Human Capital Through the Ages: A Historical Perspective from 1600s to Present *

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Abstract

This paper traces the historical development of the concept of human capital, emphasizing its evolution from early economic thought to its contemporary significance. Beginning with the contributions of economists such as Sir William Petty and Adam Smith prior to the mid-20th century, the discussion primarily centered on the importance of education and health in defining human capital. However, it was the work of scholars from the Chicago school, particularly Jacob Mincer, and Gary Becker, in the late 1950s that catalyzed a broader understanding of human capital. Their research expanded the concept to encompass mental health, on-the-job training, and insights into economic systems. By categorizing the discourse into four distinct time periods, this paper provides a comprehensive historical overview, shedding light on the conceptual foundations and theoretical advancements that have shaped contemporary understanding of human capital in economics.

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1 Introduction

Human Capital, often heralded as the true wealth of nations, distinguishes itself from physical and natural wealth by encapsulating the intrinsic value of a nation's populace in terms of health, education, and skills. While the formal study of human capital in economics gained traction in the latter half of the twentieth century, its conceptual roots extend far into history, with early economists like Sir William Petty, Adam Smith, and Karl Marx touching upon its components.

Before the mid-twentieth century, discussions on human capital primarily centered around education and health. Notable economists such as Marshall, Sidgwick, and Smith emphasized education as a cornerstone of human capital, recognizing its role in fostering individual development and economic productivity. Conversely, thinkers like Farr, Wittstein, and Fisher underscored the significance of health in enhancing human potential and contributing to societal well-being.

The term "Human Capital" solidified its place in economic discourse in the late 1950s, propelled by the seminal works of Chicago school economists Jacob Mincer, and Gary Becker. Their pioneering efforts broadened the scope of human capital to encompass a diverse array of factors, including mental health, on-the-job training, and knowledge of the economic system. Moreover, advancements in data collection and econometric techniques during this period empowered economists to construct more robust theoretical models and conduct rigorous empirical analyses, further illuminating the intricate interplay between human capital and economic outcomes.

By categorizing the evolution of human capital discourse into four distinct time periods—pre-1830, 1830-1870, 1870-1940, and post-1940—this paper aims to provide a comprehensive historical overview of the concept's development. Through an exploration of the thoughts and arguments of prominent economists across these epochs, it seeks to elucidate the gradual crystallization of human capital theory into its contemporary form. Such a historical perspective not only enriches our understanding of human capital but also sheds light on its enduring relevance in shaping public policy and fostering economic well-being.

2 Classical Economists on Human Capital - Before 1830

2.1 Sir William Petty (1623-1687) – Value of a Human Being

Sir William Petty, who was influenced by the Baconian empirical approach to science (Medema and Samuels, 2004), often used numbers, weights or measures to explain his arguments. His use of arithmetic can be seen throughout his work and even more so in his essay *Political Arithmetick*. His interest in monetary evaluations of man developed out of his interest in public finance. He calculates the monetary value of a human by estimating expenditure and rental income from land. In the first chapter, he claims that "*a small country and few people, by its situation, trade, and policy, may be equivalent in wealth and strength, to a far greater people and territory.*" According to Petty, this was possible was due to the superior human capital of the small country. Petty viewed national wealth should include labor. Therefore, a value should be placed on laborers. He also uses notion of human capital to demonstrate the power of England. He says men acquire different skills as they grow up,"*one Man is more nimble, or strong, and more patient of labor than another; one Man by Art may do as much work, as many without it; viz. one Man with a Mill can grind as much Corn, as twenty can pound in a Mortar; one Printer can make as many Copies, as an Hundred Men can write by hand ; one Horse can carry upon Wheels, as much as Five upon their Backs; and in a Boat, or upon Ice, as Twenty (Petty and Graunt, 1899).*"

In the above paragraph, he points out that the skills of the man determine the value of output. If a man knows how to run a mill, then he can produce more with the help of the machine and as a result have a higher value of himself; in his view as much as the value of twenty men without the skill of running a mill. Furthermore, when he discusses the worth of seamen, he argues that acquiring multiple sets of skills and knowledge adds to one's value and thus to one's wages. He points out that seamen are not only Navigators but a Merchants and a Soldiers, so they earn three times more than the husbandmen (Petty and Graunt, 1899).

Petty believed human capital to be an integral part of the wealth of a nation. In his essay, Verbum Sapienti (1691), Petty proceeds to estimate the value of national wealth and the value of labor. He sets the annual amount of the wealth, or stock, at 15 million pounds and the expenses to be at 40 million, and so he argues the remaining 25 million pounds of national income must have come from another source, which he finds in the labor of people. He then calculates the value of people who yield 25

million yearly to be 417 million. In this way, Petty estimates human capital to be 69l per head (Petty and Graunt, 1899). He later, in Political Arithmetic, does a similar estimation of the people of England to be about 80l sterling per head. Petty then goes on to demonstrate the actual value of the loss sustained by the Plague, by the Slaughter of Men in War, and by the sending them abroad into the Service of Foreign Prince (Petty and Graunt, 1899). According to Petty, this is a loss of wealth to a nation due to the loss of human capital. He, unlike Malthus, would view population growth as a good sign of prosperity and wealth creation. Even when it comes to crime and punishment, Petty argues that the then laws are not being economically efficient. By not putting human capital of the convicted to work to create wealth, the nation is essentially losing wealth. He views labor as the father and active principle of wealth, as lands are the mother (Petty and Graunt, 1899). He says, "*Why should not insolvent thieves be rather punished with slavery then death? So as being slaves they may be forced to as much labour, and as cheap fare as nature will endure, and thereby become as two men added to the tile Commonwealth, and not take away from it (Petty and Graunt, 1899).*" Petty thinks that even a criminal can positively contribute towards increasing the value of the society. Although this kind of policy might be highly disputed in the twenty-first century, Petty, thinking like an economist, was simply putting forward a logical economic thinking rather than an ethical one.

