what policies they support. On the other hand, two-party systems by nature only have two parties that tend to be closely related in ideology and perceived as mirror opposites by the public (Nicholson et al., 2012).

Because of these differences, a politically educated electorate would not benefit two-party systems with the same gravity as it would benefit multiparty systems. Multiparty systems would gain significant benefits from a system with higher educational outcomes because the electorate would be better poised to differentiate and align with a political party congruent with their political opinions. Differentiating parties and understanding the consequences of coalition building are needed to succeed in a multiparty system. As the number of parties increase, the information and policy knowledge needed to differentiate and assess one's support increases as well. In order to ensure that their electorate is educated to differentiate policy and parties under their common goal to seek votes and win elections, it is

intuitive that political parties would have an increased stake in high educational outcomes. This can be contrasted with two-party systems since the need for nuance, understanding coalitions, or differentiating parties and policies is much less demanding when the two major parties only need to be perceived as opposites. An educated electorate may be a common goal of all industrialized democracies, but parties within two-party systems do not have as intense of a vested interest to seek high educational outcomes to benefit their elections. A body of knowledge of many different avenues of policy or policymaking in general are simply not necessary when there are only two choices. The two parties within the system also have a vested interest in the system remaining a two-party system in order to stay in power. It can be argued that because of these factors, two-party systems do not have as much to gain from high educational outcomes. Because elected officials create educational policy that directly influences educational outcomes, two-party systems may not exhibit as high educational outcomes as multiparty systems due to these factors.

Furthermore, countries with more party competition tend to have higher public expenditures per student (Verner, 1979). This is congruent with the tendency to expand budgets as a whole as party competition increases. Similarly, recently democratized countries in Africa have shown that multiparty competition has led to an increase in education spending (Stasavage, 2005). While beyond the scope of this paper's focus, further inquiry into the effects of party competitiveness on education may be fruitful based on these findings.

The distinctions between the forms of party systems are important to determine for several reasons. Each party system holds implications that affect the process of governance in a country, notably in the makeup of legislative bodies. The makeup and primary goals of the legislative bodies are determined by the single ruling party or multiple parties within a

coalition. Research suggests that education has become an important issue for political parties as more and more parties throughout liberal democracies support expanding education (Jakobi, 2011). The increased salience of education throughout the world begs the investigation of the effects that political decisions are having on educational policy throughout the world.

These decisions include the allocation of public funding which affects the number of students to a classroom, teachers' compensation, and the quality of resources their schools have. Political decisions dictate the curriculum and standards that are expected of each grade level, and the requirements for school leaving qualifications and grade promotion. Furthermore, studies show that politically strong teachers' unions have a positive effect on educational access reforms, involving updating resources and facilities, financial support, and compensation (Fabella, 2016). These decisions are not always dictated by the central, federal government, but are influenced, especially financially, by the federal government (Fabella, 2016). Attempting to isolate and identify the impacts that political institutions have on educational outcomes, like test scores, is an important step to understanding the most beneficial conditions to promote high quality education around the world.

Additionally, competitive political parties are closely related to the health and strength of democracy. The relationship between education and democracy has substantial empirical support (Glaeser et al., 2007). Education tends to lead to increased participation and engagement in civic culture (Almond and Verba, 1989). Education, as well, has been shown to have a democratizing effect (Alemán & Kim, 2015). This effect is stronger in poorer, less developed countries, yet is still significant to democracy's health in advanced, industrialized countries as well (Alemán & Kim, 2015). This relationship may provide an explanation for

educational outcomes in the growing number of backsliding democracies, especially in Eastern and Central Europe (Csaky, 2020).

Additional Determinants of Education Outcomes

Economic Determinants

Education is an incredibly complex issue, so it is fully expected that political party systems are not going to be the only nor the primary determinant of educational outcomes nationally. Democratic states spend more money on basic public education, both in total spending and a percentage of GDP, than nondemocracies that often prefer to prioritize elite education or other sectors (Jakobi, 2011). Considering the benefits of education and the widespread, universal goal of liberal democracy to provide quality education at all levels, there is a significant amount of research to examine what drives educational outcomes.

Individually, socioeconomic status is the most consistent determinant of scholastic achievement worldwide (Montt, 2011). This effect is due to several factors including educational attainment and economic status of one's parents. Socioeconomic status of individual schools' student bodies helps to predict inequalities in performance in comparison to other schools (Montt, 2011). Generally, the wealthier and the higher the social status a student enjoys, the higher their outcomes increase compared to students of lower socioeconomic status (Montt, 2011). The cross-national focus of this paper necessitates a broader outlook to include a calculated average of a national population's wealth and educational attainment. This has been accomplished throughout the literature with GDP and average education level (Verner, 1979). These measurements would account for not just economic status, but for family background as well. Other environmental features including the extent of urbanization, literacy, the amount of electric energy consumption per capita, and

the number of doctors has been used to provide a broader picture of the large-scale socioeconomic conditions by indicating the level of industrialization of a state (Verner, 1979). Generally, the more urbanized, literate, industrialized, wealthy, and healthy, the higher the educational outcomes in a country (Verner, 1979). These societal structures and inequities are quite stable socioeconomically, which is beneficial from a research perspective (Schlicht, 2010).

It is necessary to look at wealth inequality to fully understand socioeconomic status. In countries with high inequality, data may be skewed by the disparities in outcomes at either end of the spectrum of wealth. On a more individual level, income inequality can drastically impact student outcomes depending on if they go to a "good" or "bad" school (Perry, 2009). Similarly to countries as a whole, a school's socioeconomic composition has a strong association with student achievement (Perry, 2009). Students from high-income families are more likely to score higher on standardized tests and further their education than low-income families (Montt, 2011). However at the national level and somewhat surprisingly, research shows that low levels of income inequality do not necessarily translate to equitable outcomes across countries of similar levels of inequality (Perry, 2009; Montt, 2011). High-performing and highly equitable countries have low poverty rates, low levels of income inequality, a robust compulsory education system, and low levels of school choice (Perry, 2009). However, lower-performing, more inequitable countries do not have such clear-cut commonalities (Perry, 2009). Other studies have shown a very slight correlation between outcomes and income inequality, but is insignificant when controlling for other variables (Montt, 2011). This finding supports the assumption that there is no one-size-fits-all solution to attain high educational outcomes. There are a significant number of factors at play concurrently.

