<u>THREE ESSAYS ON THE ECONOMICS OF HUMAN CAPITAL</u>

by

Stephen G. Zimmer
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of
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Three Essays on the Economics of Human Capital

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by

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Dedication

To my loving partner, Laura, for your constant support and intellectual inspiration.

To my parents, Eric and Irene, for their encouragement and support of my passions.

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No great accomplishment in one's life is done alone. I have so many people in my life who I owe thanks for their support, encouragement, contestation, and inspiration. I hope that this brief note can pay homage to those without whom, I would not have completed this project.

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Abstract

THREE ESSAYS ON THE ECONOMICS OF HUMAN CAPITAL

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What role does human capital play in economic growth? More importantly, what role does human capital play in economic theory? Does the state have a role in ensuring human capital is used in its most optimal way? This dissertation will explore these questions and more. The macroeconomic approach to human capital assumes that as a country increases its human capital stock through more education, it will increase economic growth. This is largely due to spillover effects where an educated populace produces benefits to society that are not included in the individual's cost-benefit calculation. These spillover effects often give justification for government intervention in things like education and the use of languages. This dissertation will critically analyze this approach and offer some alternative theoretical contributions from market-process theory and public choice theory to fill some of the gaps.

The first chapter of this dissertation will review the literature on human capital and growth. It examines the history of how empirical studies on human capital and

growth have evolved over time. It also examines the literature on education and specific outcomes (crime, democracy, health, etc.). This chapter shows that the empirical literature has largely failed to show any connection between education and economic growth. I ultimately conclude that the theoretical tools economists have used to answer address human capital and growth are incomplete and misleading.

The second chapter of this dissertation, published in *The Review of Austrian Economics*, addresses the gaps pointed out in Chapter 1. The approach put forward in this chapter adds market-process elements of human capital where human capital investments are guided by institutions, market signals, and entrepreneurship and human capital is treated as a structure – one that is heterogeneous and multi-specific. Adding these elements to the economics of human capital gives economists a more useful theoretical lens for which to analyze the connection between human capital and growth.

The third and final chapter of this dissertation addresses a specific form of human capital investment: languages. Specifically, it addresses a subfield within the economics of language called language policy and planning (LPP) which argues that language diversity in a given society is a public good which requires government intervention to achieve the optimal distribution of language use. Ultimately, I conclude that 1) LPP theory fails to acknowledge the epistemic limitations of language planners' ability to plan an optimal language distribution and 2) even if one assumes language distribution has some public good elements, it is not a sufficient condition for state intervention.

Chapter I: Economics of Education: A Survey of the Theoretical and Empirical Insights into Education and Economic Growth

I.   Introduction

This paper will serve as a literature review on the topic of how education affects economic growth. The question of whether and how education impacts economic growth has been a hotly contested topic among economists for close to a century. Conventional wisdom and macroeconomic theories posit that as a nation becomes more educated, they become wealthier. The basic argument says a more educated populace is more productive (i.e. the quality of human capital increases) thereby increasing economic output. Similar to an increase in the quality of physical capital, an increase in the quality of human capital increases economic output. However, the majority of empirical work done on this topic has not found a strong relationship between the education and economic growth. How can this be? This paper will explore some of the most important theoretical and empirical works on this topic. It will show that many variations of the model have been tried, but ultimately the question of how/whether education fits into growth models remains uncertain.

Early contributions to human capital theory focused primarily on an individual's decision to pursue an additional year of education (Becker 1964 [1994]). The basics of this framework state that an individual's decision to pursue additional schooling is a

function of the expected future earnings they receive as a result of additional education and the opportunity cost of foregone earnings. The empirical literature is abundantly clear that an increase in education will increase lifetime earnings at the individual level. But since most education around the world is financed through government funds, individuals do not fully capture the costs but benefit from the increase in earnings and does not fully enter into the cost-benefit estimate. The only cost relevant to the individual is the opportunity cost of forgone earnings throughout each additional year of schooling. Measuring education's impact on society as a whole includes the cost of education paid through taxpayer dollars in addition to the loss of income for each additional year of schooling.[1] With this additional cost, the connection between schooling and economic growth becomes less clear. Perhaps the added cost of government funds towards education are offset by some positive spillover effects? In other words, there is a possibility that education generates positive externalities that would not be fully captured by market prices and therefore require government subsidies. As we will soon see, even after considering positive externalities, the connection between education and economic growth is not clear.

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[1] Almost all of this literature blurs the distinction between opportunity costs and accounting costs. Foregone earnings for an individual could be an example of opportunity cost. But when economists talk about including the cost of taxation to fund public schools, they are referring to an accounting cost. A potential example of opportunity costs at the social level could be the next best alternative use of taxpayer money, but this is never measured in the growth literature. Moreover, any distinction between 'objective' or 'subjective' costs are completely ignored as well (Buchanan 1999b). Unfortunately, the distinction between opportunity and accounting costs are omitted in the literature. For the purposes of this review, the distinction will have to be ignored for now.

The remainder of this paper will proceed as follows: Section II will explore the macroeconomic theory behind education and economic growth models which have heavily informed the empirical literature that has come out in the last few decades. Section III will discuss the main empirical findings on education and economic growth. Section IV will conclude.

II.   How Education Fits Into Macroeconomic Growth Theory

In most graduate-level macroeconomics courses, students are introduced to the Solow Model (Solow 1956; 1957) early on as the foundation to more sophisticated growth theories that are taught later on. The basic model is generally structured as follows:

$$Y(t) = A(t)F[K(t), L(t)] \tag{1}$$

Where *Y(t)* is output, *A(t)* is a measure of technology, *K(t)* is an aggregate measure capital, and *L(t)* is labor all with respect to time. In Solow's early work, he concludes that economic growth beyond its steady state growth rate is primarily attributable to technological changes. The Solow model was groundbreaking for its time but was soon discovered to be insufficient at explaining cross-national differences in wealth. In other words, it was not useful empirically at explaining why some countries are rich and others are poor. In the years following Solow's contributions, many economists attempted to build off of his model to endogenize the various factors of production in the Solow model. For example, Ramsey, Cass, and Koopman's model endogenized savings, another important ingredient for economic growth in the Solow

model. For the purposes of this paper, the basic building blocks of the Solow Model should suffice before turning the discussion to incorporate human capital.

A. *Early Theoretical Developments in Human Capital*

Arguably the first economist to extensively incorporate education and human capital as an input into economic growth theory was Theodore W. Shultz (1963).[2] Until this point, education had been treated as an institution to instill moral and cultural values in pupils. Economists had largely ignored investments in human capital (i.e. spending on education, health, or relocation) because they had habitually been treated as consumption (Schultz 1961). During the 1950s, economists (Schultz included) attempted to explain the post-war recovery using models that relied heavily on factor accumulation as the primary explanation. It became increasingly obvious that these models were leaving out a "residual" of some kind that was explaining most of the post-war economic growth. For example, if an economy grew by 15% and labor and capital each attributed 5 percentage points to this growth, the remaining 5 percentage points would be the unexplained "residual." To Schultz, human capital was a major part of this residual that was being left out. As a result, Schultz argues that economists underestimated the post-war recovery in West Germany and Japan because they "did not have a concept of all capital and, therefore, failed to take account of human capital and the important part that it plays in production in a modern economy" (Schultz 1961).

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[2] Mark Blaug is said to have called him the "father of the concept of human capital" (Bowman 1980). Schultz's first major publication on human capital came in 1958 but his most comprehensive work on the subject came in 1963.

According to Schultz, in addition to instilling moral and cultural values, schools were also instilling valuable skills for pupils to use in the marketplace once they graduate and enter into the workforce. He framed the discussion of education similar to how physical capital is treated in economic growth models at the time. Students "invest" their time in the form of foregone earnings they could be making in the job market (i.e. their opportunity cost) and expect a return on their investment in the form of a wage premium later in life. As a result, a more educated populace is more productive which increases the amount of goods and services produce and increases economic growth.

In the context of the Solow Model, education enters into the model as a form of human capital (denoted as H(t) below). Similar to physical capital, human capital enhances the productivity of labor which thus increases overall output. The modified equation now looks something like this:

$$Y(t) \ = \ F[K(t), A(t)H(t)] \tag{2}$$

Where *H(t)* measures human capital as a function of labor and years of schooling with respect to time.[3] This modified version of the Solow Model was formalized by Uzawa (1965) and Lucas (1988) which was meant to encapsulate the "Solow residual."

Jacob Mincer was another early contributor to the theory of human capital. His first contribution came in his 1958 paper *Human Capital Investment and Personal Income Distribution* where he, like Schultz, hypothesized that differentials in income

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[3] Terminology and variables are used from Romer (2011).

across countries is (at least partially) attributable to differences in human capital. His primary focus was to develop a mathematical formula to explain interoccupational and intraoccupational differences in income with the former attributable to formal training (i.e. education) and the latter attributable to on the job training (Mincer 1958). Mincer would later develop a basic regression model for estimating individual and national returns to education that is rooted in the developments by Schultz and Mincer that human capital is part of the "residual" factor of economic growth. The basic formula for private returns is set up like this:

$$lny = \beta_0 + \beta_1 edu + \mu \qquad (3)$$

In this equation *lny* is the natural log of income per capita, *edu* is years of education, and μ is the error term. The slightly modified equation to measure social returns to education is:

$$lnY = \beta_0 + \beta_1 EDU + \mu \qquad (4)$$

In this equation *lnY* is the natural log of aggregate income and *EDU* is the average national years of education (Mincer 1974). The so-called "Macro-Mincer" equation (term coined by Heckman and Klenow 1997) quickly became the most popular tool to measure private and social returns to education. The simplest way to interpret this equation is if β_1 = 10%, a one year increase in the average national years of education increases GDP by .1%. If the social returns to schooling are larger than the private returns, it means there are positive externalities that are not captured in estimate of private returns. If social

returns are lower than private returns, it suggests that there may be negative externalities (i.e. education is primarily job market signaling). The distinction between social and private returns is critical to understanding the boarder conversations about education and human capital to follow. From the point of view of welfare economics, if researchers could prove social returns outweigh private returns, then government subsidies are needed to equalize private benefits with social benefits. Many of the most important empirical studies in the economics of education would use modified versions of the Mincer equation in the 90s and 2000s which will be covered in more detail in the following section.

Building off Shultz and Mincer's contributions, Gary Becker (1964[1993]) put forward a theoretical model of human capital that is still considered to be the gold standard in neoclassical economic theory today. His contributions expanded on Shultz's proposition that the appropriate measure of the 'investment' in human capital is not just tuition costs (or taxes that go to public schools) but more importantly the foregone earnings of each individual per year of additional schooling. Becker's model differs from Shultz's in two ways: 1) it emphasizes not only formal schooling but on-the-job training as factors that contribute to human capital formation and 2) it is a theory designed to answer microeconomic rather than macroeconomic questions ("why do people invest in additional schooling or job training?" versus "is human capital a major factor in determining the causes economic growth?").

During the late 1960s and much of the 1970s, mainstream interest in Solow growth accounting models had dwindled in favor of "Neo-Keynesian" models. As a

result, theoretical innovations in human capital fell by the wayside.[4] After the stagflation of the 1970s it was apparent that Neo-Keynesian models were not useful when predicting macroeconomic phenomenon. During this period, economists began to show renewed interest in Solow growth accounting models and with it, human capital empirical studies came into fashion once again.

Finally, contributions to growth theory by Robert Barro are worth including in the list of contributors to human capital theory. The primary difference between Barro's work and the previous contributions is that his focus was on income *growth* rather than income *levels*. The basic Barro growth regression is included below[5]:

$$average\left[\ln\left(\frac{Y}{L}\right)_t - \ln\left(\frac{Y}{L}\right)_{t-1}\right] = \beta_0 + \beta_1 \ln\left(\frac{Y}{L}\right)_{t-1} + \bar{\beta}\bar{X} + \mu \qquad (5)$$

This equation measures the average income per worker growth between time period *t-1* and *t* to be a function of the income per worker growth at time *t-1* and *X-bar,* which is intended to capture a long list of control variables, human capital being one of them. Barro's analysis is intended to show how countries below their steady state growth path tend to have larger levels of growth until the 'catch up' to more developed countries. But importantly, this model continues in the tradition of treating education and human capital as an input, and attempts to measure its contribution to economic growth.

B. *Education and Positive Externalities*

[4] See Blaug (1976) for a review of the literature up until this point.
[5] DeLong (1988) uses a similar growth model only instead of using output per worker, DeLong uses output per person.

In addition to the large amount of research dedicated to modeling education, human capital, and economic growth, there is also a significant amount of literature arguing that education indirectly contributes to economic growth in the form of positive externalities. Positive externalities occur when the benefits of the production of a certain good spill over to individuals who did not compensate the producer for said benefits. Since the net private benefits to producing goods with positive externalities are less than the net social benefits, goods with positive externalities will tend to be underproduced by the market unless producers are compensated through bargaining or government subsidies. The positive externality argument is commonly used by welfare economists to justify government subsidization of primary and secondary schools.[6] The idea that education produces positive externalities is certainly not new. In fact, it even predates the post-WWII discussions on human capital and economic growth discussed above. The most common examples cited in the literature are reduced crime, voter participation/making democracy work, equality of opportunity, and health.

Reducing crime is one of the oldest positive externalities of education identified by researchers. Consider this passage from economist W. T. Thornton in 1846 justifying early state interventions into primary schooling in the UK:

No one now denies that proper schools for the lower orders of people ought to be founded and maintained at the cost of the state. The expense no doubt would be considerable, but it would scarcely be so great as that

[6] Lessons from welfare economics tell us if education generates positive externalities it may be justified to *subsidize* schools, not necessarily have compulsory governments-run schools.

already incurred for prisons, hulks, and convict ships; and it is certainly

better economy to spend money in training up people to conduct

themselves properly, than in punishing them for their misdeeds (Thornton

1846; quoted in West 1965[2010]).

Over 100 years later, these sentiments continued to influence public policy. The Robbins

Report on Higher Education in the UK (1963) was designed to recommend further public

investment in university education. One of the major justifications in the report was that

education has social benefits that includes reducing crime. According to this theory,

schools prevent crime in two key ways. First, if disadvantaged students are in school,

they are not out on the streets resorting to crime to earn extra money. Second, a well-

rounded education influences students to choose a viable career path that does not include

a life of crime. The report goes on to say that public funds for schools/universities can be

a better substitute than public funding for police forces. If education is a successful

deterrent of criminal activity, fewer resources are needed for a police force.

Using education as a means to create a society of informed voters is another

positive externality that dates back to the 19th century. Similar to reducing crime, the

creation of informed voters to make a democratic government work was one of the

leading arguments supporting the public school reform efforts in the US and UK in the

19th century. Horace Mann is widely considered to be the father of the public school

movement noted in his 1847 report that free and universal schooling is "indispensable to

the continuance of a republican government" (Mann 1847). The general argument goes

something like this: if a democracy is to survive, it depends on its citizens having a

minimum ability to critically evaluate politicians and their policy proposals or else the

nation risks electing despots who 'trick' uninformed or misinformed voters. Free and

compulsory schooling reforms were intended to prevent this from happening. Mann and

other public school reformers were writing at a time when literacy rates were on the rise

as evidenced by the increase in spread of newspapers, especially among the poorer

classes (West 1965). It was also during a time when universal suffrage movements were

gaining popularity and more people were being given the right to vote (except women).

In the US, by the end of the 1820s, most states had extended voting rights to non-

property-owning white males. By 1870 all men regardless of race were given the right to

vote. As the voting franchise grew, there were growing concerns about poorer, less

educated men voting. Universal education was intended to be a solution to these growing

concerns. Even self-proclaimed champions of free-markets have found this argument

convincing. John Stuart Mill was famously a champion of public schools despite his

appreciation for laissez-faire markets (Mill 1848, West 1965). Jack Wiseman, an early

contributor to public choice theory, subscribed to this argument as well (1958). Lastly,

although he later changed his mind on the issue, Milton Friedman was heavily persuaded

by the "informed voters" argument in his earlier work. Consider this passage in Milton

Friedman's seminal book *Capitalism and Freedom*:

> A stable and democratic society is impossible without a minimum degree
>
> of literacy and knowledge on the part of most citizens and without
>
> widespread acceptance of some common set of values. Education can
>
> contribute to both. In consequence, the gain from the education of a child

accrues not only to the child but also to other members of the society (Friedman 1964).

Equality of opportunity is another positive externality identified primarily by public school reformers in the mid-20th century. This is not to be confused with equality of outcome (commonly referred to as "income equality" in popular and academic discourse). Equality of opportunity commonly refers to removing as many arbitrary obstacles to success, especially for the least well-off, while income inequality refers to distributions of income regardless of whether they are the result of arbitrary obstacles or skill (see Friedman and Friedman (1990) for a full discussion). Despite this distinction, the definition of "equality of opportunity" on a philosophical level differs depending on who you ask. In the context of education policy, a proper education is intended to be a path for poor children to escape out of the cycle of poverty by increasing the range of opportunities available to the least fortunate than they otherwise would have. Burton Weisbrod, an economist who wrote extensively on the positive externalities of education, is arguably the first economist to identify equality of opportunity as a positive externality of education. Consider this passage from his 1962 essay:

> Equality of opportunity seems to be a frequently expressed social goal. Education plays a prominent role in discussions of this goal, since the financial and other obstacles to education confronted by some people are important barriers to its achievement. If equality of opportunity is a social goal, then education pays social returns over and above the private returns to the recipients of the education (Weisbrod 1962).

E.G. West (1965) takes the position that the definition of the word "equality of opportunity" is elusive concept and open to interpretation depending on one's ethical/philosophical preferences.[7] But where the economic way of thinking enters into the discussion is the question of whether governments or private markets are better equipped at achieving the goal of equality of opportunity. He concludes that it is not clear that government control over education promotes equality of opportunity better than private provision of education. To analyze this argument, we can examine attempts by the US federal government's interventions in public schools for the last 50 years.

The Elementary and Secondary Education Act of 1965 was the first major legislation passed by the federal government to curb inequalities in educational achievement. In President Lyndon B. Johnson's own words, the sole purpose of the ESEA was to "bridge the gap between helplessness and hope for more than five million educationally deprived children" (1965). Sociologist James Coleman (1966) was arguably the first to identify this "achievement gap" where students in poor regions of the country were performing worse on math and reading test scores compared to students from wealthier backgrounds. Public schools are generally financed through property and/or sales taxes, depending on the state. As a result, public schools in poor districts are underfunded compared to wealthier districts. The ESEA was the first major attempt by the federal government to provide funding to public schools in poor districts to help close the achievement gap. It would pave the way for the creation other major federal programs

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[7] To see contemporary discussions on this issue from a philosophical perspective see Brighouse and Schmidtz (2019).

such as the creation of the Department of Education in 1980 as well as the controversial No Child Left Behind Act (NCLB) of 2001. The idea behind these measures was to counteract the socioeconomic barriers that children from poor backgrounds faced early in life by giving them the same quality education as students from wealthier backgrounds in order to allow them the same opportunities in life that they may otherwise not have. The mechanism to achieve this is to equalize school funding between poor schools and wealthy schools by providing additional funding to poor schools.

Finally, economists identify an increase in health outcomes as another positive externality of education. The logic here is that a more educated society is more aware of health risks and therefore puts society at large less at risk of spreading disease or spreads positive health habits. The first connection between education and health benefits was not identified by economists but by two sociologists, Kitagawa and Hauser (1974). Their paper concluded that mortality rates are correlated with education; less educated people are more likely to die earlier. The empirical literature that followed expanded the definition of "health" to include things like healthy lifestyles (low levels of drinking, smoking, eating unhealthy foods, etc.). Unlike the previous positive externalities mentioned above, health was not added to the list until much later in time. Most studies that connect health outcomes to education (see Lochner (2011) for a review) assume that more educated individuals are more likely to engage in healthier lifestyles that affect others (i.e. smoking) and are less likely to spread contagious diseases. The majority of the literature to follow the Kitagawa and Hauser piece is empirical in nature and will be covered more extensively in the next section.

C. Is Education Signaling?

Another theory discussed in the literature is the possibility that education acts as a signaling/screening device for employers, rather than a contributor to human capital. Fritz Machlup (1970) and Michael Spence (1973) were the first to identify the connection between job market signaling and education. The argument goes that education is used for students to "show off" their intelligence, conformity, and conscientiousness to future employers in order to increase their chances of being hired. Rather than training students with relevant skills, schools merely act as a way to certify students and do not contribute much to their human capital. Early empirical tests (Cohn, et al. 1987; Boissiere, et al. 1985) found no significant evidence of signaling effects. Later contributions from Caplan (2018) revisited the arguments and made a strong case for education as a signaling device both from a theoretical and empirical perspective. While I am sympathetic to the signaling theory of education, the remainder of this paper will primarily consider the human capital theory (unless otherwise noted) since it still remains the dominant tool economists use to explain education in the context of economic growth.

III.   Empirical Results: Does Education Cause Growth?

So far, we have gone over the history and basic theoretical building blocks of how education fits into economic growth theory. Are these theoretical models backed by the evidence available? The answer to this question has been vigorously debated over the last 50 years and no decisive conclusion has been accepted so far. But for the purposes of this paper, it is important to understand how the debate has progressed over the years in order

to see how far we've come in terms of empirically testing education's contribution to economic growth.

A. Growth Models

As mentioned in the previous section, soon after the groundbreaking contribution by Robert Solow, economists began to wonder whether there were missing elements that could be incorporated into the model. Estimating the inputs of labor and capital only get so far in estimating the drivers of economic growth. Human capital was thought to be the missing piece (or at least part of the missing piece). As soon as Schultz (1961) laid the foundations for incorporating human capital in economic growth models, researchers almost immediately began to work on estimating the returns to education. Early attempts by Edward Denison (1962) and Gary Becker (1964[1994]) provide upper and lower bound estimates of the "social" returns to education.[8] Becker provides an initial simple estimate of the social rate of return to be roughly 13% for college graduates which counts direct costs (tax dollars and other expenditures towards education) and indirect costs (foregone earnings) unadjusted for ability (which Becker argues has very little effect on the estimated return). Denison, in his book *Sources of Economic Growth in the United States*, attempts to estimate the external effects of education on economic growth. He estimates that of the 1.60% average annual growth in the United States from 1929 – 1957, .58 percentage points of this growth is the residual "growth in knowledge." Denison suggests that education has an indirect effect on the growth of knowledge and if

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[8] These early estimates were based on data from the US.

this effect is proportionate to its effect on the growth in wages, the social returns to education would be as high as 25%, which Becker considers the upper bound. Both Becker and Denison admit that these metrics are speculative at best and better data are needed, a theme we will see arises again and again among researchers who attempt to estimate the social returns to education.

As mentioned in the previous section, the remainder of the 1960s did not see many additions to human capital theory or attempt to measure its contribution to economic growth. The first comprehensive study to estimate the social returns on education since Becker in 1964 was Psacharopoulos and Hinchliffe (1973). The study was unique because it gathered data from 32 countries around the world to compare the impact of education on economic growth. Until this point, the primary focus had been estimating the returns to education in the United States. In 1981, Psacharopoulos released an updated study including 13 additional countries and shared his results. The results imply quite large social returns to education, especially in developing countries. But these returns are high because they are measuring the returns within each country in question. Cross-national empirical studies would not make an appearance on the scene until years later. Social returns from those completing primary school were estimated as high as 82 percent in Venezuela and as low as 7 percent in the Philippines (Psacharopoulos 1981).[9] Psacharopoulos's methodology is unique as well. His mathematical model combines uses three different methodological techniques. The first of which is what he calls the "elaborate" method which was used by Schultz and Becker in the earlier days of human

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[9] Primary school social returns in developed countries were not measured in this study.

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capital literature. The second is what he calls the "earnings function" method which is basically the Mincer regression. The third is what he calls the "short cut" method which combines the first two methods. Since his data come from multiple sources, different methodologies are used in different countries but preference is given to the "elaborate" method despite the fact that it is more difficult to test empirically. A summary of his findings is re-created in Table I below.

Table 1: Returns to Schooling by region and country type (%)

Region or country type	N	*Private Returns*			*Social Returns*		
		PRIM	SEC	HIGH	PRIM	SEC	HIGH
Africa	9	29	22	32	29	17	12
Asia	8	32	17	19	16	12	11
Latin America	5	24	20	23	44	17	18
LDC Average	22	29	19	24	27	16	13
Intermediate	8	20	17	17	16	14	10
Advanced	14	-	14	12	-	10	9

N = number of countries in each group
PRIM = primary school
SEC = secondary school
HIGH = higher education
Source: Psacharopoulos (1981)

As the table demonstrates, social returns at all levels of schooling show returns above 10% which is larger than the estimated return to physical capital at the time. Additionally, social returns in developing countries tend to be larger than in advanced countries suggesting diminishing marginal returns. Another consistent result with these findings is that the private rates of return tend to be larger than the social rates of return.

While later empirical studies (Krueger and Lindahl 2001) would seem to suggest that this discrepancy is potential evidence of job market signaling, Psacharopoulos dismisses this claim. He cites evidence that "initial" and "persistent" employer screening do not show any evidence of signaling. The basic idea is that while a college degree may get one's foot in the door, the evidence shows over time employees 'reveal' themselves to employers and any wage premium associated with the signal eventually washes away.

Undeterred by the social and private returns discrepancy, Psacharopoulos concludes at the end of this study that "top priority should be given to primary education as a form of human resource investment" (Psacharopoulos 1981 p. 333). This was one of the first studies to empirically test the conjectures of 19th and 20th century school reformers – schooling not only has large private rates of return but also has some returns at the social level. Psacharopoulos also addresses several concerns with his study that will be common themes in the empirical literature for the next few decades.

One controversial problem with Psacharopoulos's study is that he does not control for ability bias. Ability bias is often used in education returns studies in order to account for students who have natural abilities above the average that may contribute to the inflated returns. Students with above average ability would perform well in the job market with or without education so including this as a control variable allows analysts to make apples to apples comparisons. Family background, IQ, and ambition are commonly used controls for these kinds of studies. However, Psacharopoulos dismisses this by claiming that his own empirical findings (Psacharopoulos 1975) show that "ability differentials do not account for much of the variation" (Psacharopoulos 1981).

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Throughout the remainder of the 80s and 90s, Psacharopoulos and his team of researchers continued to be the accepted standard for social returns to schooling, updating their results approximately every decade (Psacharopoulos 1985; 1994; Psacharopoulos and Patrinos 2004).

B. Cross-National Estimates

Psacharopoulos's research implies large social returns to education, especially in less developed countries. But his results estimate the social returns within each country. Cross-national studies, by contrast, are meant to measure how much of the differences in growth rates between nations can be explained by factors like physical and human capital. The 90s and 2000s saw a flood of empirical research on the topic. One of the most widely-cited pieces on this topic came from Mankiw, Romer, and Weil (1992). Their paper attempts to reconcile the augmented Solow model to account for variations in cross-country income by adding human capital. Using secondary school enrollment as a proxy for human capital, they estimate that human capital accounts for approximately 50% of variations in growth rates. These findings did not go unchallenged though. First, Easterly (2002) and Pritchett (2001) point out that secondary education enrollment rates as a proxy for human capital is problematic for two reason. First, enrollment rates are a bad measure of steady-state human capital since the rate fluctuates over time (especially in poor countries). Second, using secondary (as opposed to primary) school enrollment rates allows Mankiw et al. to explain more of the variation. Primary school enrollment rates explain far less of the variation, which means using secondary enrollment rates biases human capital's share upwards (also pointed out by Klenow and Rodríguez-Clare

(1997)). The second major challenge to Mankiw et al.'s findings is that the model seems to imply that returns to skilled workers in poor countries are three times higher than skilled workers in rich countries (Romer 1995). This prediction is obviously false, as high skill wages in the United States are 24 times larger than in India (Easterly 2002). Moreover, if the wage differential implied by Mankiw were true, we would see net high-skill labor migration flows from rich countries to poor countries. We in fact consistently see the opposite trend.

Following the controversial findings by Mankiw et al, researchers from this point forward would primarily use the Macro-Mincer equation to estimate their findings as this tool was found to be a more accurate description of reality. As Aghion and Howitt (1997) point out, the empirical literature on human capital and growth split between two strands. The first strand treats human capital as another form of capital in endogenous growth models. In these models, the *change in human capital over time* causes economic growth. Models like those found in Uzawa (1965) and Lucas (1988) fit into this strand. The second strand estimates the *initial stock* of human capital in period *t-1* and its impact on economic growth. One of the most famous papers to estimate this was Romer (1990) who found that initial levels of human capital (estimated by literacy rates) were slightly better predictors of growth than growth in human capital over time. Romer approximates a one percentage point increase in literacy rate increases growth 1.5%.

Most prominent studies to come out during this time combined the average change in human capital over time and initial stock of human capital approaches in their analysis. Studies like Barro & Sala-i-Martin (2004) and Benhabib & Spiegel (1994)

conclude that changes in human capital over time are not significant and sometimes even generate negative results. Both employ the Macro-Mincer methodology and show that the initial stock of human capital matter more than changes over time. Not everyone is convinced by these estimates. For example, Topel (1999) challenges the Benhabib & Spiegel on methodological grounds and Krueger & Lindahl (2001) argue data quality is partly to blame for the seemingly low social returns to changes in human capital over time. Krueger & Lindahl in particular adopt a clever way to overcome the measurement error problems from available data by creating reliability ratios between the two most prominent data sources at the time: Barro & Lee (1993), Kyriacou (1991), and the World Values Survey. After incorporating these reliability ratios, the results show a lower bound 3.1% return for 5 year changes, all the way up to 18.4% for 20 year changes (Krueger and Lindahl 2001; p. 1119). However, in order to obtain these results they omit physical capital, the "rule of law" index as seen in Barro (1991,1996), and ability. Physical capital is added later in the paper which slashes the results to between 1.3% to 1.7% and completely eliminates any statistical significance.[10] Rule of law is eliminated because, as Krueger and Lindahl argue, "those other variables (rule of law) are probably influenced themselves by education" (Krueger and Lindahl 2001; p. 1119).

By this time in the history of returns to schooling literature, "ability" was not included in empirical studies especially since the publication of David Card's (1999) findings. Ability bias overstates the effect of education but measurement error understates

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[10] The returns jump to 8.3% and are significant only when they fix the return to log capital per worker at 35%.

education's effect on growth so it is argued by most prominent labor economists that it is not necessary to control for it. Therefore, most major publications on private and social returns to education feel comfortable omitting ability bias. In closing, Krueger and Lindahl once again lament persistence of measurement error when estimating educational attainment. Even though they found a way to work around these issues, their results only yield significant coefficients when they drop physical capital. Later studies from de la Fuente and Doménech (2006) and Cohen and Soto (2007) claim to have overcome the measurement error problems by diversifying the measurement of education into separate categories and reporting the results individually. Even then, the average effect of all eight measurements of educational attainment is 1.3% (Caplan 2018). Most recently, Barro and Lee (2013) updated their data set to account for the numerous measurement errors identified in previous work. So far, no one has taken the challenge to estimate the social returns to education using this data.

Given the difficulties of measuring educational attainment around the world, a number of prominent studies attempted to measure the social returns to education within the United States, where data is much more reliable. Rauch (1993) attempts to estimate the social returns by comparing average years of educational attainment with wages and land rents using data from Standard Metropolitan Statistical Areas (now called Metropolitan Statistical Areas). Acemoglu and Angrist (2000) used changes in compulsory schooling laws (CSLs) between 1920 and 1960 as a natural experiment to measure the social returns to education. Moretti (2004) attempts to measure unobservable characteristics of individuals who work in cities to see if there is a difference in ability

associated with differing levels of college attainment. Each of these studies has varying degrees of results ranging from implausibly large results (Moretti 2004) to implausibly small (Acemoglu and Angrist 2000). Overall, it is generally considered that these studies find "the evidence for positive external returns is weak, at best, and founded on dubious identifying assumptions" (Lange and Topel 2006; p. 27).

Economists largely gave up on measuring the social returns to years of schooling in the late 2000s given the difficulties of measurement errors. What has taken its place, and what dominates most of the economics of education literature today, is measuring test scores against social returns, rather than simply years of schooling. Eric Hanushek is the most vocal proponent of this view. The basic set up is similar to previous theoretical frameworks, but instead of years of schooling (or literacy rates) to proxy for human capital, they measure specific math, reading, and science test scores as a proxy. Hanushek makes a compelling case for substituting average years of schooling with test scores as a measure of human capital:

> The most important caveat with the literature on education and growth reviewed in the preceding section, though, is that it sticks to years of schooling as its measure of human capital at the neglect of qualitative differences in ensuing knowledge. As discussed, this neglect probably misses the core of what education is all about. And this neglect is clearly more severe in cross country comparisons than in analyses within countries (such as the prior work on earnings determination). Rather than just counting students' average years of schooling, it seems crucial to

focus on how much students have learned while in school when estimating

the effect of education on economic growth. (Hanushek and Woessmann

2008; p. 632-633)

To Hanushek, years of schooling is an input to human capital, not an output. And

since human capital is an input in production functions, macroeconomists have been

using measuring inputs of inputs in production functions all along. Test scores are a much

better way of measuring how much students retain from their years in school and whether

it is a predictor of future returns (individually and socially).

What do his results say? Hanushek's early estimates imply very large returns to

increased test scores. Hanushek and Kimko (2000) find a one standard deviation increase

in average test scores at the country level would increase *growth rates* by one percentage

point. These are potentially trillion dollar returns each year. Similar studies to follow

show similar results. Bosworth and Collins (2003) and Ciccone and Papaioannou (2009)

extend Hanushek and Kimko's earlier results to cross-country growth regressions and

find that test scores increase the predictability of human capital on growth when

compared to using average years of schooling. Hanushek and Woessmann (2008) then

expanded the data set and updated the results. After controlling for GDP per capital

growth in the base year (1960), years of schooling in the base year, and institutional

factors, they estimate that a one standard deviation increase in the average of math and

science PISA scores would have increased GDP *growth rates* during the 40 year period

by 1.27 percentage points. More recent studies by the duo confirm similar results (E. A.

Hanushek and Woessmann 2012). Unlike the measurement quality that plagued previous

results, Hanushek's results come from OECD's Program for International Student Assessment (PISA) test scores which are universally applied around the world. Also, unlike previous estimates of social returns, these results are tractable over various studies and do not require sophisticated mathematical alterations to achieve any meaningful results. Moreover, Hanushek's research on test scores are the first to show that the social returns outweigh the private returns (E. A. Hanushek and Kimko 2000).