Bureaucratic Determinants

On a more individual level, the literature shows that school-level variability such as class size, student to teacher ratio, overall quality of resources, quality of teachers, and public expenditure on education have an influence on educational outcomes (Montt, 2011). Countries around the world vary in the ages that children start compulsory education, the length of the school year and school day, and the level of student enrollment (Montt, 2011). Student-teacher ratios in particular, which are a result of a jurisdiction's educational policy and expenditure, have shown to influence educational outcomes greatly. Narrower ratios imply a more attentive teacher which tends to have a positive impact on students' educational experience regardless of the competence or educational level of that teacher (Verner, 1979). Countries that invest in the teacher workforce also tend to have higher enrollment, improved performance, and more equitable outcomes (Montt, 2011). States with lower student-teacher ratios can be interpreted as the political system exerting more effort into education (Verner, 1979).

Enrollment levels paint a more complicated picture of a nation. There are countless explanations for lower enrollment in primary, secondary, and tertiary education that are very country specific. The level of enrollment is important because the lower enrollment is the more likely there are significant barriers, whether financial or social, that prevent individuals from attaining quality education. Explanations may include barriers to access like poverty, hunger, the need for children and/or adolescents to work instead of attending school, and access to healthcare and other important resources. These are often represented with poverty rates and out-of-pocket healthcare expenditures per capita, respectively. Health and educational outcomes are largely interlinked due to their reliance on socioeconomic status and

inequalities (Siddiqi et al., 2011). Countries with fewer inequalities have higher outcomes related to both health and education. These inequalities, regardless of extent or degree, exert an influence over all children throughout each nation (Siddiqi et al., 2011). There is an incentive to eliminate these barriers and achieve high enrollment to ensure educational access to as many school-aged children as possible.

Public expenditure per student has shown to influence educational outcomes. Due to their emphasis on social welfare, states with social democratic party majorities are more likely to spend money on education than conservative party majorities (Busemeyer, 2006). But does spending more money necessarily translate into higher quality educational outcomes? Using the average government expenditure per student will help show the correlation, if any, between a government's financial support and investment and their educational outcomes. Public expenditures per student measure the ability and willingness of a country to spend funds on education (Verner, 1979). Considering the variability in central vs. regional control of financing education, it is important to acknowledge the structure of funding for education in each country and the defined purpose of the cost per pupil. The aspects of education specifically emphasized in public funding and the efficiency to which a country executes their goals may influence the outcomes attained.

There is much to consider within this measurement. First, more socioeconomically developed countries tend not to exhibit as much central control over their educational finances (Verner, 1979). Because of this, the effects of education spending vary greatly between different jurisdictions and can be difficult to generalize. Secondly, the efficiency of spending is an important insight into what this measurement describes. A state may dedicate a larger sum of public funds to education than another yet receive a smaller return in educational

outcomes. Therefore, not all spending on education has equal weight, especially in high income countries with existing high GDPs (Siddiqi et al, 2012). The relationship between spending and outcomes is hardly deterministic because of this (Lee, 2014). Improving efficiency in spending contributes to competitiveness on the world stage and often involves reforming the state education system (Fabella, 2016). Due to the large undertaking this requires, it is reasonable to assume that the efficiency of spending is rather stable.

Moreover, it is likely that teachers' unions have some sort of effect on the public policy and bureaucratic decisions regarding education through their two main avenues of action: collective bargaining and political organizing. Collective bargaining agreements regulate education policy about measuring teachers' evaluations, class size, student placement, instruction, curriculum, compensation, working conditions, and other important matters related to practitioners (Cowen & Strunk, 2014). They often restrict the flexibility of school districts in an effort to protect and advance the goals of teachers (Cowen & Strunk, 2016). Hoxby (1996) shows that unionized districts in the United States spend more, even if not on teachers' compensation, and have higher dropout rates than non-unionized or weakly unionized districts. A replication of this study within a single state found unions had no significant impact on student outcomes (Lovenheim, 2009). As for union's political organizing, they are often perceived to be blockers of reforms that seek to change the status quo, but that the relative strength of unions plays a role in the political power that they are able to wield (Cowen & Strunk, 2016). However, only a small number of studies have investigated the impact of unions on students' educational outcomes and have produced conflicting evidence (Cowen & Strunk, 2016). Average American students fair better in union schools, while low- and high-performing students tend to fare better in nonunion schools

(Ebert, 2007). It is difficult to identify and generalize conclusions and their proposed solutions because of the wide variation and lack of control in performing this type of research (Ebert, 2007). For example, union negotiations may spillover into nonunion districts as an attempt by administrative officials to ward off unionizing, further complicating analysis of the effects of unions (Gindin & Finger, 2013). Additionally, union districts often benefit from attracting and retaining teachers, and positively affect wages and spending (Gindin & Finger 2013). While unionization will not be included within this paper's analysis due to a lack of readily available data, it informs the argument regarding public expenditures per student. More research on the impacts of unions on educational outcomes may be fruitful for future analysis.

Health as a Determinant

Additionally, the cost, accessibility, and quality of healthcare and a population's health in general may have effects on educational outcomes. The general health of a country relies on its healthcare system, and ultimately reflects the wealth and dedication a country is willing to invest (Montt, 2011). Education and health often have similar determinants, but these similarities diverge significantly when it comes to income inequality (Siddiqi et al., 2011). There is a strong association with mortality rates in high-income countries with high income inequality (Siddiqi et al., 2011). While these determinants do not have the same effect on educational outcomes, health itself plays an important role in these outcomes, particularly food insecurity and hunger (APA, 2020). Food insecurity is defined as a lack of nutritious foods to have good health and is quite common even in advanced industrial democracies like the US and Canada (Ke & Ford-Jones, 2015). Both food insecurity and hunger can cause toxic stress, a near constant activation of the body's stress management system, and diminished

cognitive bandwidth (APA, 2020). Because of this, children that go to school hungry focus on food and often have a diminished capacity to concentrate on other things like schoolwork (Ke & Ford-Jones, 2015). Food insufficiency contributes to many poor health conditions, including chronic illnesses, anxiety, depression, colds, stomachaches, and even can negatively impact brain development, learning, information processing, and educational outcomes (APA, 2020). Because poverty does not simply affect the children of the family, it is intuitive that this combination of toxic stress and diminished concentration would likely extend to children if a close relative, especially within the household, is experiencing poor health, even unrelated to food insecurity. The ability to afford both sufficient nutritious foods and quality healthcare is key to avoiding these issues.