C. Interpreting the Results

After examining the literature on the social returns to education, it is not obvious whether or not the social returns to education *exceed* private returns. Even the research conducted by Psacharopoulos and his team, which shows massive social returns within the countries he studied, still show that private returns are larger than social returns across the board (see Table 1). Most scholars in this field lament the lack of quality data as a reason why results are not as reliable. However, others are even more pessimistic. Mark Blaug (1976) in the early stages of the human capital research program raised some serious doubts as to the status of the this approach, especially targeting attempts to estimate the "earnings" function both from a private and social returns perspective. He first doubts whether schooling is an accurate measure of human capital given ability biases. But even when ability is taken into consideration, there are difficulties and nuances that are impossible to incorporate. For instance, should we be measuring family background, IQ, or 'motivation?' How do we know these factors are pre- or post-school influences? Since most economists don't even bother to include ability bias in their estimates, these questions are left unanswered.

Pritchett (2001) has long since determined that the existing macro evidence does not support the notion that social returns exceed private returns. But he does *not* claim that bad data is the reason for this finding. He gives three reasons for why the evidence does not add up: 1) Increasing education in politically dysfunctional countries may encourage educated workers to engage in rent-seeking which increases private returns but may decrease social returns[11], 2) The demand for educated workers has remained stagnant but the supply has increased dramatically over the last 50 years, and 3) Schools are ineffective at instilling cognitive skills in pupils that contribute to productivity later in life. Later on, he would add to his discontent by claiming cross-national measurement techniques are completely ill-equipped at answering the questions economists try to answer when it comes to returns to education. He would go as far to say "it is reasonable to avoid using this type of aggregate data for any purpose for which individual level data would do" (Pritchett 2006).

Bryan Caplan also has issues with the way education is studied by labor economists that are relevant for our discussion. First, he vehemently disagrees with the elimination of ability bias controls in studies like these. Labor economists since the late 1990s largely abandoned including controls for ability in econometric estimates of the returns to education, especially after David Card's (1999) seminal study. The bottom line is that labor economists see little to no evidence of ability bias in their studies but Caplan argues there is plenty of good statistical research to confirm it is worth including.[12]

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[11] Easterly (2002) makes a similar claim.
[12] For a review of the literature, see Caplan (2018; p. 76-79).

Almost all of the studies discussed above completely ignore ability bias when estimating the social returns to education. Even with this omission, the results are still not convincing.

Caplan's second critique of studies like these is that researchers constantly complain about the bad data surrounding educational attainment, but they never consider the possibility of measurement error with other variables in the model. For example, most of these studies account for things like investment in physical capital, output per worker, or GDP per capita. While it is true that data on educational attainment, especially in poorer regions of the world, are questionable at best, there is rarely any mention of the possibility of bad data for everything else.

What about research on test scores? The research by Eric Hanushek and others seems to yield consistent and significant returns through using test scores. Caplan once again casts doubt on the significance of these results for three reasons. First, standardized tests measure what is taught in school, not necessarily what skills are needed in the labor market. He argues, "the vast majority of modern jobs use little math and virtually no science" (ibid; p. 120). Second, these studies continue to leave out estimates of ability bias (IQ in particular could be a strong omitted variable) which could be what test scores are capturing. Third, it does not seem plausible to give schools 100% credit for student test scores.

A deeper issue with this is even if we concede test scores are the key to unlocking enormous gains, the question on how we accomplish this is up for debate. Hanushek

himself argues simply increasing school resources has no noticeable effect on test scores (which we will discuss later in this chapter). Increasing the average years of schooling is relatively easy to accomplish, especially where governments can impose compulsory schooling laws (which is the vast majority of the world). Increasing test scores is a much more complicated question.

Regardless of what complications or obstacles one has in mind, the main takeaway is that the macro literature does not come to a cohesive conclusion on what the social returns for education are and whether they are larger or smaller than the private returns. Krueger and Lindahl's (2001) results are widely considered to be the gold standard and their best estimates is an extra year of schooling for a nation increases GDP growth by 1.5 percent (not percentage points). Compared with the generally accepted private returns worldwide, 9.7% according to Psacharopoulos and Patrinos (2004), there is simply nothing in this literature to suggest that social returns are larger than private returns.

But what if the positive externalities exist in other areas? Macroeconomists often assume that if there are positive externalities to education, they will show up in growth measurements and the returns will be larger than private returns to education. But what if these factors, for whatever reason, do not show up in growth estimates and need to be measured individually? The remainder of this section will now revisit the externalities listed in Section II to see if the empirical literature determines any link to these externalities.

D. Measuring Positive Externalities Individually

Crime

Does an increase in education reduce crime? According to Lochner (2011), education can decrease crime in four different ways: "(1) education raises wage rates, which raises the opportunity costs of crime; (2) education may directly affect the financial or 'psychic' rewards from crime; (3) education may alter preferences for risk taking or patience; and (4) schooling may affect the social networks or peers of individuals" (ibid; p. 193).

In order to test these theories, Lochner categorizes empirical studies in three different buckets. First, he examines the evidence of school attendance on criminal activity. Using OLS and IV, Lochner and Moretti (2004) estimate that an extra year of education reduces the probability of imprisonment by .1 percentage point for white people and .4 percentage points for Black people. Additionally, they estimate that by increasing high school completion rates by 1% saves approx. $20.9 billion (in 2008 dollars) in reduced incarceration and victim costs.

Second, he examines the evidence of school quality on criminal activity. Two prominent natural experiments that addressed this question gathered data on students randomly assigned through a lottery system to attend selective schools (i.e. better quality schools) in their region. Cullen, Jacob, and Levitt (2006) estimate that students who won a school lottery in Chicago were 60% less likely to be arrested. Deming (2011) ran a similar study compares only students who are classified as "high risk," meaning they are

determined to have a higher probability of being arrested. High risk students who were randomly assigned a better-quality school were 45% less likely to be arrested with a felony 7 years after the random assignment than students who attended their traditional school.

Finally, he examines the evidence of whether students who are in school are less likely to commit crimes. To estimate this, researchers gathered data from states that changed compulsory laws or momentary school closures (i.e. teacher strikes) in order to estimate the impact of exogenous changes in school attendance and crime. Anderson (2014) selected states that increased compulsory attendance laws (for instance, changed the dropout age from 16 to 17) and used difference-in-difference regressions to estimate whether these laws had any effects on crimes committed by 17-year-olds before and after the laws passed. He finds that changing the dropout age to 17 reduces arrests for 17-year-olds by 8% and compulsory schooling age of 18 reduces arrests for students aged 16-18 by 9.7% - 11.5%. Bell, Costa, and Machin (2016) would find similar results. Luallen (2006) used teacher strikes as an exogenous change in school attendance to estimate the effect on crime compared to regions that remained in school. He finds that extra day in school reduces property crime by 29% but *increases* violent crime by 32% in urban regions.

How should we interpret these results? The studies mentioned above that argue increase in average educational attainment reduces crime fail to account for ability bias, similar to social returns literature. In this case, 'ability bias' would take the form of students who may already be prone to criminal activity (as measured by personality traits

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or past delinquent behavior). Studies that take this into account (Arum and Beattie 1999; Webbink et al. 2013; Caplan 2018) all find that the association between an increase in years of schooling does not decrease the probability of criminal activity.[13] The school choice lottery natural experiments seem to confirm with relative confidence that school quality has a strong association with lower criminal activity. What these studies show is that the *quality* of the school matters more for reducing student criminality than merely keeping students in school longer. The last group of studies, whether students physically being in school helps lower criminal activity, show mixed results. Studies that examine compulsory laws fail to take into account personality characteristics or past delinquent behavior. Moreover, they only show that compulsory laws affect students at that age decrease as a result of the law. It does not show long-term decrease in criminality. Days off studies seem to show criminal activity working in opposite directions depending on the type of crime. Overall, the literature on education and criminality does not seem to depend on the *level* of overall education but rather the *quality* of schooling children receive.

Voter Participation/Making Democracy Work

Do more educated citizens increase the quality of democracy? Attempts to answer this question come in two forms: 1) education and democratic participation and 2) education and the quality of democratic regimes. The literature is very clear that more

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[13] Even Lochner and Moretti (2004; p. 180) show that after adding additional controls for ability and family background, the association between education and criminality drops significantly.

educated individuals are more likely to vote.[14] But upon further reflection, the act of voting is not necessarily a social benefit by definition. After all, plenty of despotic regimes throughout history have been democratically elected only to strip away the same democratic institutions once they are in power. Given this complication, we can safely say the first reason is not definitively a social benefit.

What truly matters is whether education reinforces democratic institutions in the long run. The answer to this question, once again, largely depends on who you ask. The evidence is clear from Barro (1999) that education and democracy are highly correlated. As to whether there is strong causation, Bobba and Coviello (2007), Castelló-Climent (2008), and Fortunato and Panizza (2015) all find positive effects of education on democratic institutions while Acemoglu et al. (2005) and Lochner (2011) are unconvinced that the existing empirical studies show any evidence of a strong connection between education and democracy.

A strong reason to doubt these results is that there is plenty of evidence to suggest that schooling has a negligible effect on students' long-term knowledge retention.[15] Simply put, merely keeping children in school longer or teaching them more testable material does not increase their ability to retain knowledge. If the evidence shows formal schooling has little to do with retaining knowledge that students were taught in school, how can we expect schools to promote 'good' democratic institutions? A further complication is the possibility of reverse causation: what if democratic regimes allow for

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[14] For a summary of these results see (Lochner 2011; p. 265).
[15] For a review of this literature see (Caplan 2018; p.39-50)

education to flourish more than autocratic regimes which is why democracy and education are correlated? More robust research is needed in this area before we can completely rule it out. These wrinkles in the literature are left unanswered which is why the connection between education and 'good' democratic institutions is not well established.

Equality of Opportunity

Does more education promote "equality of opportunity?" Answering the question of what defines "equality of opportunity" is beyond the scope of this paper. Even if we leave the definition of equality of opportunity open to interpretation, testing the hypothesis that education promotes equality of opportunity is not any easier. Despite this limitation, some efforts have been made to find a connection between education and promoting equality of opportunity.

One of the most popular methods among education researchers is to test whether specific policies have a significant effect on student test scores; in particular, whether certain policies close the achievement gap between poor students and wealthy students. Test scores, in this manner, are meant to serve as a proxy for the quality of schooling students receive. If the "achievement gap" between wealthy students and poor students is narrowed, then it is assumed poorer students have a better set of opportunities compared to wealthy students.

One clear pattern has emerged from the literature so far: increasing inputs for schools has been unsuccessful at closing the achievement gap. The first study to capture

this sentiment came from sociologist James Coleman's research in the early 60s (referred to as the "Coleman Report") which found that school resources had little to do with student achievement. The primary causal factor of student achievement seemed to be the student's socioeconomic background (Coleman, et al. 1966). Later studies from Eric Hanushek (2003; Hanushek et al. 2015) and Lant Pritchett (Pritchett 2013; p. 99-101) would largely confirm Coleman's sentiments half a century ago. It is pretty clear from these studies that efforts to increase school resources in the U.S. and in the developing world have no effect on closing the achievement gap. Answering the question "what education policies allow for the most equitable distribution of opportunities for the least well-off?" remains an open one that is debated vigorously especially among development economists. More problematic is the ambiguity of the definition of "equality of opportunity" and its connection with education. As a result, we cannot definitively say the connection between education and equality of opportunity is clear. What we can say is that attempts by governments to equalize results through increasing inputs has simply not worked.

Health

Does education increase public health outcomes? In this section in particular it is important to distinguish between purely private and social health benefits. Purely private benefits would include things like healthy diet and exercise to prevent obesity. Whereas social benefits would accrue from more hygienic lifestyles that potentially prevent the spread of contagious diseases or smoking less which reduces the effects of secondhand smoke. For private benefits, the best studies estimate an extra year of education reduces

10-year mortality rates by 1% - 3% (Lochner 2011; p. 238-239). Lochner interprets these as "small to modest" effects on mortality rates.

The estimates of social returns to education on health is much more complicated. Lochner (ibid) claims that health externalities due to increased education are not as clear as the private returns due to lack of research on the topic. While he does not address the issue head-on, he at least concludes that the existing evidence does not justify subsidizing education exclusively for the sake of public health benefits (ibid; p. 260). More recently, Caplan (2018) considers the connection between education and health benefits and whether they generate social returns. He shows that identifying the link between education and health is even more complicated when researchers consider the fact that education may be a cover for social status. Increasing one's social status reduces stress which is known to have many positive effects on one's health. Upon further reflection though, social status is a zero-sum game when looked at socially. I can only look better in the status hierarchy if others around me look worse. When researchers consider status into the equation, education's effect on mortality drops by a half (Euteneuer 2014). Given the unconvinced conclusions Lochner and Caplan come to, it is safe to say education's effect on health does not generate noticeable social benefits.

IV.   Conclusion

Human capital made its debut into formal economic analysis over 50 years ago. While there are many examples one can use to describe investing in human capital (on-the-job training, moving, learning a new language, etc.), no example has attracted more

attention from economists than education. In the U.S., all 50 states have compulsory

school attendance laws that last at least until age 16 which means that almost all children

spend a significant amount of time in some form of formal schooling for over 10 years.

Economists have spent an enormous amount of time evaluating how much education

contributes to economic growth first by evaluating the private returns to education, then

by calculating the social returns. If the social returns are greater than the private returns,

then education may have some positive externalities that do not get captured in the

private returns and may justify government subsidies (from a welfare economist's

perspective). It is uncontroversial at this point to say that education pays from an

individual's perspective. The more education one receives, even after accounting for any

omitted variables, the greater the return to future earnings.[16] It is more controversial to

say the link between education and economic growth has not been proven.

Macroeconomists have been unable to show how much, or even whether, the social

returns to education exist, they have not shown that the social returns exceed private

returns, and they have not shown a strong connection between education and possible

positive externalities.

What have we learned from these empirical studies? The results can be broken down

into two categories. The first category treats schooling attainment as an input that is

either increased or decreased and is measured by years of schooling or attendance rates.

This is an input-output framework in a rather basic level. To use the terminology of

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[16] This is true whether one subscribes to the human capital or signaling model of education. Both models merely differ on *why* they pay individually.

William Easterly, it is like following a cooking recipe (Easterly 2002, 2006). Increasing or decreasing inputs in the recipe is similar to increasing/decreasing inputs into a production function. Krueger and Lindahl (2001) provide the most widely-cited results using this framework which largely fail to show any significant social returns, least of all social returns that exceed private returns. For decades researchers complained that bad data were the primary cause of unconvincing results but they have to this day been unable to overcome this obstacle. Economists like Mark Blaug (1976), Lant Pritchett (2001), William Easterly (2002), and Bryan Caplan (2018) have all declared that the social returns literature in this framework are at best insignificantly small, and at worst completely useless.

The second category still operates within an input-output framework but adds far more nuance. This includes the literature on measuring test scores and their effect on economic growth. The difference here is that test scores are not as easily manipulated by policy instruments as years of schooling. If a nation wants to increase student enrollment or the average years of schooling in a population, compulsory schooling laws are a fairly clean-cut way to accomplish this goal. But increasing test scores is not as easy to manipulate (assuming no cheating takes place). The literature largely begun by scholars like Eric Hanushek on test scores provide the most robust findings of all (despite a handful of limitations). But even these results are not as clean as they appear. They continue to omit ability bias and they implicitly assume that test scores reflect skills demanded in the labor market. Moreover, they raise more questions than they resolve. For instance, if test scores are the key to growth, how do we raise them?

What if we look at the most common examples of positive externalities cited by economists and other social scientists over the years? The relationship between crime and education seems to be connected more with the quality of schools rather than the number of years in school. Also, past delinquent behavior may do a better job of explaining the connection (similar to ability bias in growth estimates). The relationship between democracy and education is also problematic. Increasing the number of voters is not by definition a social benefit and there does not seem to be a clear consensus on whether education increases the quality of democratic institutions. Equality of opportunity is at best a nebulous philosophical concept that may even be impossible to achieve. One pattern is clear from the literature though, increasing school resources does not narrow the gap between wealthy student test scores and poor student test scores. Finally, health outcomes insofar as purely social benefits seem to very small and when status effects are taken into account, they are even smaller to the point where they are barely noticeable.

The general conclusion we must come to is this: economists have simply not found a connection between education and economic growth. And if there are positive externalities associated with an educated populace, they have yet to be shown beyond reasonable doubt. From an individual's perspective (aka private returns), education pays very well. Getting at least a high school education (in rich countries) seems to be a profitable decision from an individual's perspective. But unfortunately, economists' quest to detect any social benefits not captured in an individual's decision to get additional schooling has ultimately failed. If the available evidence does not support the theory, what is needed now is an alternative theoretical framework for how education fits into

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economic growth models. More broadly, what is needed is an alternative theory for how education fits into the complex web of economic activity. This task will be taken up in Chapter 2.

Chapter II: Rethinking The Role of Human Capital in Growth Models

I.   Introduction

In Chapter I, we clearly showed that macroeconomists quest to empirically discover social returns to education has largely been a failure. While Chapter I mostly showed the history of the social returns to education literature, this chapter will identify where this literature went wrong and offer insights from market-process theory and complexity economics that the mainstream literature ignores. Researchers in social returns to education field blame measurement error or unreliable data as the primary source of their failure to generate reliable results. This paper identifies deeper issues with the theoretical construct and offers some theoretical insights from Austrian and complexity economics that the mainstream literature ignores. The approach I put forward in this paper focuses on the market-process elements of human capital where human capital investments are guided by institutions, market signals, and entrepreneurship and human capital is treated as a structure – one that is heterogeneous and multi-specific.