Hypothesis and Theoretical Model

It is possible that because of their explicit influence on policy and political structure as a whole, political parties and the needs of elected legislative officials within those parties will have an effect on the educational outcomes of a country's public. In both types of party systems, educational policies that frame and inform the educational systems are influenced directly by the political parties and their individual office holders, whether elected or appointed. There is some debate about the desirability of an educated electorate and if desirable, to what degree (Hansen, 2009). There are two main approaches: the elite and the deliberative. The elite approach views other personal factors not related to political education, like aggregated opinions and mental shortcuts, more important to voters' choices than a fully informed electorate (Hansen, 2009). On the other hand, the deliberative approach requires voters to make informed decisions of political parties and politicians, usually understood through choice of party and personal values. Hansen (2009) acknowledges that political

knowledge has a greater influence in multi-party systems than two-party systems. He argues this is due to the number of parties competing for power. It is this same principle that informs my theory. Because of the broader selection of choices available, I argue that more political knowledge is needed to participate in politics through the ballot box. States with multiparty political systems then have a vested interest in a more educated electorate and therefore will have higher educational outcomes to achieve this goal.

It is important to investigate the distinctiveness of political parties to fully understand how the public conceives of the political party system. Research from the US and Australia, both two-party systems, shows that the public perceive the two major parties as polar, mirrored opposites (Nicholson et al., 2018). On the other hand, multiparty systems, as depicted in Canada and Hungary, show that the public also perceives parties on the opposing ends of the political spectrum as opposites, but that parties on the same side of the left-right political spectrum were still highly differentiated (Nicholson et al., 2018). This supports the argument that electorates in multiparty systems have a more pressing need to differentiate between parties than in two-party systems that solely rely on pure opposites. I argue that this need for differentiation and distinctiveness translates into different needs for education. States with multi-party systems would have a greater need for high quality education that would allow the electorate to properly distinguish the larger number of parties within their system.

To assume that political party system's influences are the only influence would be unwise and illogical. It is prudent and necessary to examine the other factors known to have an effect on educational outcomes. The factors examined in this paper in addition to type of party system are a country's wealth, level of wealth inequality, the strength and health of democracy, public education expenditures per student, out-of-pocket healthcare expenditures,

and student-teacher ratios. These variables allow the focus to be placed on a broader, national level in order to compare educational outcomes cross-nationally and the effect that wealth, poverty, and access to necessities like affordable healthcare have on education. Unfortunately, this approach will leave out some of the very important but more individually based elements that exert influence on students' achievement. Similarly, the usage of national averages will eliminate the nuance that comes with the nuance of different jurisdictions within a country.

From this discussion, I developed the following hypotheses:

H_1: Countries with multiparty systems will have higher educational outcomes than two-party systems.

H_2: Countries with healthier democracies will have higher educational outcomes.

H_3: The wealthier a country is, the higher their educational outcomes will be.

H_4: The higher income inequality a country has, the lower their educational outcomes.

H_5: The more money a country spends on education federally, the higher their educational outcomes will be.

H_6: The more affordable a country's healthcare is, the higher their educational outcomes.

H_7: Countries with lower student-teacher ratios will have higher educational outcomes.

Research Design

The object of my research is to determine factors that influence general educational outcomes in developed democracies. The thirty-seven OECD member states are the sample that will be quantitatively analyzed, as the availability of data permits.[2] Unavailable data for specific countries will be indicated as needed with each respective variable. These countries

[2] OECD member countries: Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, South Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom (UK), United States (US)

were chosen based on their general status as developed, liberal democracies, with the exception of Turkey, with varying political party system types and wealth. OECD provides a great deal of accessible data for these countries and allows for a robust analysis.

Dependent variable: PISA educational outcomes

In line with many other cross-national comparative studies, I will be operationalizing my dependent variable with data from the Programme for International Student Assessment (PISA) tests from 2018. Due to anomalies in testing data received from Spain's PISA reading tests, Spain's 2018 reading score has not been released by OECD. Considering Spain's reading scores have remained relatively stable since 2000[4], I will utilize Spain's 2015 Reading score for the purposes of this study.

The PISA test is administered and analyzed by OECD. It tests and aggregates data from randomly selected 15-year-olds, irrespective of grade level, in 79 high- and middle-income countries every three years on three subjects: mathematics, reading, and science (Schleicher, 2019). It is not a subject test, but instead tests students' abilities to use wider knowledge, concepts, and skills in these three core subjects within real-life situations (Lee, 2014). It also questions students about their family background, learning habits, and engagement and motivation in school (Montt, 2011). It has been used extensively throughout the literature to compare educational outcomes across countries (Busemeyer, 2012; Lee, 2014; Montt, 2011; Perry, 2009; Peter et al., 2009; Samuelsson & Lindblad, 2015; Siddiqi et al., 2011; Schlicht et al., 2010).

Although, there are some drawbacks to utilizing this particular test. It only studies 15-year-olds, excluding primary and tertiary schooling altogether. Considering individuals in the countries within this study are able to vote at age eighteen and not all individuals attend

tertiary school, studying the average educational achievement of 15-year-olds is not too far of a departure from the education of a voting aged 18-year-old. Since it is cross-sectional and not a longitudinal study, it only measures particular students at one specific point in time (Montt, 2011). Therefore, it is not effective to provide historical or causal explanations (Montt, 2011). Further, it is scaled to show normal distribution, making cross-national differences less visible (Perry, 2009). Even with the caveats to the usage of the PISA test, it is a useful starting point to assess real-world educational outcomes related directly to students' performance cross-nationally (Humburg and van der Velden, 2015). Cumulating all three scores is not standard practice within the literature because it distorts data. Because of its relevance to the electorate's ability to engage in politics, I will use the reading score specifically. I will obtain this data from the OECD's Volume 1 of PISA 2018 Results[3] and Spain's 2015 score from Our World in Data's Quality of Education database[4].

Independent Variables

Political party system

The primary goal of this paper is to determine the correlation between the type of political party systems and educational outcomes. It is expected that multiparty systems will have higher educational outcomes than two party systems. For the most accurate assessment of the number of political party systems, I will measure this with the effective number of parties determined by Laasko and Taaeperne (1979). It is defined as one over the sum of the square of the percentage of seats/votes won by each party within a system (Laasko & Taaeperne, 1979). I will utilize seat share instead of vote share since educational policy is

[3] https://www.oecd-ilibrary.org/sites/28450521-en/index.html?itemId=/content/component/28450521-en
[4] https://ourworldindata.org/quality-of-education

controlled by elected policymakers, not candidates. This will allow each analyzed country to be most accurately categorized as a two-party or multiparty system. The data that I utilize was compiled through Gallagher's (2019) Election indices dataset at Trinity College Dublin[5].

Strength of Democracy

Due to the empirical evidence for a correlation between democracy and education and the significance of party politics in keeping democracies healthy, it is appropriate to examine this relationship. I expect countries with healthier democracies to have higher educational outcomes than countries with weaker democracies. I will use Freedom House's (2020) Global Freedom Scores to measure this variable[6]. Freedom Scores measures more than the health of democracy electorally, including real-world political rights, civil liberties, and freedoms of individuals, and is therefore a more robust, inclusive measurement for understanding the breadth of democracy comparatively (Countries and Territories, 2020).

Wealth

Considering socioeconomic status is one of the key determinants in student performance, it is essential to include this variable in my analysis (Montt, 2011). It is expected that the wealthier a country is, the higher educational outcomes they will exhibit. I will be measuring this variable with gross domestic product (GDP) per capita, to account for a country's wealth adjusted for population. Admittedly, there is much nuance lost with using averages to sum up an entire country's socioeconomic position. However, this allows for an

[5] https://www.tcd.ie/Political_Science/people/michael_gallagher/ElSystems/Docts/ElectionIndices.pdf
[6] https://freedomhouse.org/countries/freedom-world/scores

estimated comparison between several countries. I will obtain this information from OECD's database[7].

Income Inequality

Wealth distribution and income inequality are a separate but equally important features of a state's socioeconomic condition. I expect countries with lower levels of inequality to have higher educational outcomes. I will measure wealth inequality with the Gini coefficient. The Gini coefficient codes income inequality where a score of zero is perfect equality and a score of one is perfect inequality (Perry, 2009). I will acquire this information from the OECD's database[8]. There is no data given for Spain, New Zealand, Japan, Colombia, or Turkey. These countries have been excluded from the sample for a total sample size of 32 countries.

Public expenditure per student

Public expenditure per student measures the willingness and ability of a country to invest in education. Although there is a great deal of nuance within this measurement, I expect that the countries that spend more money per student will have higher educational outcomes. Since the PISA test measures 15-year-olds regardless of grade level, I will be using total expenditure per student in primary and secondary school combined. I will acquire this data from the OECD's database[9]. Expenditures are expressed in equivalent USD converted using purchasing power parities (PPPs) for GDP to account for the relative cost of local goods, services, and inflation rates (OECD, 2021). There is no available data for Switzerland and

[7] https://data.oecd.org/gdp/gross-domestic-product-gdp.htm
[8] https://data.oecd.org/inequality/income-inequality.htm
[9] https://www.oecd-ilibrary.org/education/total-expenditure-on-educational-institutions-per-full-time-equivalent-student-2017_6463e5d4-en

Greece. These countries have been excluded from this sample for a total sample size of 35 countries.

Healthcare costs

Beyond the school level, there are many environmental factors that may affect students' ability to attend or perform in school. Hunger, poverty, access to healthcare or resources for disabilities, or the need to provide for the family would greatly affect students' outcomes. The effect of toxic stress caused by food insecurity, poverty, and stressful home situations are particularly troubling in relation to concentration in school and increasing risk for adverse health outcomes (Ke & Ford-Jones, 2015). High healthcare costs are often associated with a slow descent into poverty, either chronic or transient poverty, even in developed, wealthy countries like the US (Krishna, 2020). Because of this interaction between health and education, I expect countries with more affordable healthcare systems to have higher educational outcomes. To estimate the accessibility and affordability of healthcare, I will use the amount of out-of-pocket healthcare expenses per household per capita, as a percentage of total health expenditure. This measurement allows for more analysis into the affordability of healthcare than simply insurance coverage, especially considering the vast majority of OECD countries, with the exception of the US, have universal or near-universal public healthcare[10]. I will acquire this data from the WorldBank's database[11]. The values are expressed in USD per capita converted into PPPs for GDP.

Student teacher ratios

[10] https://stats.oecd.org/Index.aspx?DataSetCode=INSIND

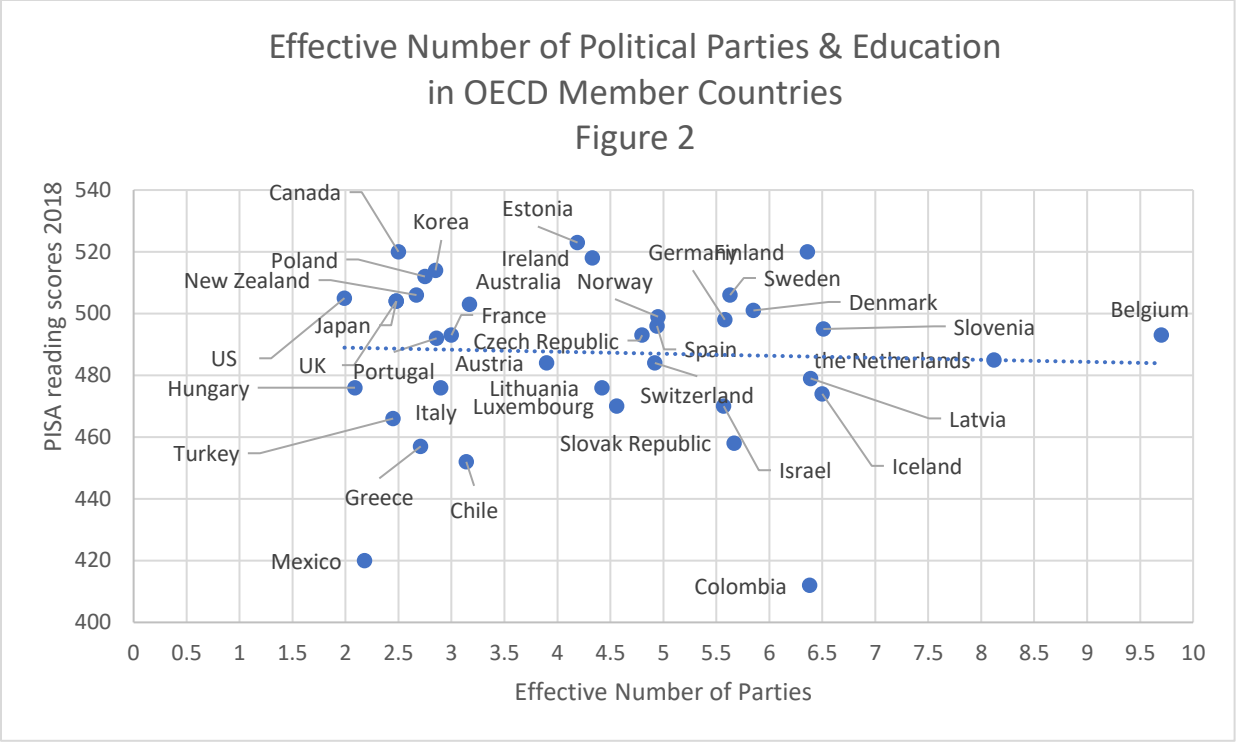
[11] https://data.worldbank.org/indicator/SH.XPD.OOPC.PC.CD?end=2018&name_desc=false&start=2018&type=shaded&view=map

As depicted in much of the literature, student-teacher ratios and enrollment play a role in educational outcomes. Considering the difficulty of assessing teachers' competence and ability nationally, let alone cross-nationally, student-teacher ratios can be used to estimate teacher impact on student's performance and well-being. As aforementioned, lower student-teacher ratios tend to have positive effects on students due to the implied higher level of attention given to students by virtue of a smaller class size (Verner, 1979). I expect a similar outcome. I will utilize student-teacher ratios for secondary schools considering PISA tests 15-year-olds. I will retrieve this data from the WorldBanks's datasets from the United Nations Educational, Scientific and Cultural Organization (UNESCO)[12]. Australia's data will be retrieved from the Australian Bureau of Statistics[13].