The social returns to human capital literature all fit into what I am calling the aggregate approach. The aggregate approach, as outlined in this paper, is defined by the following characteristics:

1. It treats human capital (as measured by years of schooling or test scores) as a measurable, aggregate stock.

2. Analytical attention is fixated on interaction with other aggregate variables.

3. Economies are mechanical, equilibrated relationships.

4. Institutions are either not considered at all or included in the background.

5. It attempts to answer questions like "how much does human capital contribute to growth?" or "how much positive externalities does education generate?" [17]

While having the advantage of mathematical tractability, the aggregate approach is at best severely limited in its explanatory power because it ignores many useful insights, as outlined in this paper, and is at worst misleading.

The aggregate approach will be contrasted with what I am calling the market-process approach which incorporates a blend of Austrian theory and complexity economics. The market-process approach is *not* a wholesale rejection of empirical analysis. As will be discussed below, there are several micro-level empirical studies that fit well within the framework put forward here. While not perfect, studies like these address smaller scale questions which are less likely to contain the flaws pointed out in this paper. I will also show where future empirical work can be done within the theoretical framework put forward here that can more accurately describe how education (or more broadly, human capital) fits into economic activity.

In this paper, I will use a somewhat expanded definition of human capital laid out by Gary Becker (1964) in which he treats it as a person's investment in skills that result in

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[17] The characteristics of the aggregate approach are borrowed from Wagner's (2010) characterizations of the "neo-Walrasian research program" and Wagner's (2020) "mechanical systems." The elements listed here are not intended to be an identical match, but rather a subset of the elements Wagner focuses on.

future returns (monetary or otherwise) relative to opportunity costs. The expanded definition taken in this paper incorporates insights from Lewin (2011) where human capital is not merely prior investments in skills, but the embodiment of human capital with physical capital to produce something of value. I accept this definition from an *individualistic* perspective. I do not accept this definition from a supposed *collective* unit perspective. Simply adding up the amount of human capital (however measured) a country has and calculating how much that contributes to growth is impossible and potentially misleading.

The remainder of this paper will be structured as follows. Section II will briefly outline the literature on market-process and complexity economics that is relevant for the thesis of this paper. Since most of the mainstream literature on the social returns to education was outlined in the previous chapter, they will not be mentioned here. Section III, the bulk of this paper, will outline the insights based on the market-process approach that the aggregate approach ignores. Here, I will draw on a large body of existing literature (both empirical and theoretical) that fits within this approach. Section IV discuss some implications. Section V will conclude.

II.   Relevant Literature

The aggregate approach to human capital has largely failed to generate any consistent empirical results. Authors in this field blame measurement error or bad data. While this all may be true, this paper identifies deeper issues with the methods of the aggregate approach and seeks to offer some theoretical insights ignored by the existing literature.

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How may we continue to use human capital to explain why some countries are rich and others are poor? More fundamentally, what alternative theoretical approaches to human capital are available beyond mainstream macro models? This paper will address these questions but take a very different approach than the mainstream studies mentioned above.

The approach taken in this paper draws heavily from a blend of Austrian theory and complexity economics. While there are differences between the two research programs, there are several important similarities to both that are relevant for the central argument of this paper. First, both approaches reject theorizing about economic activity as if it were in equilibrium (Arthur 2015; Devereaux & Wagner 2020; Hayek 2012; Kirzner 1997; Lewis & Wagner 2017). Second, both approaches emphasize adaptive and spontaneous ordering rather than assuming order from top-down mechanisms (Hayek 1978; Wagner 2010, 2020; Koppl et al. 2015; Arthur 2015). Third, both approaches recognize the importance of entrepreneurship and creativity as drivers of economic growth (Kirzner 1997; 2013; Hayek 2012; Devins et al. 2013; Felin et al. 2014; Koppl et al. 2015; Lewis and Wagner 2017). Finally, both approaches emphasize the importance of institutions and how they influence economic outcomes and organization (Hayek 1978; 2009; 2011; Boettke 2000; 2018; Koppl 2002; Podemska-Mikluch and Wagner 2012; Devins et al. 2013). The market-process approach taken in this paper incorporates insights from these research programs to offer insights the mainstream view of human capital ignores.

To be certain, there have been several attempts to construct an Austrian theory of human capital. For instance, (Lewin 1999; 2011) emphasizes the tacit and subjective knowledge embedded in physical capital for which human capital is needed in order to operate capital equipment. From there, he argues that as the structure of capital increases in complexity as economies grow, the heterogeneity and complexity of human capital grows along with it as well. Recognizing this fact is important in order to have a complete theoretical framework of human capital. Baetjer and Lewin (2008) highlight these points even further. Holcombe (1998) argues that we should think of human capital investments as a *result* of entrepreneurial action rather than a *cause* of entrepreneurial action. Horwitz and Lewin (2008) extend the heterogeneous element of human capital to the dynamics of household division of human capital investments. Finally, Burns (2018) recently incorporated a "structure of human capital" approach to Austrian Business Cycle Theory to highlight how interventions by policymakers can disrupt intertemporal investments in human capital. The approach put forward in this paper builds on the foundations of these works and should therefore be viewed as complementary.

III.   **Market-Process Approach to Human Capital**

In this section I will sketch some theoretical insights for human capital based on Austrian economics and complexity economics. I will outline this approach in four unique sub-sections. First, I will highlight connections between Austrian capital theory and how they may be applied to human capital. Second, I will highlight the importance of comparative institutional analysis as applied to human capital. Third, I show how the

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emergence of prices, profit, and loss signals guide the dynamics of human capital. Finally, I discuss the importance of entrepreneurship in human capital theory.

A. *The Structure of Human Capital*

The market-process approach taken in this paper draws heavily from the Austrian contributions to capital theory. The early debates regarding capital theory date back to the 1930s and were primarily between by F.A. Hayek and Frank Knight.[18] In the end, mainstream economists adopted a Knightian version of capital theory into their models which dominated empirical studies for the remainder of the 20th century.[19] In spite of this, several refinements to Austrian capital theory (F. A. Hayek 1941; F. A Hayek 2008; Lachmann 1957; Lewin 1999; Kirzner 2012) were made over time to contrast it with the mainstream version. The Austrian theory of capital is unique in its approach when compared to the mainstream view because it treats capital as a structure rather than a stock, capital goods are heterogeneous and multi-specific rather than homogeneous and perfectly substitutable, and production and consumption happen over time rather than instantaneously (Hayek 1941).

While mainstream economists began developing theories of human capital in the late 50s and early 60s, an Austrian theory of human capital never caught up with mainstream versions until Lewin (1999) added a discussion on human capital and how it fits in with his broader theory of capital. Here, we will focus on a few elements that are mentioned in

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[18] See White (2007) introduction to (Hayek 1941; p. xxviii) for a comprehensive list of references of the debate during this time.
[19] A more comprehensive summary of the two positions can be found in Hayek (1941; p. 69-70)

Austrian contributions to human capital, but are not adequately emphasized: the heterogeneity and multi-specificity of human capital.

Ludwig Lachmann (1957) provides a clear articulation of the heterogeneous and multi-specific use of physical capital by emphasizing it is not necessarily the heterogeneousness in *form* that matters but the heterogeneousness in *use*. In other words, the physical form of capital is not as relevant for economic analysis as its use in a complex capital structure. The same can be said of human capital. Investments in human capital made throughout one's life can be reshuffled and used for a different purpose than its original intent.[20] For instance, learning calculus is necessary for an aspiring engineer but can also be used in physics, medicine, and economics.

An important difference between physical and human capital is that human capital is inalienable to the individual. Owners of physical capital can sell their capital goods (or rent them out) in which case they are no longer in possession of it. Owners of human capital cannot separate skills they learn and sell them to someone else. They may teach others and charge fees for their services (as teachers, tutors, or mentors), but this is very different than selling the rights to own or rent that capital. However, this distinction does not prevent us from drawing parallel insights between physical capital and human capital. As Lewin (1999; 2011) and Baetjer and Lewin (2008; 2011) point out, physical capital derives is value not necessarily from its physical form, but in how it is subjectively

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[20] This primarily applies to "general" (as opposed to "specific") investments in human capital (Becker 1964; Lewin 1999).

interpreted by its owners/users. An example they frequently use is a hammer. A hammer in its physical form is just wood and metal. But what makes a hammer a hammer is not just the raw materials, but rather the knowledge embedded in what one can do with a hammer or more specifically, what *value* one can produce with a hammer. Thus, it is impossible to separate the knowledge element from physical capital which implies that human capital and physical capital are inextricably intertwined.

With these insights in mind, we may now articulate how human capital can be reshuffled or repurposed by the individual. Here, we are primarily referring to "general" skills, as contrasted with "specific" skills (Becker 1964; Lewin 1999). Specific skills are more likely to be unique to the particular firm that requires a set of skills. In other words, specific skills are skill sets that are less likely to be useful across multiple firms. General skill sets, by contrast, are more likely to be versatile across multiple firms or industries.[21] Relatively more general skill sets are easier to reshuffle or repurpose in a complex market economy, or even an "entangled" market economy (Wagner 2016).

Examples of reshuffling of human capital happen constantly in a market economy. Any time a person leaves their job for a similar job in their industry, they are reshuffling their human capital to capture potential supranormal gains. An accountant who leaves a job and transfers his or her skills to a job with more benefits or more opportunities. A server at a restaurant who transfers their skills to a more up-scale

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[21] The conclusion Becker (1964) and Lewin (1999) come to is that from the perspective of the firm, it is more profitable to invest in specific human capital skills for their employees than general skills otherwise employees could use the general skills at a competing firm.

restaurant for better tips. A laid-off factory worker in a declining industry who transfers their skills to a job in an industry on the rise. These examples, while hypothetical, demonstrate the reshuffling of human capital for different purposes than their original use and promote economic growth. There is no demonstrable increase in the "stock" of human capital with each of these examples, yet they all show how reshuffling or repurposing human capital can contribute to growth.

To the aggregate approach, the above examples are irrelevant unless there is a change in the amount of education or skills that an individual obtains. Using a structure metaphor to describe human capital is more realistic because it emphasizes human capital's *use* in a complex economy. To the aggregate approach, human capital is reducible to a homogeneous variable similar to how the Knightian (mainstream) view of physical capital reduces it to a single variable. For what purpose that human capital is being used in a complex market economy is irrelevant to the aggregate approach. By contrast, the market-process approach emphasizes that human capital has multiple uses in a complex economy and how it is used and in what context is most relevant. Moreover, in the context of economic growth, reshuffling human capital is an important element to promoting growth that is not captured in the aggregate approach. Since human capital is heterogeneous and multi-specific, one must be cautious in using terms like "increasing" or "decreasing" the amount of human capital in a nation because this does not capture a change in the *use* of human capital. We will return to some implications in the next section but for now, the important takeaway is that the aggregate approach gives us an overly simplistic and incomplete vision of human capital in a dynamic economy. By

focusing on the measurable variable itself (years of schooling or test scores), the aggregate view is unable to explain the process of the emergence of human capital or its role in a complex adaptive economy.

B. Institutional Analysis and Human Capital

Institutions can be thought of as the rules of the game that guide the countless interactions in a complex economy. They exist everywhere we look even if we do not notice them at first sight. Institutions are important here because they determine the constraints within which exchange takes place. For instance, an institutional setting that rewards rent-seeking and corruption makes those kinds of interactions more rewarding and therefore we should expect to see more of them (Holcombe 2018). Conversely, an institutional setting with well-defined property rights, stable rule of law, and relative ease of entry/exit into the market will make it more profitable to satisfy customer wants and we can expect to see more of this activity in this setting.

The emphasis on institutional analysis has rightly been at the forefront of Austrian methodology since its inception.[22] To paraphrase Boettke (2000; p. 31), who was in turn paraphrasing Mises, without protection of property rights, there is no exchange of goods and services. Without exchange of goods and services, there are no prices to reflect the relative scarcity of goods and services. Without prices, rational economic calculation for economic participants is impossible. The main takeaway here is that it is the institutional setting (property rights protection) that gives rise to market activity in the first place

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[22] Boettke (2018; p.159-195) highlights the primary contributions.

because it allows the necessary information to flow to decision-makers. Without property rights protection, prices and other market signals lose their meaning entirely. This assessment of institutions makes sense for the for-profit sector. How can we apply it to a market-process approach to human capital? Specifically, how can we apply it to the modern school system? After all, the vast majority of students around the world are educated through some version of a public school (Roser & Ortiz-Ospina 2013). To include this in our discussion on institutions, we need a slightly more nuanced theory of institutions.

Public schools around the world vary in the degree to which they are controlled by local level governments versus national level governments and how much funding they receive from local level governments versus national levels of government. These details matter when discussing institutions and education for two reasons.

First, they change the incentive structure for how education systems operate. The further away, spatially and physically, decision-makers are from the local knowledge of communities, the more likely institutional failure is to occur (Ostrom, 1990, 1996, & 2010). With regards to education, this happens when decision-making shifts from a model that depends on parental involvement, to one that does not depend on it or actively discourages it (Ostrom 1996; Pritchett 2013).

Some empirical studies on this subject are useful to help illustrate this point. Lant Pritchett, in his analysis of school systems in developing countries, distinguishes between

what he calls "spider" and "starfish" systems (Pritchett 2013).[23] Spider systems are top-down systems that require all decision-making to pass through a person or group of people at the top of the system in order for change and adaption to happen. Starfish systems, by contrast, are largely decentralized systems that rely on local knowledge to make decisions and adapt to changes and rely on a network of relationships to share knowledge.[24] Pritchett draws upon numerous estimates of educational achievements in developing countries and compares them to the results in OECD countries. He shows that across the board, OECD countries outperform developing countries on educational achievement. According to Pritchett, the reason for this discrepancy is because developing countries are more likely to create education systems that resemble spider systems described above. Ultimately, Pritchett and other authors conclude that starfish school systems tend to respond to parent and student demand better than spider school systems because the former are more flexible and have a stronger incentive to react to customer demands. Woesseman (2005) and Sapelli (2005) confirm these sentiments as well.

Elinor Ostrom identified this trend in her field work while studying local community's "coproduction" of outputs like urban highways and schools (Ostrom 1996). She points out in her study that community coproduction of education diminished greatly

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[23] He calls them "spider" and "starfish" systems because for spiders, any information that comes in contact with the web they weave (for instance, a fly) must first pass through the spider's brain. It is then up to the spider how it wants to react. Starfish, by contrast have no brain at all. Starfish process information and react to it through a decentralized nervous system that does not pass through a centralized brain (Pritchett 2013; p. 5).

[24] These two systems are very closely related to what Hayek (1978) would call "cosmos versus taxis" or what Ostrom (Ostrom 2010) would call "polycentric versus monocentric" systems.

in Nigeria after the federal government increased its control over local schools. As Ostrom puts it, "[w]hen coproduction is discouraged by taking over schools that villagers had perceived as being 'their' schools, by creating chaotic changes in who was responsible for funding and running a primary school system, and by top-down administrative command as the style for all decision making, only the most determined citizens will persist in coproduction activities." (ibid; p. 1078). Additionally, Fischel (2001) shows that states in the US that shifted from local property tax revenue to state tax revenue as a means of funding public schools saw declines both in funding and quality of public schools as a result. The reason why, he argues, is that when property taxes are the primary means of funding public schools, property values become directly linked to school quality and/or proximity which gives homeowners a strong incentive to monitor the quality of schools. Shifting away from this scheme decreases the financial incentive for homeowners to care about public schools in their district.

The examples above imply that education means much more than simply getting more students to attend school for longer periods of time. The quality of education they receive matters and good quality education depends on an institutional arrangement that relies on and adapts to local knowledge. To the aggregate approach, more children in schools for longer periods of time will show up as an increase in human capital (when using attendance rates and average years of schooling as their metric) in growth statistics. To the market-process approach, the change in these variables only matters if it increases the quality of human capital that is put to productive use.

Second, the output indicators used by school administrations (attendance rates, graduation rates, test scores, etc.) change their meaning as the institutional arrangements change. For example, take the rise of high stakes testing in the United States in the last 30 years. Prior to the reforms in the 1990s culminating to the No Child Left Behind (NCLB) Act of 2001, school metrics were primarily used to gauge school performance and act as an information tool for parents and local administrators (Nichols & Berliner 2007). After the passage of the NCLB, states could lose federal funding if they were not meeting adequate yearly progress standards for test scores in reading and math. Unintended consequences like teaching to the test, teachers cheating by giving students answers or discarding poor performing students' answers, and state-level politicians "shifting the goal posts" (Muller 2019; p. 93) in order to meet funding objectives have all been well documented (ibid).

What is important for our discussion is not necessarily the perverse incentives that resulted from the NCLB, but rather the *meaning* attached to school metrics has changed as a result of an institutional change. The meaning of test scores shifts from a metric that transmits knowledge to parents and administrators, to a goal to achieve in order to maintain funding. As Jerry Muller puts it: "Tests of performance are designed to evaluate the knowledge and ability that students have acquired in their general education. When that education becomes focused instead on developing the students' performance on the tests, the test no longer measures what it was created to evaluate." Institutions matter not only as a guide to human action, but also to give meaning to the dispersed and tacit knowledge within a complex economy (Hayek 2012).

These insights matter because interpreting data across multiple countries to calculate returns to human capital can give us a false impression if the differences in the meaning of the data are not taken into account. Test scores in an institutional setting where they are used to transmit information mean something very different compared to test scores in an institutional setting where they are used to reward or penalize schools. The aggregate approach cannot take into account for these differences which is why a more nuanced theory of human capital that accounts for institutions is needed.

To be fair, the aggregate approach is not necessarily at odds with institutional analysis in general. Indeed, there are a some studies within the aggregate approach that include various measures of the quality of institutions as control variables (for example, Barro 1991; Hanushek and Woessmann 2008). What separates the market process approach from the aggregate approach with regards to institutional analysis is threefold. First, the majority of studies using the aggregate approach completely ignore any institutional considerations. It is not a requirement to include any discussion on institutions to make a contribution to the aggregate approach. In the market-process approach, institutional analysis is impossible to ignore. Second, when the aggregate approach does include institutions, it treats them as static. Measured values of the quality of institutions are static by their very nature and tell us little about the dynamics of these institutions. Third, the market-process approach argues that institutions give *meaning* to human capital and its role in the market process. Institutions are not merely another control variable to add to a model, but they are what gives the variables in question meaning in the first place (Wagner 2020).

C. *Human Capital and Market Signals*

We should briefly mention why market signals (prices, profits, and losses) are important ingredients to the market-process approach to human capital. Hayek's most famous essay, "The Use of Knowledge in Society," argues that "[f]undamentally, in a system in which the knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people in the same way as subjective values help the individual to coordinate the parts of his plan" (Hayek 1945; p. 526). In other words, prices emerge and act as a way for buyers and sellers to communicate the relative scarcity of goods and allows producers to allocate resources to their highest valued use.

But prices are not merely given to market participants who then simply react to the new information by reallocating resources to maximize utility. Kirzner (2011; 2013) emphasizes "entrepreneurial alertness" within dynamic market settings and how it contrasts with standard neoclassical frameworks.[25] To Kirzner, the price system in a market economy serves two roles. First, a price discrepancy announces to entrepreneurs that resources are being misallocated. The role of the entrepreneur is to be *alert* to such discrepancies. Second, the price discrepancy lures entrepreneurs to correct the discrepancy with pure profit (Kirzner 2011; p. 328). Inherent in every entrepreneurial act is a sense of uncertainty, there is no guarantee that every entrepreneurial act will end in success. Profits are a way of rewarding entrepreneurs for making accurate predictions and

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[25] We will address entrepreneurship and human capital more thoroughly in the following sub-section.

acting on those predictions. On the flip side, losses tell entrepreneurs that they have made

an error in judgement and resources should be reallocated. Prices are not merely

exogeneous vectors which economic agents react to mechanically. Prices are influenced

and changed by alert entrepreneurs in search of pure profit opportunities. The conclusion

drawn from these insights is that in an institutional setting with property rights protection,

market signals act as feedback loops to ensure entrepreneurs correct previous errors by

reallocating resources to higher valued uses.

The field of complexity economics emphasizes the role of market signals in its

theories as well. To Wagner (2020) and Devereaux and Wagner (2020), prices are not

merely "data," but are highly dependent on the institutional framework within which they

emerge (a similar point we stressed earlier). Like Kirzner and Hayek, Wagner and

Devereaux also stress the *emergent* nature of prices and they reject to the "prices as

given" framework used by neoclassical interpretations. To Koppl et al. (2015), prices in

the "law-governed" systems are predetermined whereas in creative systems, prices

change as a result of the emergence of novelty in unpredictable ways.

As mentioned before, the majority of students around the world are educated

through public schools. Price, profit, and loss signals do not matter as much within

education systems. However, these signals matter a great deal for individuals entering the

job market. A market process theory human capital emphasizes the role price formation

plays. Investments in human capital are highly sensitive to the perceived payouts relative

to foregone opportunities. Alert entrepreneurs are constantly scanning the job market to

discover previously unnoticed profit opportunities to repurpose human capital

investments or invest in new human capital. These opportunities are strongly connected

to the structure of physical capital as well. Some empirical examples may help illustrate

my case.

As industries rise and fall, the returns to skills within these industries/fields rise

and fall with them. To take a simple example, consider the rise in personal computers

(PCs) in the late 20th and early 21st centuries. In response to the growing demand for PCs,

between the years of 1970 and 2016, computer science degrees as a percentage of all

bachelor's degrees in the United States increased eightfold (Digest of Education

Statistics, 2018). In fact, the choice of college majors in response to market conditions

fits very well with the microeconomic research in these fields. Freeman and Hirsch

(2008) find that college major choice is heavily responsive to the wage premium within

the respective field, Long et al. (2015) estimate a roughly three-year lag between a boost

in wages and the college major choice response, and Han & Winters (2020) show that

booms and busts in the energy industry in the 1970s resulted in subsequent booms and

busts within college majors associated with the energy sector (such as geology and

engineering). The responsiveness of human capital investment to prices, profits, and

losses is not only intuitively straightforward, it also matches very well with the empirical

literature.

Baetjer and Lewin (2008) highlight a specific technological invention that is

particularly applicable to the market-process theory of human capital put forward here:

software. Software is not strictly speaking *physical* perhaps aside from the memory space it takes up on a computer. Its continual improvement over time is based on constant tinkering and discovery by software engineers who are alert to existing discrepancies in how software is currently used. When a software engineer makes a discovery big enough to open up a new market, this event triggers new demand for workers to repurpose or invest in new human capital in that direction. In a system with continual emergence of novelty over time, human capital investments are constantly being repurposed or reinvented to serve the needs of a changing economy. Without this constant emergence of novelty into the system, human capital remains stagnant and predictable.

The insights above remind us that there is more to the economics of human capital than simply the interaction between aggregate variables. When analytical attention is fixated on aggregate variables, we lose sight of *why* these variables are constantly changing in the first place. Moreover, the aggregate approach is only interested in changes in the size of the stock of human capital. While this is no doubt important for economic analysis of human capital, the market-process approach includes far more interesting phenomenon in its analysis because it treats human capital as a structure that responds to changes in market signals.

D. *Entrepreneurship and Human Capital*

There are two ways to examine the role of the entrepreneur in the market-process approach put forward here. 1) Entrepreneurs within school systems and 2) Human capital entrepreneurial discovery in an entangled political economy (Wagner 2016).

While keeping in mind the Kirznerian insights developed above, we should address some complexity economics contributions to the theory of entrepreneurship. Scholars within the complexity economics field also emphasize the importance of entrepreneurship and institutions in their models. Of central importance to this field is the institutional setting and its ability to enable "novelty" (Felin et al. 2014; Koppl et al. 2015) into the system. Novelty, in this view, allows economic systems to expand the plane within which new economic activity can take place that was not possible, or more importantly, foreseen, before the emergence of novelty.

An example these authors use frequently is a screwdriver. They ask readers to imagine listing all uses of a screwdriver. Such a task would be impossible. Why? Because the list would only include its possible uses given the existing technological limitations. For instance, one of the uses of a screwdriver is as a possible antenna for a short wave radio. But such a use would not make sense to someone living in 1850 since that technology did not exist at the time. Technological innovations are constantly pushing the boundaries of the space within which complex economic interactions occur.

Novelty introduced into the system also creates unforeseeable changes to how institutions form and change over time. For example, widespread use of the internet has created a need to expand the legal framework governing fraud, defamation, and intellectual property. Another emphasis on institutions within complexity economics demonstrates why it is misguided to think that institutions can simply be discarded or changed from the top-down (Devins et al. 2013). Institutions, like any other economic

processes, are adaptive and change in unpredictable ways. While institutional change happens all the time and it is important to analyze this process, it is incorrect to theoretically construct institutional change as if it were an object of choice.[26]

A great example of the emergence of novelty within education systems is work done by James Tooley (2013, 2021) on low-cost private schools in developing countries. While it is true that most students around the world are educated in public schools, there are many corners of the world where a larger percentage of students are educated in private schools. Tooley spent years traveling to remote parts of developing countries (India, China, Ghana, Kenya, Nigeria, Sierra Leone, South Sudan, Liberia, and Lebanon to name a few) and discovered a trend going on that had not been acknowledged by experts in international education. He discovered that as much as 50% of students in these regions were being educated by low-cost private schools (ibid). These are schools that charge as low as $1 a month in fees and cater almost exclusively to poor communities in developing countries. The proprietors of these schools created them in response to the growing demand from parents who were dissatisfied with the deplorable quality of public schools available to them. Not only do parents prefer them to public schools, the students outperform their public school counterparts in aptitude tests in almost all cases studied. Additionally, when public schools are shut down in times of conflict (e.g. civil war) or turn into recruitment centers for child soldiers, these low-cost

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[26] Scholars in the Austrian tradition make very similar points as well. See Hayek (1978) for a discussion on spontaneous rule formation and Boettke, Coyne, and Leeson (2008) discuss the difficulty in institutional change.

private schools rush in to fill that gap (Tooley & Longfield 2017). In the UK and US during the Industrial Revolution, demand for basic literacy and mathematics increased tremendously (West 2001). Similarly, as developing countries gradually climb out of abject poverty, their desire to educate their children to prepare them for adulthood increases. When public schools fail to satisfy this demand, alert entrepreneurs step in to provide quality education.

This analysis may be puzzling at first. Poor countries are poor primarily because institutions do not adequately protect property rights. For example, Indian law prohibits schools from generating a profit which would ordinarily stifle entrepreneurship and innovation (Dixon and Tooley 2005; p. 42). So how can a thriving market for low-cost private schools exist in these parts of the world? Tooley and Dixon discuss this discrepancy. They argue that while it is true the rules and regulations "on paper" for private and public schools are not conducive to entrepreneurial activity, these low-cost private schools often operate under the radar of regulators. Government inspectors will often turn blind eye in exchange for a bribe or school administrators will keep two books – one for government inspectors that conceals any profit and another for actual bookkeeping. Thus, there exists a market for schools that operates outside of state regulation where entrepreneurs can (with admittedly some arbitrary barriers) freely discover unnoticed profit opportunities.

Next, let us examine the dynamics of individual investors of human capital.[27] As we saw earlier, an institutional setting that protects private property allows for price, profit, and loss feedback loops to guide production to their highest valued use. We should expect the same phenomenon to exist with human capital investments. But what happens when the institutional setting does not adequately define or enforce property rights? Or if the setting is somewhere in between the two extremes? How do entrepreneurs respond in these settings?

William Baumol (1990) contrasted between productive, unproductive, and destructive entrepreneurship which he argued are largely a result of the relative payoffs between each of them. The conclusion drawn from his analysis is that the direction of entrepreneurial activity is largely determined by the institutional setting. An institutional setting that lacks stable property rights enforcement will see more unproductive or destructive entrepreneurship than a society that has stable property rights protection. Podemska-Mikluch and Wagner (2012) expand on this by adding that the relationship between entrepreneurship and institutions is "bidirectional." While in Baumol's analysis political action is characterized as "additive," meaning political action stands outside of market activity and imposes institutional change, Podemska-Mikluch and Wagner argue that it is more realistic to theorize political and market activity as acting side by side. They contrast market entrepreneurs and political entrepreneurs as having separate goals: market entrepreneurs want to generate a profit by satisfying consumer demands, political

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[27] For this part, we are discussing institutions beyond those that exclusively apply to school systems.

entrepreneurs want to redistribute resources to further their own political goals. If a market entrepreneur's plan fails, they pay the cost of misdirected resources because they are residual claimants. If a political entrepreneur's plan fails, the costs are shifted among taxpayers. An institutional setting that creates a window for political entrepreneurial gain redirects resources in that direction which in turn gives rise to new political entrepreneurial opportunities.[28]

Applying the two-sided nature of entrepreneurship to a market-process approach to human capital is fairly straightforward. Bill Easterly's (2002) work on the faults of macroeconomics and development economics illustrates this well. His fourth chapter in *The Elusive Quest for Growth* counters the argument put forward by macroeconomists and development economists (who frequently operate within the aggregate approach) that education is a primary generator of growth in developing countries. To Easterly, a country's institutions and the entrepreneurial opportunities (productive, unproductive, or destructive) they generate for educated individuals are much more important than simply getting more students to attend school (which, for a long time, was the primary goal of development experts in education). A government that actively destroys property rights and market signals creates more opportunities for jobs that require rent-seeking skills.

This example perfectly illustrates the bidirectional nature of institutions and entrepreneurship: as institutions decline in quality, they induce new generations of young

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[28] Roger Koppl constructs a very similar model with his theory of "big players" who act in similar fashion as political entrepreneurs because they are less restrained by market signals and can induce significant change in a given economic system (2002; p. 120-138).

entrepreneurs to shift their talents to reap the previously unnoticed rewards. As this process churns over time, fewer and fewer market entrepreneurial gains become available. Newer generations of political entrepreneurs will discover and capture new rent-seeking gains. The institutional change that brought about these opportunities becomes further entrenched. New institutional changes occur to offer more opportunities to political entrepreneurs, thus deepening the entanglement between political and market activity.[29]

Institutions that allow or even promote rent-seeking activities also affect the reshuffling of human capital. The 'revolving door of politics' demonstrates this quite well. The revolving door of politics describes when former politicians tend to take jobs as lobbyists for large corporations when their political career ends (or vice versa). Politicians develop networking skills in order to maintain relationships with special interest groups throughout their political career. They must also learn the details of large corporations that operate within their state or district. When they exit politics, a career as a lobbyist is a lucrative way to repurpose or reshuffle the human capital they spent a lifetime accumulating. In an institutional setting that creates opportunities for repurposing human capital as a politician or a lobbyist induces reshuffling of human capital away from potentially productive uses towards unproductive uses.

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[29] For those interested, Murphy, Shleifer, and Vishny (1991; 1993) offer a rather peculiar test of this theory. They found that countries with a higher ratio of engineering majors grow faster than countries with a higher ratio of law students.

Another good example of this phenomenon in action is pointed out by Coyne and Hall (2018; p. 96-119). Here, Coyne and Hall argue that part of the reason for the rise in the militarization of domestic police departments in the U.S. is because they often recruit former military personnel to fill vacant positions in their department. These former military personnel learned coercive skills to keep occupied populations under control while stationed abroad. In order to be successful in military operations abroad, one must be willing to engage in techniques like "monitoring, curfews, segregation, bribery, censorship, suppression, imprisonment, torture, violence, and so on" (Coyne and Hall 2018; p. 30). When they return home, many of the military personnel become police officers and simply transfer these same skills (i.e. human capital) to their new role as police officers. Coyne and Hall argue that this is one of the reasons why police militarization has been on the rise in recent years. We already pointed out earlier that human capital cannot be separated from one's mind in the same way physical capital can be sold when it is no longer needed. With countless time and effort invested in these skills and little incentive to learn new skills, soldiers who return home simply repurpose the military skills they learned while abroad and apply them for a different purpose.

As this example demonstrates, the increased military efforts abroad set in motion a chain of events that created supranormal returns to coercive human capital from an individual's perspective. When soldiers return home, the best option available to them to repurpose their skills is with police departments which is, according to Coyne and Hall, one of the contributing factors to the increased militarization of police forces.

These examples along with Easterly's insights provide us a with a lucid depiction of the entangled nature of institutions, market and political entrepreneurs, and human capital. Notice the difference between these examples and the insights pointed out earlier (*Section III A*). When institutions protect property rights, human capital investments and reshuffling will tend to shift towards productive activities. When institutions shift away from protecting property rights, human capital investments and reshuffling will increasingly shift towards unproductive uses. Indeed, these insights help us explain the empirical failure of the aggregate approach to human capital. A theoretical framework based on the market-process approach put forward here has a simple explanation for this failure. A large part of the reason why simply increasing the number of educated individuals does not show up in growth statistics is because the approach completely ignores *where* these human capital investments go to in the first place. The aggregate approach is simply ill-equipped to offer an explanation.

IV. Implications

A few implications arise from the market-process approach to human capital put forward in this paper which are worth mentioning here. Some of these are policy-related while others call attention to further research that fits in with the market-process approach to human capital.

First, the market-process approach illustrates the impossibility of central planning education systems. In his book *Knowledge and Decisions¸* Thomas Sowell has the following famous passage with regards to Soviet-style central planning:

Examples abound in the Soviet press, where economists and others decry particularly glaring instances and demand 'better' specification – rather than raising the more politically dangerous question of whether *any* articulated specification by central planners can substitute for monitoring by actual users, as in price-coordinated economies. For example, when Soviet nail factories had their output measured by weight, they tended to make big, heavy nails, even if many of these big nails sat unsold on the shelves while the country was 'crying for small nails.' (Sowell 1980; p. 214-215)

The same insights Sowell applied to Soviet planning applies to education around the world. Indeed, international development programs intended to educate more students in developing countries often rely on data points like attendance rates, literacy rates, or test scores to gauge the effectiveness of public schools rather than consider the institutional environment and whether it is conducive to satisfying consumer demands. Development economists are increasingly relying on randomized-control trials (RCTs) to measure the effectiveness of policy interventions in education and other development areas. However, RCTs are no substitute for the coordinative and cooperative mechanisms built into a market economy through the price system (Coyne 2013; p. 78-79). This problem is compounded by the fact that most public schools are often organized by national and local governments. Indeed, if we are truly to evaluate the role of education in a complex economy, it is perhaps time to have a more "politically dangerous" conversation Sowell was referring to.