Results & Discussion

I will be performing a quantitative analysis over the hypotheses listed in my theoretical model. I examine the thirty-seven OECD member states in order to discover correlations between my independent variables and educational outcomes. The data I collected is as follows.

[12] https://data.worldbank.org/indicator/SE.SEC.ENRL.TC.ZS
[13] https://www.abs.gov.au/statistics/people/education/schools/latest-release



When comparing the effective number of parties with educational outcomes, I find no relationship. Running a correlation between the two variables produces a correlation coefficient of -0.048, almost exactly no correlation. Multiparty systems greatly outnumber two-party systems within OECD member countries. Even amongst two- to two-and-a-half party systems, including the US, UK, Canada, Hungary, Turkey, Japan, and Mexico, there is an extremely wide variety of PISA scores. The data clearly depicts that the type of political party system on its own has no effect on the educational outcomes of students. The proposed stronger vested interests of multiparty systems compared to two party systems mentioned within my theoretical model do not translate into reality. The other hypotheses tested may further explain these differences in scores amongst countries with similar party systems.

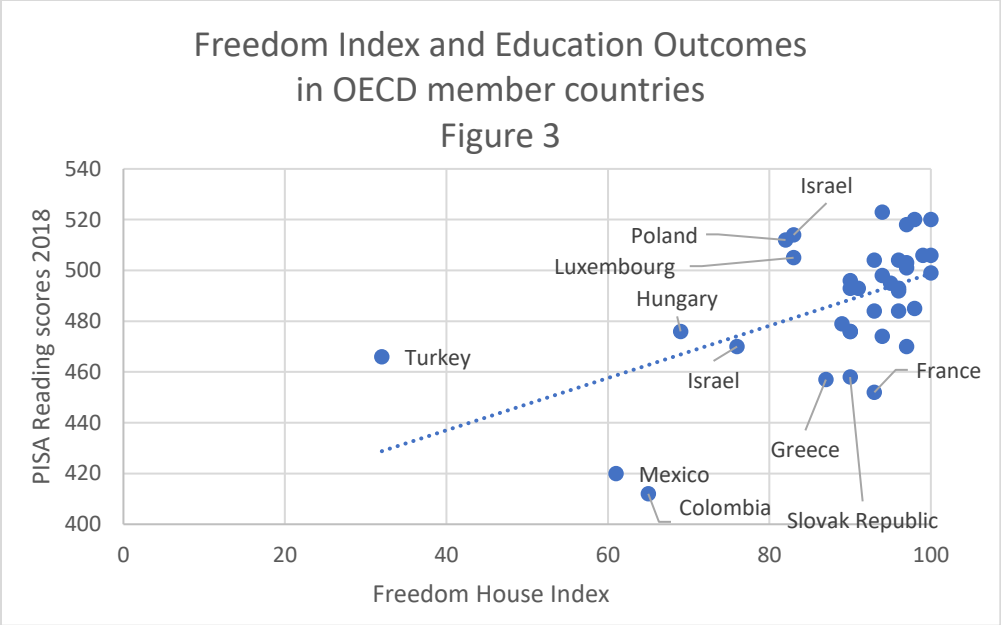
An internal analysis from Sweden states that the Social Democrats would lose 1.4 percent of support and Liberals would gain 6.3 percent of support if the Swedish voters were fully informed (Hansen, 2009). Hansen (2009) states that there has been support for the

number of parties having a positive effect on the impact of political knowledge and that there is a clear relationship between education and political knowledge. Unfortunately, this concept does not have an effect in this sample of OECD member states. Hansen (2009) finds a correlation between the support for right-leaning parties and an increase in political knowledge, exhibited in the US, Sweden, Finland, and Denmark. Although my analysis does not include the placement of parties nor their distinctiveness from each other on the political spectrum, this may be an interesting concept to test in the future with a larger sample. Considering the lack of evidence of correlation between party systems and educational outcomes, it is unlikely that other party-related institutional features like party distinctiveness will have an influence on the outcomes of students.

Busemeyer (2006) found that social-democratic parties are more likely to support education than conservative parties, congruent with each ideologies' perspective on government spending. Because parties within two-party systems tend to coalesce in the middle of the political spectrum, and multiparty systems tend to have more spread out, ideologically varied parties, it is intuitive that social democratic parties are more frequently found in states with multiparty systems. This situation presents a difficult "chicken-or-the-egg" scenario for the purposes of this research paper. While the party system creates the environment for social democratic parties to survive and even flourish, it begs the question to discover the underlying principles of that state that led to the multiparty system's existence. A more detailed qualitative analysis of the position of a state's political parties on the ideological spectrum would be beneficial to examine this further.

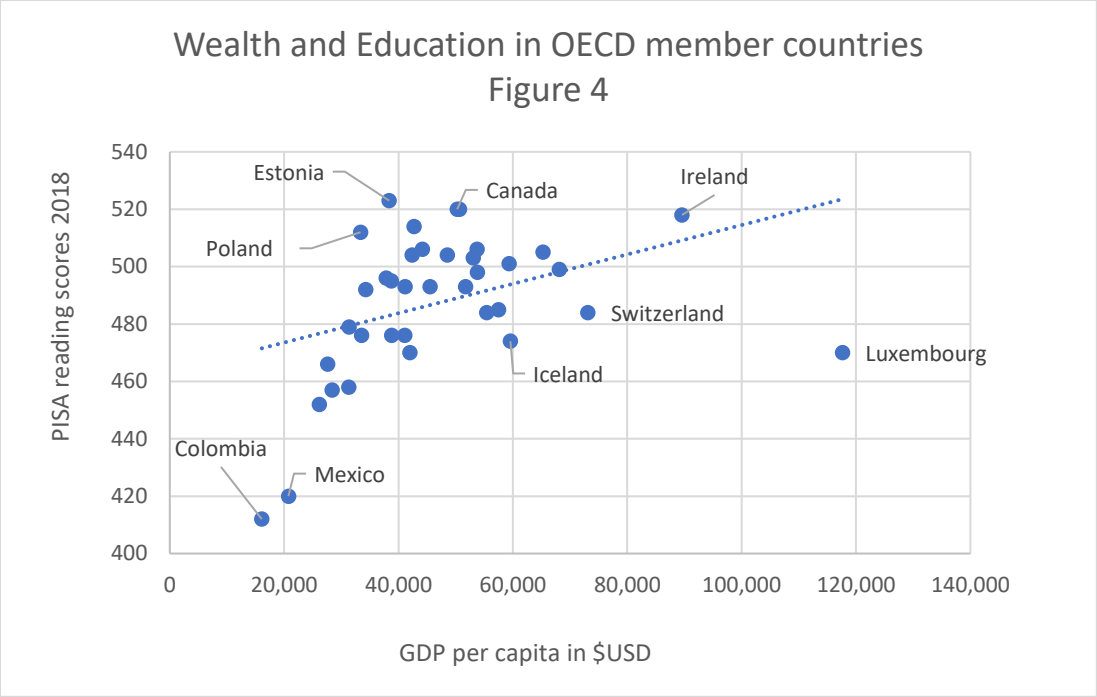
Another possible explanation is that other mechanics such as polarization are the main drivers behind party distinctiveness, not education. (Nishikawa, 2012). When polarization is