The market-process approach to human capital can be seen as a contribution to the discussion of the market's future role in education. In the same way central planners in the Soviet Union failed to replicate the market's coordinative features by using measurable aggregate outputs as planning goals, education planners have failed in their efforts to centrally plan an education system. Rather than focus on aggregate outputs, the market-process approach emphasizes customer (i.e. parents and students) preferences. Indeed, much of the debates around school choice in the United States (and elsewhere) emphasize the benefits of giving parents and students more choice in selecting a school rather than being assignment to a school based on zip code. Increasing competition in school systems allows parents to utilize their local knowledge to make a decision on where to send their kids to schools. While education policy reformers focus on aggregate measures of performance to determine the health of schools, parents and students rely on tacit knowledge to make decisions.

Second, and somewhat related to the first point, the market-process approach shows us why over-relying on aggregate measures of human capital can be misleading. Even empirically successful studies around test scores and growth (Hanushek and Woessmann 2008) should be taken with a great deal of caution. We discussed in the previous section that institutions give meaning to information we observe in education systems in the first place. Studies like these may include institutions as a control variable or discuss them in a footnote. But without a recognition that these variables have different meanings in different institutional settings, cross-country comparisons of variables like test scores make empirical tractability difficult to interpret.

Third, the aggregate approach to human capital focuses almost exclusively on human capital contributing to growth. What if the opposite is true? Reverse causation would mean that as countries (and presumably individuals) get richer, they invest more in human capital building activities relative to other forms of investment or consumption.[30] Reverse causality fits perfectly within the market-process approach taken in this paper. As economies expand, the division of labor expands along with it (Smith [1776] 1976; p. 31-36). As the division of labor expands, there is an increase in demand for highly specialized labor which creates a strong incentive for individuals to invest in these specialized skills. This does not deny that human capital investments contribute to growth either, but rather the causation is likely bidirectional.[31]

Reverse causation may also help us explain why developing countries have had difficulty in developing a stable and efficient education system in the long run. A developing country with institutions that promote rent-seeking and other forms of destructive entrepreneurship will not grow faster by putting more students in classrooms. If the only lucrative jobs available in a given nation are ones that merely redistribute resources or actively destroy value-creating enterprises, increasing the number of educated students does not help that country grow out of poverty. Emphasizing reverse causality in education redirects our attention towards institutional analysis that Austrian economists (and plenty of others) have been emphasizing for decades. The problem then

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[30] Bils and Klenow (2000) provide one of the more widely cited studies to answer this question and find evidence for reverse causation.

[31] Some of the scholars cited in this paper who have recognized the possibility of reverse causation include Becker (1964), Krueger and Lindahl (2001), Easterly (2002), Pritchett (2006), Hanushek and Woessmann (2008), Coyne (2013), Caplan (2018).

shifts from "how can we get test scores up?" to "what institutional arrangements allow for human capital investments to flow to their highest valued use?"

Finally, we should address some future avenues for research. From an empirical perspective, this paper has shown why empirical studies within the aggregate approach are misleadingly incomplete because they lack the theoretical lens we've been discussing. However, there are plenty of empirical papers out there that avoid most of these pitfalls, some of which have been highlighted above. Once again, the market process approach does not reject *all* empirical attempts to answer questions regarding human capital. The market-process approach pieces together some of the existing empirical work that fits in with the framework put forward here, and shows where future empirical work can be done within this approach. This paper calls for smaller scale empirical questions with regards to human capital and education. Any empirical work in the tradition of comparative institutional analysis, economic history, or field work has the potential to make great contributions to the economics of human capital.

Comparative institutional analysis can shed light on how different institutional arrangements impact education systems and how they impact human capital investments *after* formal education. After all, education is not the same thing as schooling. Economic history can perhaps shed light on how school systems have changed or developed over time as a result of some institutional shift. E.G. West's (1965; 2001) work focuses on education systems in the UK and US prior to public school reforms in the 19th century. Coulson (1999) adds some insight into how education systems in Ancient Greece,

Ancient Rome, Germany, France, Japan, and Canada vary across the world. Building on these works and others by adding institutional analysis can help us understand the dynamics of education systems change over time. Finally, field work is another important avenue scholars should consider going forward. The work by Ostrom (1996) and Tooley (2013, 2021) could not have been accomplished by studying education systems from afar. Studying education systems that are often overlooked by international development organizations can help us understand how poorer communities around the world find clever and unique ways of educating themselves when the public school system fails them.

V.   **Conclusion**

This paper contrasts the aggregate approach with the market-process approach and argues that the aggregate approach has failed to adequately explain the relationship between human capital and growth. The market-process approach fills in the gaps left wide open by the aggregate approach by emphasizing the heterogeneity and multi-specificity of human capital, institutions, market signals, and entrepreneurship. The market-process approach is meant to offer unique theoretical insights for how to study the relationship between human capital and growth. These insights are borrowed largely from Austrian literature and areas of complexity economics which gives us a more realistic assessment of the role of human capital in economic growth.

Contributions to the aggregate approach set out to measure the positive externalities generated by human capital. Even though they were not able to confirm these

externalities exist, much of the economics profession continues to use education as an example of an activity that generates positive externalities which justifies government intervention. Much of the mainstream debates around education policy revolve around curriculum (for example common core and critical race theory) or test scores. While these discussions are worth having, they obstruct us from the real questions about the purpose of education, the connection between education and complex modern economies, or how human capital more generally fits within a dynamic economy. This paper hopefully will steer the conversation in a more productive direction. The market-process approach put forward in this paper offers a more realistic way to incorporate human capital theory in theories of complex societies.

Chapter III: The Political Economy of Language Policy and Planning

I.   **Introduction**

Chapters 1 & 2 focused on human capital theory and how it has historically been treated by economists. Chapter 2 exposed some serious flaws in human capital theory and offered some insights based on market-process theory that give a more realistic interpretation of the role that education and human capital fit with a dynamic market economy. In this third chapter, I will examine a specific form of human capital: language use. Language is a unique example of human capital in that it is used by literally everyone in some form and it is a heterogeneous form of human capital. For example, a person with an existing skill set who moves to a new country without learning the native language will have a much more limited returns to his/her existing skill set than a person with identical skill sets who learns the native language. In this sense, language is one of the most heterogeneous-in-use forms of human capital. In this chapter, I will address one approach to the economics of language use that argues linguistic diversity in a multilingual society is a public good and therefore requires state intervention to shift distributions in an optimal direction.

Is there an economic justification for state intervention in the distribution of language use? According to scholars in the language policy and planning (LPP) field, the answer is

a resounding 'yes.' LPP is founded on the idea that language diversity is a public good and will therefore be under-valued and under-produced if left purely up to market forces. The logical conclusion, according to LPP, is to use economic theory (specifically welfare economics) to calculate what types of interventions work for particular situations in order to create an optimal language distribution that maximizes social welfare. This paper will challenge the core assumptions of LPP. Specifically, it will challenge the ability of planners to create an 'optimal' language distribution in a given nation. Ultimately, I conclude that 1) LPP theory fails to acknowledge the epistemic limitations of central planners and 2) even if one assumes language distribution has some public good elements, it is not a sufficient condition for state intervention.

Language policy and planning (LPP) is admittedly a fringe field of study that has not quite caught the attention of mainstream economists.[32] Nonetheless, it has a multidisciplinary history dating back to the 1950s (Goundar 2017) that has spanned across sociolinguistics, sociology, economics, political science, and many other disciplines. In recent years, it is gaining popularity especially in Europe where multilingual questions with regards to European Union (EU) policies are more prevalent than in the United States.

LPP theories assume that language diversity is a public good which is vulnerable to market failure absent any policy interventions. Policy interveners (or "planners" as they are often referred to in the LPP literature) must take into account various factors

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[32] With the possible exception of Ginsburgh and Weber (2020).

when intervening. These include but are not limited to the status of various languages within the country in question, the linguistic distance between available languages, the absolute and relative number of minority language users in a given country, the cost of policy interventions to change the distribution of language use, and the (income and price) elasticity of demand for language use (Grin 2016). After accounting for these factors, LPP gives planners a blueprint for how and when to intervene to alter the distribution of language use. LPP's theoretical model implicitly contains two assumptions:

1. All relevant knowledge regarding costs and benefits are available and comprehendible to language planners.

2. Planners can use policy levers to change the language distribution to its optimal location.

If both of these assumptions are satisfied, LPP theories and their policy recommendations can create Pareto-optimal allocations of language distributions.

It is argued in this paper that both of these assumptions are naïve. These two assumptions overestimate the ability of planners to acquire relevant knowledge to determine the 'language equilibrium' and neglect political/bureaucratic incentives policymakers face which inhibits their ability to intervene in the way LPP models predict. By not accounting for these faults in their models, LPP has very little use for economists interested in the economics of language.

We should be clear at the outset that this paper does not reject the economics of language as a field of study. Moreover, this paper does not reject all philosophical or ethical justifications for protecting or reviving minority languages either. Rather, the focus of this paper is purely the economic theory chosen by LPP scholars for using policy interventions via the state to accomplish its goals. In other words, this paper challenges the means chosen (policy interventions), not necessarily the ends in mind (minority language protection or revival).

The remainder of this paper will be structured as follows. Section II will briefly summarize the relevant literature in the economics of language and LPP. Section III will address and challenge Assumptions 1 & 2 above by showing that the knowledge embedded in language use is tacit and dispersed among countless individuals and is not possible to be obtained by a single mind. We will also challenge the assumption that planners have the incentive to intervene optimally in this section. Section IV will discuss some implications of the paper's findings. Section V will offer some concluding remarks.

II.   Language Policy & Planning: Theory and Summary of Relevant Literature

Most scholars point to the historical origins of the economics of language to Jacob Marschak (1965). The assumption economists often make in this field is that language is purely a means of communication to lubricate exchange. The constant evolution of language is a process of creating more efficient modes of communication. Following this line of reasoning, the conclusion is that a convergence towards a homogeneous or shared language creates positive network externalities since it is more efficient to communicate

the more people learn the *lingua franca.* In this sense, linguistic fragmentation can be seen as a transaction cost that hinders trade and interaction thereby hindering economic growth. The more people who learn a shared language, the cheaper cross-national trade becomes, thereby promoting economic growth.[33]

However, as has been pointed out by Grin (2003 & 2016), Hurford (2014) and Wickström (2013 & 2016), language use is not merely a form of communication but it is also a form of cultural expression or cultural identity. If one accepts this fact, according to this point of view, then one must recognize the fact that the interaction of diverse cultures brings about gains from trade. Multiple cultural perspectives interacting to solve a problem increases the chances that the problem will be solved as efficiently as possible (Grin 2016; p. 641). Therefore, if 'too many' minority languages are allowed to die, the cultural identities and practices attached to the language use die with them. As these cultural identities and practices die, there may be foregone gains from trade, leaving society worse off than it would be if the minority language(s) was preserved.

Thus, we have an inherent tension going on: a tendency towards a homogeneous language has positive network externalities in the form of more efficient communication, but the decline of some languages may leave society worse off in the form of foregone gains from trade between unique cultures. How can societies find the 'middle ground' where the positive network externalities and gains from trade between cultures are at

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[33] The negative relationship between linguistic fractionalization and growth has been dubbed the 'Fishman-Pool hypothesis.' For empirical studies that confirm this hypothesis see Alesina et al. (2003), Hall and Jones (1999), Easterly and Levine (1997), Pool (1972), Fishman (1966).

their optimal levels? In economic terms, how can economists calculate the social welfare function and optimize the distribution of language use? This is the question LPP intends to address.

The conventional wisdom within the LPP literature is that the optimal distribution of language use is a public good and therefore requires state intervention to steer linguistic variables towards an optimal distribution. Grin (2003, p. 30-36; 2016), Wickström (2013; 2016), and Wickström, Templin, and Gazzola (2018) outline the theoretical foundations for key market failures present within linguistic environments. For the purposes of this paper, we will focus on the two that get the most attention: public goods and network externalities. Francois Grin makes the case that languages are non-rival "because the use of a language by one person does not reduce the 'amount' of language available for use by another person. . ." (Grin 2003 p. 35) and non-exclusive "since there is no practical mechanism (particularly a price-based one) for keeping a person from experiencing a particular linguistic environment" (ibid). Based on these two criteria, Grin concludes "there is absolutely no guarantee that the free market (that is, decentralized decisions made by social actors) generates the behaviour that will result in the establishment and maintenance of the socially optimal linguistic environment" (ibid).

Grin also makes the case that positive and negative network externalities are present in linguistic environments. A person who joins a community and learns the native language benefits other members of the community who now may communicate with and trade with this new person. In other words, the new member of the community generates a positive network externality for other members of the community when they learn the

native language. Conversely, linguistic environments may also impose negative network externalities. Consider the same example but suppose there are two spoken languages in the community, the native language and a minority language. Each additional person who learns the native language (but does not learn the minority language) imposes a negative network externality on minority language speakers.[34]

According to LPP theory, the two market failures present within linguistic environments give justification for state intervention to reallocate the distribution of languages. With regards to language as a public good, consider Wickstrom, et al. who state "we have a market failure due to the incentives to 'free ride', that is, enjoy the good without contributing to its provision. Hence, an intervention through the public sector is in general needed" (Wickstrom, et al., 2018; p. 26). When referring to the positive network externalities Wickstrom et al. state "[s]ince the individual calculus here differs from the social one, a planning measure through the public sector is called for. The compulsory teaching of a lingua franca in all schools would be [an example of] such a planning measure" (ibid; p. 25). When referring to the potential negative network externalities, "compulsory teaching of many different languages would again be the best policy to neutralize this externality. . ." (ibid; p. 26). Notice how the above analysis displays the inherent tension within LPP. On the one hand, having a common language lubricates communication and trade (positive network externality); on the other hand, this process may crowd out other minority languages which impose costs on speakers of those

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[34] For a more formalized model of linguistic externalities, see Church and King (1993).

languages (negative network externality). In this sense, the goal of LPP is to find the sweet spot where positive and negative network externalities are internalized through state coercion.

The above analysis can be summarized in Figure 1. The y-axis represents dollar values of multiple languages. The x-axis represents the degree of multilingualism starting with a perfectly monolingual society on the left side all the way to a multilingual society on the right side. The marginal benefit ($\sum$MB) curve is derived by vertically summing up all the individual marginal benefit curves in a given society. The marginal cost ($\sum$MC) curve is the sum of the marginal cost curves of increasing the degree of multilingualism. The point Q* is the socially optimal point where the balance between the social benefits of a common language and multilingualism are maximized. LPP theory argues that individuals left to their own devices will gravitate towards the left side of the graph and public policy is needed to preserve minority languages and thus move towards Q*.
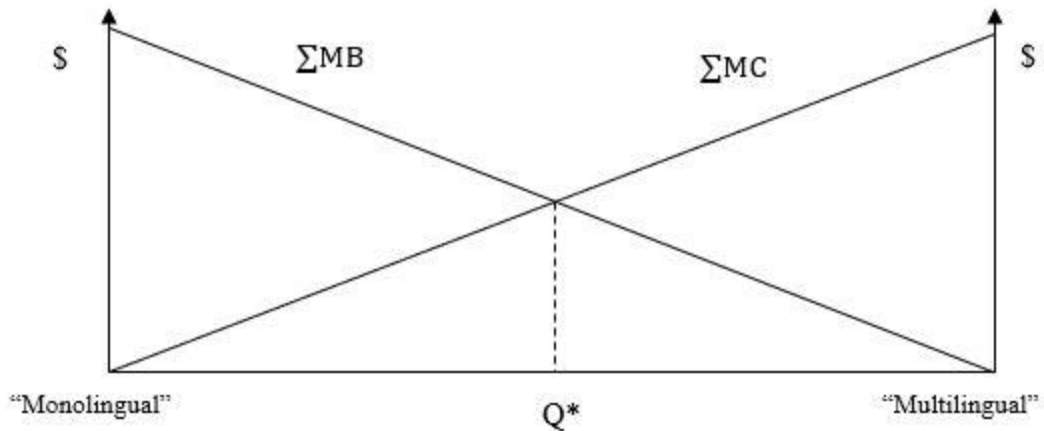
Figure 1: Equilibrium position between monolingual and multilingual society.[35]

It should also be noted that moving the degree of multilingualism to the right of Q*

creates a 'public bad.' In this scenario, there are too many languages spoken in a given

society which stifles communication and generates social costs that outweigh any social

benefits of diverse languages. One can also think of this diagram in the context of

environmental policy. If we think of the far left as 'unregulated pollution' and the far

right as 'perfectly clean air,' decreasing the amount of pollution to Q* is socially optimal

but moving too far to the right of Q* can create public bads (high energy costs, for

example) as well.[36] While the emphasis of LPP is primarily on the 'unregulated linguistic

environment' (to the left of Q*), it is helpful to keep in mind that the goal is not to

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[35] This graph is a modified version of what appears in Buchanan (2001; p. 311).
[36] Francois Grin is fond of comparing language economics to environmental economics (Grin 2003; p. 29).

preserve an infinitely large number of minority languages, but rather to preserve them until $\sum MB = \sum MC$.

It is one thing to theorize that language diversity is a public good that requires planning and/or policy interventions. It is quite another to measure relevant data points and make accurate assessments for how policy interventions may create Pareto-improvements in the linguistic environment. How do LPP studies estimate the costs/benefits of various language policies?