low, parties may not successfully differentiate themselves as distinct choices, especially in two party systems (van der Eijk & Franklin, 2005). There is significant evidence that as a party system grows more polarized, the easier it becomes for the electorate to distinguish parties (Lupu, 2015). Heightened party polarization often increases the salience of political parties, intensifying partisan conflict as disagreements become more heated (Lupu, 2015). Lupu (2015) describes that polarization can have a stabilizing effect on developing democracies, but in already established, advanced democracies, party polarization can have a corrosive effect. There is further evidence for this within OECD member states. The intensity of freedom has a strong positive correlation with educational outcomes. Whether this destabilization of democracy is a result of increasing polarization, gridlock, or other country-level factors, the relationship between education and the strength of a democracy is clear. Running a correlation between PISA reading scores and Freedom Scores, the correlation coefficient is 0.548. As expected, this positive relationship is moderate, yet clear. Considering this democratizing effect is stronger among lower income countries, expanding the sample beyond OECD members states may show more conclusive results.



It is reasonable to conclude that an educated general public, and therefore educated electorate, is simply an inherent goal in healthy democracies. By the virtue of participating in the OECD's PISA test to cross-nationally examine the strength of their educational systems, the benefits of education in and of themselves are incentive enough to desire strong educational outcomes.

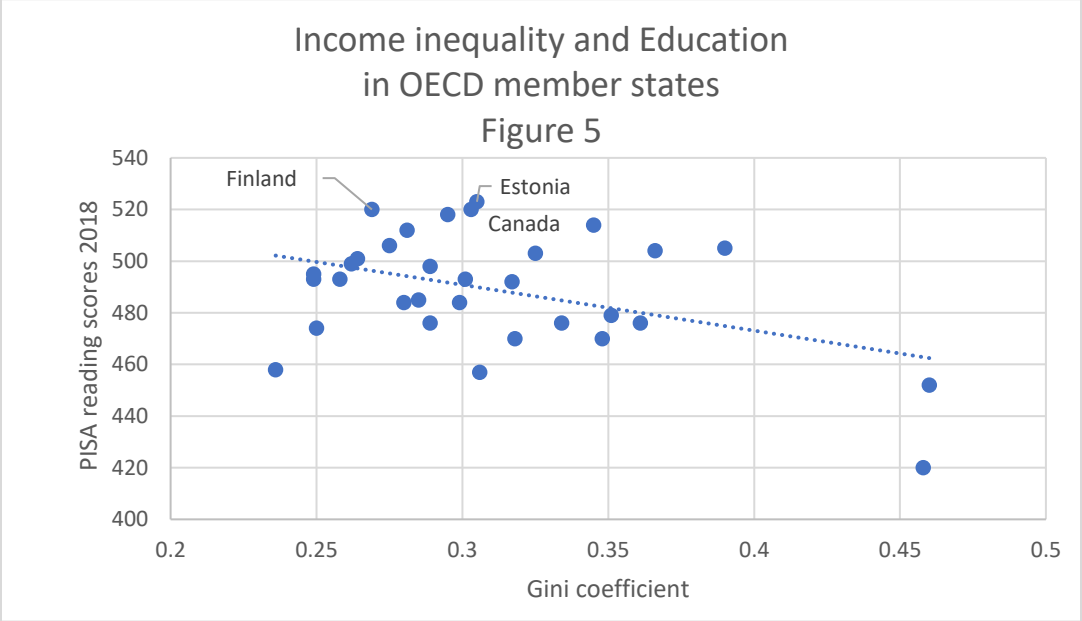
Consistent with my hypothesis and the literature at the individual level and country level, there is a correlation between wealth and educational outcomes. Running a correlation between wealth and education, the correlation is .387, relatively weak but clearly positive.



It is worth noting that research has shown that in already advanced capitalist economies, increasing GDP has not proven to benefit educational outcomes, with a similar result relating to health outcomes and life expectancy (Siddiqi et al., 2011). More specifically, national increases in health spending have not shown to correlate with positive health outcomes (Siddiqi et al., 2011). This implies that in the world's wealthiest countries, growth is not effective to improve quality of life. Expanding the sample to less rich, non-OECD member countries in future analysis may warrant more conclusive results.

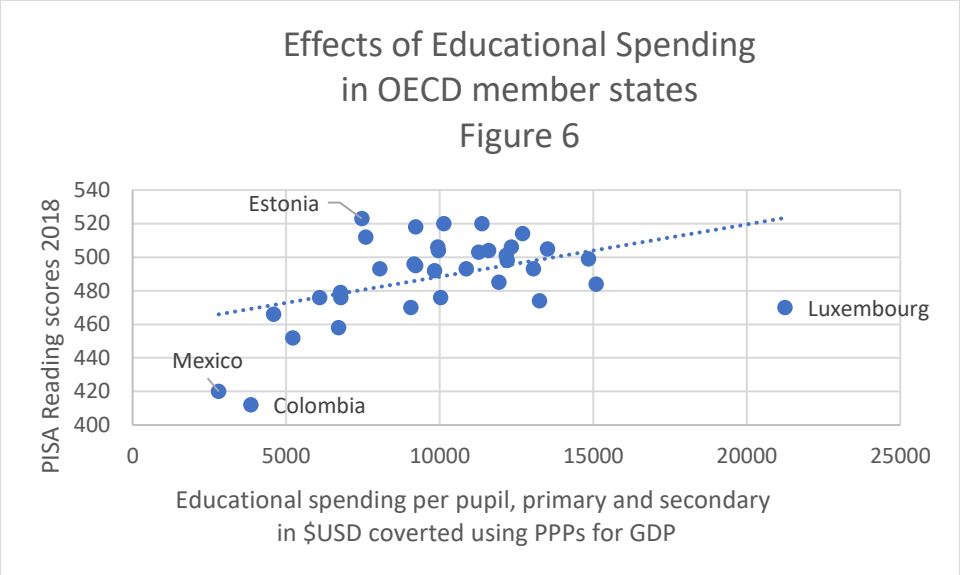
By that same token, income inequality has a clear negative relationship with educational outcomes. As income inequality increases, educational outcomes decrease. The correlation coefficient is -0.4227, showing a moderate negative relationship. According to this data, income inequality has a stronger impact on educational outcomes than a country's

wealth. This comparison is not affected by the slightly different sample size due to unavailable income inequality data[14].

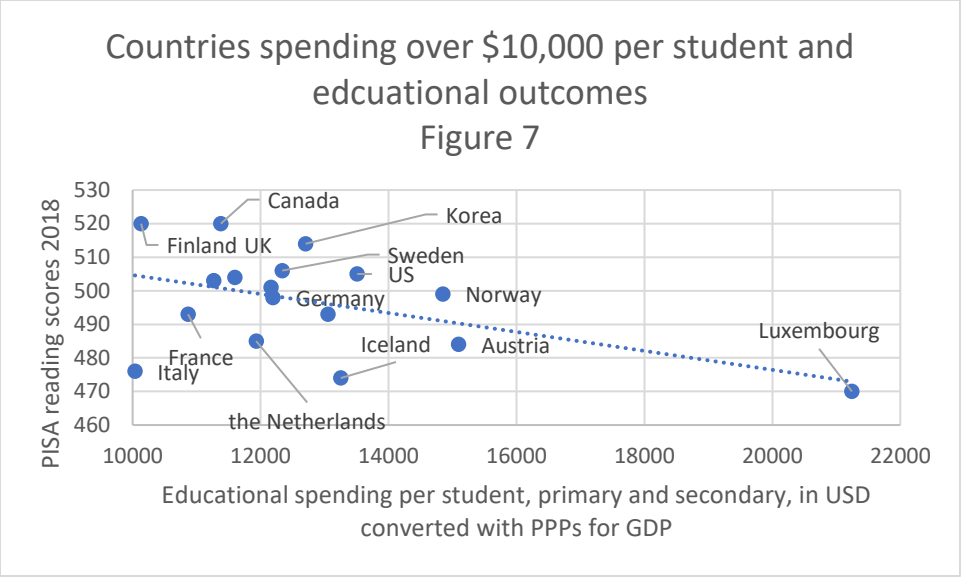


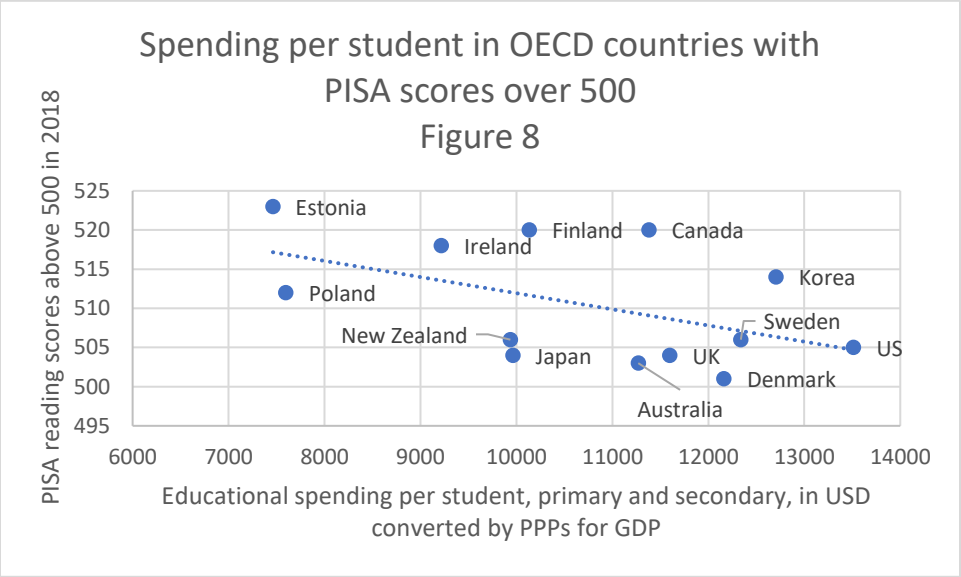
On an individual level, social-democratic states, such as Finland, show little to no relationship between school-level socioeconomic status and educational outcomes compared to liberal welfare states such as Canada (Peter, 2010). As shown in Figure 3, these states also have the lowest levels of income inequality. Peter's (2010) finding is replicated in this analysis. The effect of income inequality may have far-reaching effects, as discussed below.

[14] With the same sample size of 32, GDP/per capita and educational outcomes have an even weaker relationship with a correlation coefficient of 0.299.



There is a moderate positive relationship between government spending per student and educational outcomes. The correlation coefficient for these variables is 0.443. This is the expected result, with educational outcomes increasing as spending per student increases. However, the intersection of spending per student and other socioeconomic factors like income inequality, the sources of additional funding, and bureaucratic factors like the effects of unions may play a hidden role. I examine this further by analyzing both the OECD member countries that spend the most (over $10,000 per student) and the countries that have the highest educational outcomes (a PISA score of over 500).