According to scholars working in the LPP field, there are measurable data points available to economists to estimate the distribution of languages that will optimize social welfare. Since LPP continues along with the assumption that language diversity is a public good, individuals are not able to express willingness to pay in a typical market setting as they would for private goods. As such, LPP scholars must find other ways to measure costs and benefits of different language policies. Ideally, a researcher would simply aggregate monetary and non-monetary benefits and subtract any costs to determine the overall society benefits or costs of a given policy measure. If the marginal benefits to language diversity are equal to the marginal costs language diversity, then the status quo is efficient and no policy is needed. If the marginal benefits are greater than the marginal costs of increased language diversity, then a policy intervention is needed to maximize social welfare.[37]

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[37] See Wickström, Templin, and Gazzola (2018) for a more elaborate depiction of cost-benefit calculation with regards to language policy.

We will not dive deep into the empirical literature in this paper but will briefly mention the methodology of a few just to illustrate the estimation of costs and benefits in the literature. Vaillancourt (2018) estimates the marginal cost of minority language protection by estimating the change in education funding as a result of protective policy measures and estimates the marginal benefits by estimating the change in access to public services offered by provincial governments. Desgagne and Vaillancourt (2016) also estimate the benefits of Canadian language policy using access to public services as a proxy for marginal benefits and measure the marginal costs of the Official Language Act of 1969 in Canada. Caminal and Di Paolo (2018) find that after the reforms in Catalonia, Spain to revive the Catalan language in schools (alongside Spanish) resulted in more endogamy which they argue is a social benefit. Finally, Arcand and Grin (2013) reevaluate existing studies on linguistic fragmentation and economic development using an IV approach and find that in some areas, linguistic fragmentation actually increases development.[38]

However, there are several questions left unanswered within LPP scholarship. Is the optimal distribution of language use obtainable by anyone? Or is it dispersed among countless individuals? Do state actors have the ability or the knowledge to create an optimal distribution of language diversity? Finally, even if we assume this knowledge is (partially) available, do state actors have proper incentives to use intervention tools at their disposal, or are these decisions best left up to dispersed communities? In the

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[38] We should stress here that including these studies is not intended to be a ringing endorsement of the methodology or the findings but rather to *illustrate* the methodology of a typical empirical LPP study.

sections to follow, I will argue that LPP fails to address these questions which makes the case for policy intervention with regards to language distribution very weak.

III.   The Political Economy of Language Planning

This section will address both Assumptions #1 and #2, starting with Assumption #1 (knowledge of the optimal distribution of languages is obtainable by a single mind and a planner has the ability to act on this information). If this assumption is satisfied, then it is possible for a planner to use policy tools like subsidies, regulations, or education policy to alter the distribution of languages to maximize social welfare. All the planner has to do is gather the relevant knowledge of the current linguistic distribution, discover how far the status quo is away from the optimal distribution, determine which policy intervention is best suited to correct the market failure, and implement the intervention to correct the status quo. Since LPP theory carries on accepting Assumption #1 as given, their focus is on what optimal policy interventions can be done.

In this section, we will argue this assumption is not satisfied when we consider insights from market-process theory. The relevant knowledge required for planners to make optimal allocative decisions is not possible to be ascertained by a single mind. Moreover, the spontaneous creation of languages throughout history has created the social benefits of language (both cultural and communicative) in the first place, which makes language planning wholly unnecessary.

A. *The Fatal Conceit of Language Planning*

Is it possible for language planners or language theorists to obtain the relevant knowledge to make socially optimal language allocative decisions? The answer to this question is not unique to language policy, specifically, but it is connected to debates economists have been having for over 100 years regarding the feasibility of central planning. One of the leading critics of central planning, F.A. Hayek, spent a large portion of his career addressing the question about the knowledge available to central planners. In his famous 1945 article, he argues that the data required to satisfy equilibrium conditions is never given to economists or planners but is rather inarticulable, contradictory, and dispersed among countless individuals (Hayek 1945). The way markets are able to make sense of this dispersed knowledge and allocate resources efficiently is through the price system. Prices act as signals to producers which communicate the relative scarcity of goods and services.

Hayek would make modified versions of this point later in his career as well. His 1974 Nobel Prize address "The Pretence of Knowledge" (Hayek 1989) argues that the supposed facts required to satisfy formal macroeconomic models were not simply given or even obtainable by economists or policy-makers. His final book published, *The Fatal Conceit*, argues that central planners (or those who advocate for various forms of central planning) suffer from a flawed vision of the world where they believe "man is able to shape the world around him according to his wishes" (Hayek 1988; p. 27). A major reason why they make this mistake is because of a misunderstanding of how knowledge arises in the first place. Knowledge emerges from the discovery process in a market economy where entrepreneurs are constantly searching for newer and better ways to

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allocate resources. The lure of pure profit is what drives entrepreneurs to discover these opportunities. The necessary data to calculate equilibrium criteria is never given *a priori* and it is never contained in a single mind.

Unfortunately, LPP theorists are making the same error that has been made by economists for well over a hundred years. Implicit in LPP theoretical models is that the necessary facts of language distributions can be calculated and solved by gathering the right amount of data and implementing the correct policy measure. In other words, LPP becomes an applied maximization problem. LPP theorists forget that the knowledge needed to decide on behalf of countless people which languages should be protected or not protected is inarticulable and unobtainable. The decision for an individual or group of individuals to learn majority/minority languages is based on an incalculable number of factors, regardless of whether they be monetary, non-monetary, communicative, or cultural reasons. In other words, it is simply impossible for planners to obtain the necessary amount of information to shift the distribution of languages in a Pareto-improving direction. Data gathering to make policy prescriptive advice with regards to language distributions amounts to elaborate guesswork.

LPP theorists are correct in that the distribution of languages is not determined directly based on a price system.[39] There is no bidding process to decide whether English is used in a corporate board meeting instead of French, for example. LPP theorists argue that this fact shows optimal language diversity is a non-excludable good which acts as a

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[39] However, there is certainly an argument to be made that language distribution is heavily influenced by economic fluctuations over time.

disincentive to 'produce' it. However, this does not match with the historical reality of language evolution over time.

Indeed, the creation and evolution of languages throughout history has been a largely decentralized and spontaneous process. This fact was even acknowledged by the founder of modern economics, Adam Smith. Smith's "Considerations Concerning The First Formation Of Languages" was added as an appendix to the third edition of *The Theory of Moral Sentiments* in 1767 (Smith 1767). Although there is no particular argument Smith makes about the origin of languages, a common thread throughout his essay is that languages change and evolve to meet the needs of particular time and place. Dugald Stewart also pointed out the evolutionary and spontaneity of languages: "languages . . . are the gradual result of time and experience, and not of philosophical speculation; yet every language, in process of time, acquires a great degree of systematical beauty" (Stewart 1858, p. 423).

Another century later, Hayek would frequently use language evolution as an example of spontaneous order. For example, in *Law, Legislation, and Liberty vol. 1* he states: "Although there was a time when men believed that even language and morals had been 'invented' by some genius of the past, everybody recognizes now that they are the outcome of a process of evolution whose results nobody foresaw or designed." He makes similar references in *The Constitution of Liberty* (1960) where he uses language as an example of spontaneous order eight times throughout the book and even refers to it as the "most important" (*ibid;* p. 126) example of spontaneous order.

Hayek would also go on to say language played an important role in the process of rule formation. The other frequent example of spontaneous order (which received much more of his intellectual attention than language) was the law, or at a more basic level, rules. One of Hayek's main arguments in *Law, Legislation, and Liberty vol. 1* is that rules are often formed and followed before they are articulated and/or codified in a formal legal setting. Human beings spontaneously developed a common language in order to have a shared understanding of what is/is not permissible action and to teach others these rules of just conduct (1976; p. 74-76). Developing such rules, and subsequently communication of such rules, was necessary in order to facilitate trade amongst others. In economic terms, the creation of rules fostered demand for the creation of language.

The key takeaway here is that language and languages formed spontaneously over time to suit the needs of humans all over the world. They were not created by an individual mastermind. Recognizing these facts calls into question the 'public good' elements of language diversity. After all, if the 'market failure' element of public goods is that they will be underproduced or not produced at all because of the free-rider problem is true, then we would see little to no change in language and languages over time. We indeed see the exact opposite effect. At best, languages contain some public good elements, but when observed through different institutional contexts, there are large enough private gains to induce contributions to existing languages and the creation of new languages. For example, the creation of new languages entails private rewards for individuals in a primitive society without an existing shared language. Which is indeed what we have seen in the history of ancient societies and language formation.

It is well-established that the creation of languages has gone hand-in-hand with increased trade relations. Nigel Holden argues "[n]one of the great business empires of the Ancient World [. . .] could have sustained themselves without a fully functioning language of business" (Holden 2016; p. 290). As international trade became more profitable in the Ancient World, a strong demand emerged for merchants to either speak their customers' language minimally or to create a *lingua franca*. In the same way that merchants in the medieval period created a merchant law to facilitate trade (Benson 1989), merchants in the Ancient World had a strong incentive to woo potential customers by either learning their language or using a shared *lingua franca*. As international trade expanded, the need for an expanded language to include "writing, the introduction of coinage, the introduction of weights and measures, [and] the emergence of contracts" in order to make trade more efficient (Holden 2016; p. 295). Additionally, "the primary function . . . of the earliest cuneiform tablets was to record economic transactions of grain, livestock and textiles in the temple and palace economies, but this was extended to record the economic and legal affairs of private and business enterprises" (Brosius 2008; p. 246 as quoted in Holden 2016; p. 297). Indeed, the spontaneous development of language and trade was intertwined in a bi-directionally causal relationship. The increased value in trade also led to the creation of a common language between two or more communities, also known as *pidgin* languages (Crystal 2003). Pidgin languages were classified by a combination of the two or more interacting communities to form a kind of 'broken' version of each language so that traders could communicate effectively

with each other.[40] When observed through various institutions, 'on paper' public goods

become more like private goods if we change the context in which it is provided (Cowen

1985; Coyne 2015).

At this point, one may ask: why revisit literature on the evolution of languages when

it has already been well-established? After all, Grin (2003) acknowledges the

spontaneous and unplanned nature of language evolution but still argues for policy

interventions to change the dynamics of language distribution to maximize social

benefits. If the LPP literature is aware of this, why mention it here? LPP theory

recognizes the spontaneous evolution of languages, but it ignores the key takeaway from

this insight. The important takeaway is that the creation and evolution of languages

generated social benefits for future generations without any centralized direction.[41]

Countless individuals utilized their local, tacit, and dispersed knowledge to interact with

each other and work together to create something that was not part of their original intent.

Indeed, the invention of languages was a product of "human action, but not the execution

of human design" (Ferguson 2011; p. 90). No single person could ever accumulate

enough knowledge to accurately direct or predict the course of language use.

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[40] It should also be pointed out here that while pidgin languages were originally created for trade purposes, later in history they grew out of necessity. For instance, enslaved people brought to America from Africa developed a pidgin form of English in order to communicate with their slavers. Indeed, most of the surviving pidgin languages today are located in regions of the world formerly occupied by Wester colonizers (Crystal 2003).
[41] As pointed out by Givati (2018) languages like French have at least attempted to be centrally planned by organizations like the Académie Française with limited success (Hurford 2014; p. 24)

A system of government interventions in the process of language formation and/or language distribution would disrupt the discovery process inherent in language use. A spontaneous and decentralized system of language use allows individuals to utilize tacit and dispersed knowledge to alter existing languages to better suit their needs[42] and allows individuals to choose languages they want to learn, in addition to their mother tongue, based on circumstances of time and place. A system where governments intervene in the spontaneous development of language use, disrupt the entrepreneurial discovery process that has allowed languages and language to fluctuate based on individual preferences (Kirzner 1985). Since the knowledge embedded in this process is scattered among countless individuals and not available to anyone, an interventionist system in language use would only stifle this discovery process.

To be clear, the argument is not that it is too difficult or too costly to acquire the necessary knowledge to optimally change language distributions. The tacit nature of knowledge means that the knowledge required to plan a language regime is not something available to *anyone*. It is often not even articulable to the person utilizing their local knowledge. Data collection is not a substitute for the tacit and dispersed knowledge to make a decision. By missing this key point, economists in the LPP field are led to the incorrect conclusion that policy interventions can be used to alter language distribution in a socially optimal way.

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[42] For example, the word "selfie" was added to the Merriam-Webster dictionary in 2014; a word which would be utter nonsense 20 years ago.

B. Economics of Politics and Bureaucracy in Language Planning

We have now established that language planners lack the requisite knowledge to alter language variables in an optimal direction. What if we relax this assumption slightly? What if, for the sake of argument, we allow the fact that language planners can acquire *enough* knowledge to make an accurate decision on how best to allocate language distributions? After all, markets are able to allocate resources to their highest valued use despite each individual having limited knowledge. Because prices, profits, and losses act as feedback loops for producers and consumers, each individual does not need to have perfect knowledge in order to make reasonably informed decisions. Why should we expect the same of language planners? If we allow for the possibility that planners can obtain adequate knowledge of the 'language equilibrium,' do language planners have the proper incentives and feedback loops to act on this knowledge?

To LPP theorists, this question is usually completely ignored. It is assumed that if given a 'plan' for how to optimize language distributions, planners will simply implement the plan efficiently with no waste or unintended consequences. Planners, or policymakers, are assumed to be acting completely in line with what LPP models demand. How to achieve a linguistic equilibrium becomes a simple applied maximization problem. Unfortunately, these assumptions do not match with reality because they omit any theory of government action.

To construct a robust theory of government action, we need to use a theory that addresses political and bureaucratic decision-making as they are, not as they ought to be.

Or, as James Buchanan put it, "politics without romance" (Buchanan 1999a). From an economic perspective, there is simply no reason to believe that human beings are self-interested in the marketplace but motivated by the public good when entering the world of politics. If LPP theories are correct in stating that language distribution is a pure public good, or at the very least has some public good elements, we cannot simply declare market failure and then turn control over to government provision without first examining the incentive structures within political or bureaucratic agencies. In order to examine these incentive/feedback structures, we will look at both the demand side and the supply side of government provision/intervention.

Let us begin with the demand side. In a well-functioning market economy, consumer demand has a negative relationship with market prices. Individual demand is revealed through willingness to pay for goods and services. A constant feedback process between consumer demand and producers pushes prices towards a market equilibrium, although it will unlikely ever reach it in the real world. When it comes to willingness to pay with government-provided goods and services, the relationship is far less clear compared to a typical market setting. Government agencies have no profit or loss mechanism to guide decision-making to ensure that they are using scarce resources to the highest valued use. Given this limitation, they must turn to alternative ways to determine how resources are allocated.

With regards to measuring consumer demand, governments face three challenges with no clear solution (Gruber 2011, p. 187, 219; Coyne 2015, p. 377). First, customers have little incentive to reveal their true preferences for language distribution. We cannot

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simply ask each individual or a representative sample of a community what their preferences are since they have a strong incentive to exaggerate their true preferences in either direction. Boudreaux, Meiners, and Zywicki (1999) provide a strong argument for why researchers cannot simply ask a sample of the population its preferences as a substitute for demonstrated preferences in order to influence policy-making. Second, consumers may not actually know their true preference absent a price mechanism. Price mechanisms in market economies balance lofty expectations with the reality of scarcity. Without this mechanism, it is simply impossible to truly measure consumer preference. Third, it is extremely difficult, if not impossible, for governments to aggregate individual preferences. It is simply not possible to vertically sum individual demand curves for language distribution, set the price equal to marginal cost, and allocate language distributions accordingly.

Democratic elections can be thought of as a way to work around these issues. Voters can express their preference for language distributions by voting for candidates who promise to preserve threatened minority languages. However, this process is no substitute for decision-making via the market process either. The chances that one single vote will overturn a national election are vanishingly small. Given this, voters have very little incentive to stay informed on topical political issues and may end up voting for candidates despite not knowing what policy stances the candidate has. This phenomenon is well-documented by public choice economists and is often called 'rational ignorance' (Tullock 2005; p. 227-228).

Still, it may be argued that consumers purchase goods and services in market economies with relatively little knowledge on what they are buying or how it is made. More to the point, one's individual decision to learn a new language without intervention is done without the knowledge of social costs/benefits, yet it has evolved over time with little central planning. Once again, why should we expect voters to have perfect knowledge of language distributions in order for political decision-making to be efficient when consumers never have perfect knowledge but markets are efficient (Wittman 1995)?

The answer to this question lies in the institutional framework between the two settings. Consider the market setting first. If an individual decides to learn a new language, they incur the marginal costs/benefits from the decision and will continue learning until MB = MC. If they make a mistake (i.e., invested too much or too little in language learning), they bear the cost of that mistake and no one else. There is also reasonable expectation that they will get a return on their investment or else they would not take the time to learn the language in the first place.

Now consider the same individual in a voting booth deciding between two or more candidates' preferred language policies. There is basically zero possibility that the voter will cast a deciding vote, so there is no guarantee that the voter will get what they want. Moreover, the voter pays a negligible personal cost if they make a mistake. Taken together, how can we rely on voters to vote for a candidate that promises to change language distributions in a Pareto-optimal direction? If we take the social benefits of language diversity as given, how can we rely on a majority vote to elect a candidate who

will implement a language plan perfectly? More problematic, what recourse do voters have if politicians fail to make good on their promises? Without addressing these problems, the case for language planning becomes very weak.

Let us now turn our attention to the supply side of government provision or intervention. Here we will examine the incentive structure of the key actors involved in the supply of government activities: elected officials, special interests, and bureaucracies. Elected officials' primary motivation is to seek reelection. To do so, they must maximize the required number of votes in order to secure reelection. In order to maximize the number of votes, candidates must appeal to the median voter. We already established that voters have little incentive to express their true preferences in voting situations. Even if we ignore this limitation, we must ask whether politicians have an incentive to make good on campaign promises after they are elected. If we assume a politician who promised to change language distributions to their optimal level was elected, what incentive do they have to actually make this happen?

When compared to market settings, there are very few constraints elected officials face if they do not fulfill campaign promises. The frequency of elections varies by the level of government in question and also varies by country. Even if voters vote in line with their true preferences, there are very infrequent moments when they may 'punish' elected officials for breaking campaign promises. Even more problematic, elected officials are not contractually bound to fulfill campaign promises. Contrast this with market settings. In a market, if someone does not uphold their end of a bargain, consumers may take their business elsewhere, write a negative review online, or in

extreme cases may seek legal recourse. In well-functioning markets, there are strong mechanisms in place to discipline principals and agents in a contractual agreement.[43] Both parties have a strong incentive to uphold their end of the agreement. In a political setting, these constraints are very weak. They are even weaker in national election settings compared to local elections (Tiebout 1956). The possibility of politicians to impose negative externalities on the population, especially when it comes to language planning, is too large to ignore.

LPP theory largely ignores the literature on the problems of aggregating voter preferences and political incentives. But these are all very relevant for a theory that concludes there is a role for government intervention in language distributions. Voters have very little incentive to stay informed and vote for the socially beneficial language distribution, especially if it goes against the wishes of linguistic majorities. Furthermore, even if a politician was elected to impose a language intervention that perfectly match LPP models, there are very weak incentives for the politician to keep these promises. Any theory of government intervention that ignores these issues, does so at its own peril.

Politicians do not derive their policy preferences exclusively from their constituents. The influence of special interest groups in crafting and implementing legislation cannot be ignored either. Special interest groups are characterized by an organized group of individuals with a common purpose who seek to concentrate benefits among their members and disperse costs among the general population (or taxpayers).

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[43] For example, a language tutor who does not uphold her end of the bargain to her mentees will suffer the costs from an action.

Typical examples of special interest groups in the United States include the Sierra Club, whose primary interest is environmental protection, and the NRA, whose primary interest is in protecting the rights of gun owners. Special interest groups exert pressure on politicians most commonly in the form of campaign contributions or political advertisements in order to see their policy preferences (or more specifically the policy preferences of their members) enacted.

Special interests also have the potential to impose large negative externalities on the general population. The classic example to illustrate the influence of special interests is farm subsidies. Firms in the farming industry have a strong incentive to band together to pressure legislatures for subsidies because the windfall gains outweigh the costs. Conversely, the general public, who ultimately bears the cost of the subsidy, have very little incentive to band together to resist such a program since the marginal benefit of collective action to each individual is relatively small. Therefore, we expect the subsidy program to persist.

The social costs of special interests imposed on the general public come in two forms. The first and most obvious is the financial cost. While the hypothetical subsidy program outlined above costs each American very little, multiply this example for almost every industry in the country and the costs to the average taxpayer become enormous. The second social cost comes in the form of the opportunity cost of lobbying efforts for each firm, which is a deadweight loss. In keeping with the farming industry example, the opportunity cost of a firm investing in lobbying could be investing in newer (or cleaner) capital equipment and possibly lowering the cost of food for consumers. Once again,

multiply this opportunity cost among several industries, and the social costs of special interests imposed on the general population become massive.

The role that special interests play with regards to language policies has largely been ignored in the LPP literature. Political theorist Chandran Kukathas identified this problem in his critique of LPP.[44] He states:

> The problem with [LPP] is that it will require some political decisions
>
> about which languages are to be promoted and which abandoned, since it
>
> will not be possible to support every language. In all likelihood, the ones
>
> that will gain political support will be those with sufficiently many
>
> speakers to be politically powerful (Kukathas 2003; p. 240).

Consider, for example, the case of India. There are over 121 languages spoken by over 10,000 people in India and 22 languages recognized by their constitution (Census of India 2011).[45] Any proposed plan to preserve some languages will inevitably mean preserving some languages at the expense of others. Given the incentive structures of politicians and special interest groups, the decision as to which languages will be preserved will not be based on which will maximize social welfare. It will be based on which linguistic groups are the most politically well-connected.

Let us now turn to the final major actor in the supply side of government provision/intervention: bureaucracies. In most democratic regimes, bureaucracies are in

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[44] Kukathas does not critique LPP by name, but does critique the same principles used to justify LPP theory from a philosophical perspective.
[45] It is estimated there are over 19,500 total languages spoken in India (PTI 2018).

tasked with executing new legislation. We are once again maintaining the assumption

that bureaucrats are self-interested just like we assumed with politicians. However, the

context is very different with bureaucracies. Most notably, bureaucrats are not as

motivated by vote-maximizing as with politicians. Instead, they are characterized as

budget-maximizing and/or maximizing the number of subordinates under their control.

The size and functions of bureaucracies vary around the world depending on institutional

contexts but the general principle is the same – the end goal of all bureaucracies is to

secure as much funding as possible to solve a specific problem (or problems). Another

important characteristic of bureaucracies is that they do not base their output decisions on

profit and loss signals as firms do in a marketplace. In most democracies, decisions

regarding bureaucratic output are made based on legislative charters. Legislatures are also

in charge of approving the budget of bureaus. Measuring success is far more arbitrary and

nuanced depending on the mission of the bureaucracy (see for example Muller 2019)

compared to market settings.

Bureaucracies also have the potential to impose large externalities on the general

population. Similar to politicians, weak constraints make it very difficult for

bureaucracies to allocate resources to their social optimal level. As outlined by Gordon

Tullock (2005; p. 192-205), the primary issue is that bureaucratic output can be

characterized by monopoly (the bureaucracy) against monopsony (the legislature). If

legislatures had perfect knowledge of the bureaucracy's cost curves, they would simply

determine the optimal output at the intersection of the cost curve and the demand curve

and set the budget accordingly. However, this is rarely the case in real world settings.

Members of the legislature commonly oversee many bureaucracies whereas

bureaucracies are directed by one legislative committee. When viewed through the lens

of the principal-agent problem, the incentive structure gives considerable slack for the

'agent' (the bureaucracy) to overstate the optimal output level and therefore be granted a

budget that is far beyond the optimal level. From a social point of view, the excess budget

is wasteful and is a negative externality on the general public.

Taken together, the arguments put forward here pose a serious challenge to the

validity of language planning. To simply declare that linguistic diversity is a public good

vulnerable to market failure and therefore should be managed by the state, without

acknowledging the epistemic limitations as well as the incentive structure of government

actors, is naïve. The 'knowledge problem' argument shows that language planners can

never obtain the necessary amount of knowledge to either replicate or improve language

distributions under a laissez-faire outcome. Moreover, it provides us with a logical

explanation why spontaneous forces have gradually created the linguistic environment

that we all benefit from without any central direction. This insight gives us a strong

reason to believe spontaneous forces can create a socially beneficial linguistic

environment and that it is not possible for a centrally planned linguistic environment to

provide the social benefits LPP promises.

The 'public choice' argument shows that the incentive structure of government

actors, from the demand and supply side, have weak constraints that potentially impose

tremendous costs on the general public. Any theory that treats market failures as a simple

applied maximization problem without acknowledging the institutional constraints

government actors face is incomplete at best. Unfortunately, LPP theory does not acknowledge these constraints. Voters face very few costs if they vote for a candidate who gets linguistic distributions 'wrong' and voters have no recourse if a politician breaks their campaign promise to get linguistic distributions 'right.' Politicians have very weak constraints to actually implement policy changes to move linguistic distributions towards their optimal level. Their primary motivation is to be reelected which is not a guarantee that this motivation will dovetail with the 'socially optimum' linguistic distribution. Special interests always play a role in any legislative decision making and linguistic planning would not be an exception. Placing the power of language distribution in the hands of governments will inevitably lead to a rent-seeking race by politically well-connected language speakers which will concentrate benefits in the hands of a few at the expense of the general public. Finally, bureaucracies, who would be in charge of carrying out a linguistic policy, have very few mechanisms to ensure scarce resources are being used efficiently and a strong incentive to maximize their budget higher than the optimal level. Since LPP does not account for these problems with government provision, it cannot be used as an analytical tool (as it stands right now) to assess language distributions.

IV. Implications

We have clearly seen that from a theoretical perspective, LPP has some major flaws that are left unacknowledged. By utilizing the insights left out of LPP that are put forward in this paper, we can come to a closer understanding of how and why languages are important to well-functioning societies. Once again, the argument put forward here is

not that *any* effort to preserve or promote a language either for personal or cultural gains is futile. It is arguing that language diversity is not able to be rationally constructed by anyone. Instead, language and languages are the outcome of a spontaneous process that is constantly evolving to suit the demands of people over time all around the world. To think otherwise is to commit a "fatal conceit" error that Hayek warned about 34 years ago.

What do the insights above mean for policy analysis? LPP is most relevant for education policy. Language education is especially relevant in non-English speaking countries where the native language and English are often taught side-by-side at an early age. If there truly are social benefits to linguistic diversity, early childhood education seems like a great place to start to ensure minority languages are salvaged. And if one takes the assumptions and conclusions of LPP seriously, then there is a large role for government intervention in schooling to ensure that threatened languages are adequately taught alongside majority languages. However, if we acknowledge the public choice insights listed above, then the argument for language intervention in early childhood education becomes much less clear.

The argument made in this paper is not that schools should not or cannot make any decisions regarding languages taught in schools. The difference is in the theoretical approach. The theoretical approach of LPP says some languages should be preserved by being taught more in schools. Therefore, governments should intervene until social marginal benefits equal social marginal costs. The argument made in this paper is that languages are a spontaneous order that is impossible for any central planner to recreate or

redirect more efficiently. Therefore, the role of schools is to respond to consumer demand for language use in multilingual societies. The question is now reframed as: what institutional arrangements allow for schools to respond to consumer demand?

Most countries around the world have some form of a public school system and virtually all governments either heavily subsidize or completely control primary and/or secondary schools. Even so-called private schools around the world are heavily subsidized[46] and are still required to abide by testing and credentialling standards set by governments. It is therefore appropriate to characterize public (aka government) school systems as a modern bureaucracy, deeply entangled in a web of relationships between local communities, state/provincial governments, and national governments. Since they are exclusively funded through tax revenues, there is a less clear relationship between supply and demand. The 'discovery' of the most efficient way to instruct young students happens outside the normal profit and loss mechanisms.

Despite this limitation, there are still important differences in the way public school systems perform. For example, school systems that emphasize decentralized and adaptive systems tend to perform better and are more responsive to consumer demand than school systems characterized by top-down control (Ostrom 1996; Pritchett 2013). The reason why this is the case fits perfectly with the insights pointed out above. Decentralized school systems have stronger relationships with local communities, otherwise parents can send their children to another public school (or a private school) or

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[46] The notable exception being "low-cost private schools" in developing countries as pointed out by James Tooley (2013; 2021).

move to a new community. Top-down school systems face far less competition and far less of an incentive to respond to demand. For multilingual societies, a decentralized school system is much more likely to cater to the needs of families who wish to retain a minority language or learn the majority language.

It is also worth mentioning the potential of despotic governments using language and education policy to impose large costs on cultural or linguistic minorities. LPP's stated goal is to preserve minority languages by advocating government intervention in school systems to achieve this goal. What happens when the opposite effect occurs? Tooley and Longfield (2017) argue that government control of school systems in impoverished countries has been one of the major causes of conflict or even civil war. In the case of Sudan, language was consistently used as a means to oppress its citizens. Before independence, British colonizers in Sudan actively suppressed the use of Arabic languages (Leonardi 2013). After independence, the Sudanese government nationalized schools and imposed its version of Arabic in schools despite the fact that different dialects of Arabic were spoken in the south. These measures are now considered to be one of the major factors that led to the near constant civil war between the north and south for 50 years. As Tooley and Longfield state:

> Also, had Arabic and the strong Islamic curriculum not been imposed, but
> rather the language and the manner of instruction been left to the people in
> the communities running the mission and other private schools, then
> education would probably not have been the focus of such antagonism
> towards the government. Overall it is clear that throughout the period

under consideration, political decisions have been detrimental to the

education and development of the people in South Sudan [. . .] The

colonial powers used education as a tool of oppression, and the post-

colonial powers did more of the same. Therein lay the source of the

conflict in South Sudan (Tooley and Longfield 2017; p. 84-85).

The case of Sudan and South Sudan is an extreme one, but it nonetheless shows the

potential for abuse of power by governments that are in control of education systems and

language use. It also shows that language interventions by the central government

favored the politically well-connected at the expense of South Sudan. LPP's insistence

that language distributions be shaped and molded by government intervention must

account for these risks. Once language is included as a tool for governments to alter at

will, there is a very real chance it will be used as a political bargaining chip to be used at

the expense of minority language speakers or even the general public in the long run. The

intention may at first be to preserve minority language but this does not mean that in the

long run it cannot be used to impose massive costs on everyone except the politically

well-connected. Again, the issue is not whether schools should teach multiple languages

or not. The issue is who controls them and how much of a say customers (parents and

children) have in their education.

   LPP does not limit itself to education policy. Some other examples of policy

interventions include subsidies for publishers to write or translate books into threatened

languages, subsidies for television broadcasts in threatened languages, and change public

road signage to include threatened languages to name a few (Grin 2016; Desgagne and

Vaillancourt 2016). The assumption built into LPP's model is that these interventions will increase the production of linguistic diversity until it reaches its socially optimum point. Once again, these policies in practice are at the mercy of politicians with relatively weak constraints and the potential to be captured by special interest groups. For example, a broadcasting company may continuously lobby to continue to air television programs in a minority language. The opportunity cost of money, time, and resources dedicated to lobbying efforts are all deadweight losses that are not counted in LPP policy proposals. Moreover, a newly elected politician who has an antipathy towards linguistic minorities could easily end the subsidy program and/or use their power to actively suppress linguistic minorities. Absent any binding constraints, the long-term consequences of granting elected officials the power to control language distributions gives them the power to promote *and* suppress languages.

What are the alternatives then? If the theoretical justification for government intervention in language distributions is weak, what theory can take its place? The answer is to treat it like a spontaneous order as Hayek has accurately described it for over half a century. As was stated earlier, languages originated, evolved, and even died off over time[47] by the spontaneous interaction of countless people over time. We owe the existence of language and languages to bottom-up spontaneous forces. There is simply no

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[47] The obvious example that comes to mind is Latin, which was the dominant language of the world until the fall of the Roman Empire.

reason to believe that language distributions can be rationally constructed as an engineer can rationally construct a bridge.[48]

The conclusion arrived at in this paper is the same that Chandran Kukathas arrived at almost 20 years ago:

> What is worth considering, however, is how to make the potential for
> conflict over such issues as language less troubling and potentially
> damaging. One important way of doing this is by permitting those who
> use, and are attached to, minority language to exit from the dominant
> arrangements if they so wish: to set up their own newspapers and
> broadcast media; to run their own schools; and to conduct their own affairs
> generally in the languages they prefer to use (Kukathas 2003; p. 243).

In other words, no language or linguistic group be given special privilege over another. An institutional environment that enforces property rights, rule of law, free entry and exit, and free expression would achieve such a goal. In such a setting neither the majority nor the minority linguistic group would receive special privileges. The only reason why languages would survive (or die) in the long run is because it is the most effective (or ineffective) way to communicate with others or preserve cultural practices.

V.   Conclusion

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[48] This partially explains why Esperanto, the most famous rationally constructed language created in the late 19th century, has failed to displace any dominant language used today.

There is one major overlap between LPP and the arguments put forward in this paper: both agree that economists have mistakenly neglected the economics of languages. Both economists and linguists stand to gain tremendously by combining their theoretical tools to explain more clearly how languages change and adapt over time. There are plenty of opportunities to use the tools of economics to study the origin, function, and evolution of languages. In a globalized world where anyone with internet access may teach themselves any major language in the world through programs like Rosetta Stone or Duolingo, the opportunity to extend economic analysis to these areas is ripe. Language is a peculiar topic because it is used by literally everyone on the planet in some form, it was never strictly speaking 'invented' by anyone, and it is constantly being updated by its users rather than being produced by someone else. Economists have plenty of room to extend their analysis to languages. However, the correct tools must be used to answer these kinds of questions.

This paper has argued that LPP is using an ineffective set of tools to answer questions about linguistic diversity. LPP relies almost exclusively on welfare economics to address language-related issues. Its weakness is its failure to acknowledge alternative theories (namely market-process theory and public choice theory) that have exposed major flaws of welfare economics for decades.

The primary flaw in LPP theory is the same flaw Hayek identified in what he called 'rational constructivism' decades ago. As he famously stated then: "The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design" (Hayek 1988; p. 76). LPP eschews these lessons and instead carries on

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assuming planners can deliberately create a better world by changing language

distributions. It also eschews the lessons public choice scholars have pointed out for

decades about the perverse incentives and social costs of government intervention.

Because of these omissions, LPP as it stands must ultimately be rejected.

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Biography

Stephen G. Zimmer is a PhD Student at George Mason University. He is also a full-time Economist at the U.S. Bureau of Labor Statistics. Prior to that, he spent three years at the Mercatus Center at George Mason University as a Program Coordinator. He received his Bachelor's in Economics and Political Science at Florida State University in 2012 and his Master's in Economics at George Mason University in 2018.

When he is not working, reading, or writing, he enjoys playing the guitar/piano and traveling the world with his lovely fiancé, Laura.