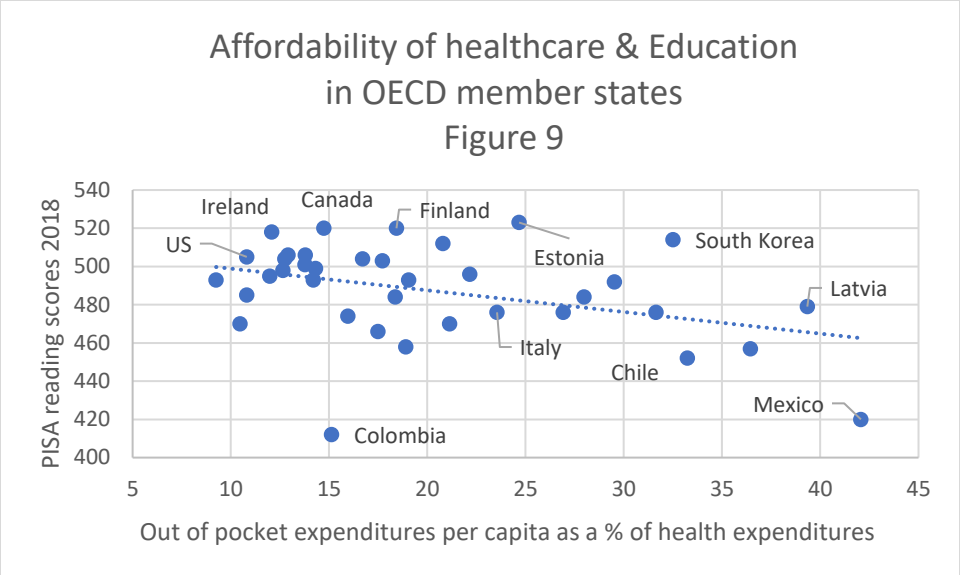




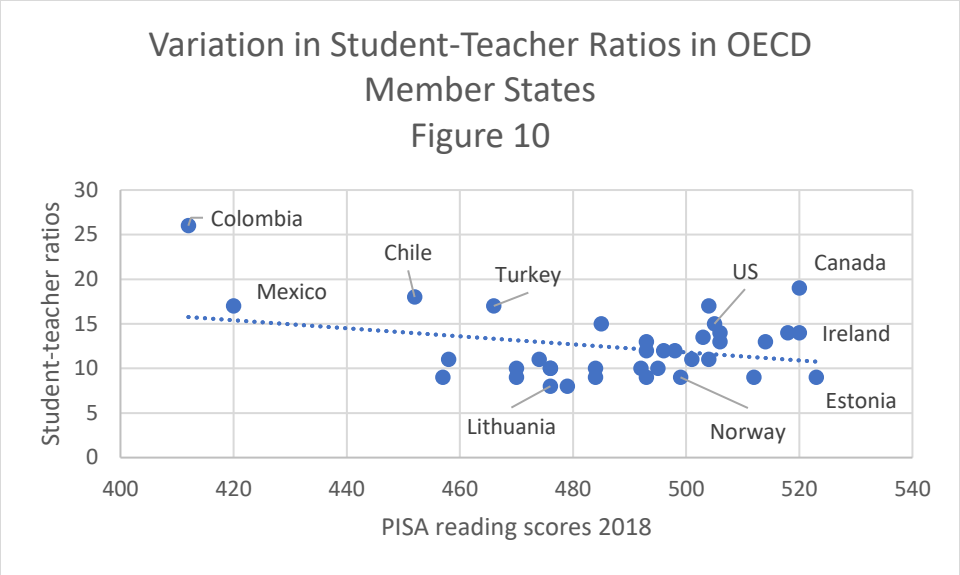
Among countries that spend the most, there is a moderate negative correlation between spending per student and educational outcomes. Figure 7 depicts a correlation coefficient of -0.485, only slightly stronger than the initial analysis of all OECD member countries. Countries like Finland and Canada spend a relatively small amount of money and recoup the highest educational outcomes within the sample. Among countries that have the highest PISA scores, there is a negative correlation between spending as well. Figure 8 depicts a correlation coefficient of -0.502, even stronger than both previous analyses of spending. Countries like

Poland, Estonia, and Ireland have among the highest educational outcomes in all OECD member states and spend significantly less per pupil than countries like the US and Denmark who receive much lower educational returns compared to their financial investment. This is not meant to discount that spending overall does seem to have a correlation with educational outcomes. However, it is evident that spending as a whole does not encompass the entire picture nor directly lead to higher educational outcomes. This can be explained through several different factors.

For example, the role of inequality and sources of additional funding may explain the disparity in spending versus educational return for the US. The US has a relatively high-income inequality for the size of its economy, which translates into large income disparities in different communities since as a very small percentage of the population holds much of the country's wealth. K-12 education has historically been financed primarily through property taxes and state funding (Shaw, 2010). Because of this, the importance of federal funding may be reduced. Therefore, educational outcomes would rely primarily on each individual school district's socioeconomic status and their willingness to invest in education. Funds are not redistributed across local municipalities (Siddiqi et al., 2011). Hence, a school district's funding will vary significantly due to the intensity of income inequality in their geographical location. On the other hand, Canada spends considerably less than the US yet receives higher educational outcomes. Canada's educational funds are collected by provinces and distributed across school districts per student (Siddiqi et al., 2011). Government spending contributes to students' success, but the country-level intricacies discovered within the data are more important than the total sum.



There is a weak but significant negative relationship between the average out-of-pocket healthcare costs as a percentage of healthcare expenditures and educational outcomes. Running a correlation with these variables produces a correlation coefficient of -0.391, weaker than expected but still negative. As out-of-pocket spending increases, educational outcomes decrease. This provides further evidence that health and education do have some correlation to each other. It is unclear from this data which is the causal factor. However, it is reasonable to conclude that both variables have an influence on each other. This aligns with the literature on the topic (Siddiqi et al., 2011).



Student-teacher ratios do have a weak, negative relationship with educational outcomes. Running a correlation shows the correlation coefficient is -0.304. Although weaker than expected as student teacher ratios decrease, educational outcomes do tend to increase slightly. This result may be influenced by the vast majority of OECD member countries having similar and fairly low ratios. The average student-teacher ratio is 12:1. In order to determine significance, a larger sample size may be necessary.

Conclusion

As expected, wealth and income inequality are strongly correlated with educational outcomes across OECD member states. The status of democracy and freedom in a country also prove to be important factors to attain high educational outcomes. Surprisingly, the bureaucratic variables, spending, student-teacher ratios, and affordable healthcare, only showed weak correlations. Additionally, my analysis disproved the hypothesis that political party systems have an influence over the educational outcomes of a country. Finally, the biggest conclusion from this paper is that there is no simple, one-size-fits-all answer to what produces the best educational outcome for students. It can only give us insights to some broad

aspects that can contribute to high quality outcomes. It is extremely difficult to encapsulate the entire picture.

For future analysis, a larger sample beyond economically developed, industrialized democracies within OECD are likely to provide more insightful results. The inclusion of a time element, utilizing data from multiple years of PISA tests, may also contribute to different findings. Further investigation into the impacts of polarization and unionization on educational outcomes may lead to a deeper understanding of comparative education policy. Finally, more in-depth statistical analysis would provide more clarity of both existing and future analyses.

While many stable, developed democracies within OECD are exhibiting more polarization and signs of backsliding into authoritarianism, such as the US and Hungary, the effect it will have on the education of children and the future electorate cannot be understated. My analysis provides evidence that the principles of increasing economic growth, decreasing inequality, and supporting strong democratic values support high educational outcomes. This finding serves as more evidence for developing countries, backsliding democracies, and strong, established democracies to continue to strive towards a creation of a more equal and educated human race.

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