2.2 Adam Smith (1723-1790) – Division of labor

While Smith does not use the term "Human Capital" at all, he thoroughly discusses the idea in Wealth of Nations(WN). Smith said the skills of a man is just like that of a machine that has fixed costs and returns a profit (Kiker, 1966). According to Smith, the improvements in the quantity of work through the division of labor is due to three different reasons, increase of dexterity in every particular workman, by saving time between tasks and to the machines (Smith, 1776). The division of labor reduces the job of a man to a simple operation; he can get better at it by repeatedly performing it and thus raise the value of his production. Smith gives an example of a professional smith who works alone vs. several boys working in a factory where there is the division of labor. The boys by specializing their skill through the division of labor could produce two to three thousand nails a day while the smith could one produce two to three hundred (Smith, 1776). These boys could thus demand a higher wage for their higher productivity.

Smith also describes human capital as one of the four types of fixed capital. He

notes, "*Fourthly, of the acquired and useful abilities of all the inhabitants and members of the society. The acquisition of such talents, by the maintenance of the acquirer during his education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in his person. Those talents, as they make a part of his fortune, so do they likewise that of the society to which he belongs. The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labour, and which, though it costs a certain expense, repays that expense with a profit (Smith, 1776).*" Here, Smith describes the acquisition of human capital as an investment which would repay a future profit just like an investment in useful machines, profitable buildings, and improvements to land.

From the accounts of the above descriptions, is Smith saying that there are two types of human capital, one fixed and the other variable? Education, study or apprenticeship, on the one hand, are examples of fixed human capital whereas, skills gained through repetition (the division of labor) are variable human capital that could grow with experience. Education, study, apprenticeship, need some fixed cost to acquire while acquiring variable human capital need no fixed costs but time and job loyalty (sticking to one job).

Unlike Petty, who only scratches the surface of human capital, Smith is very thorough in his discussions. Smith says, "*The differences between the most dissimilar characters, between a philosopher and a common street porter, for example, seems to arise not so much from nature, as from habit, custom, and education about the various issues that's keeping man from acquiring greater human capital (Smith, 1776).*" If human capital was key to improving the value of a man or moving to the heights of prosperity, why weren't all men investing in these skills and education? According to Smith, there were several obstacles; the first is the that caused by the division of labor, which makes it possible for young people to find a job and, as a result, deprives them of higher education. Also, the repetitive nature of the work kills the creativity of a man thus limiting his human capital (Spengler, 1977). He also argues that the private endowments of schools and colleges had corrupted the school system, deeming it inadequate in providing the necessary service. Smith fears that education for which there was no demand or isn't in fashion would go extinct if there were only private schools. As a result, he is in favor of public educational institutions to encourage learning (Smith, 1776). Additionally, Smith was also against the long apprenticeships in practice in England. He believed that apprenticeships deprived

poor of the only asset, labor.

2.3 Jean Baptiste Say (1737-1862) – A fully grown man is an accumulated capital

Jean Baptiste Say is mostly known for his writing on the political economy through his essay, Treatise on Political Economy. His work is very similar to that of Smith's Wealth of Nations. Say is often credited with popularizing Smith's ideas in Europe and the United States (Medema and Samuels, 2004). About human capital, Say writes, "*With regard to those sources, that are inalienable, as are the human faculties of mind and body, they can never be the subject of actual exchange, and their value is a matter of mere mental estimation, grounded upon the value they may be capable of producing. Thus the productive means of this description, which yield to an artisan the wages of 1 dollar a day, or of 365 dollars a year, maybe reckoned equivalent to a vested capital yielding an equal annual revenue (Say, 1836).*" Here, Say writes that we can only estimate the value of human capital through the value of wages laborers earn. In his example, the artisan has accumulated the human capital worth 365 dollars a year. Later in The Treaties, he notes that "*A full-grown man is an accumulated capital; the sum spent in rearing him is indeed consumed, but consumed in a reproductive way, calculated to yield the product man (Say, 1836).*" He, like Smith, views human capital as an investment that yields a return.

To summarize this period, both Smith and Petty highlight the importance of human capital in determining the wealth of a nation. While Petty is more concerned about the positive (in Malthus's words) aspect of human capital, he talks about the loss in economic value due to the loss in human value in plague, deaths, and punishments. Smith, on the other hand, is more concerned about the preventive (again using Malthus's language) issues with obtaining human capital. He talks about various realities of that time in England to bring to light the frictions that prevented men from accumulating higher human capital.

3 Post Smith era On Human Capital (1830 – 1870)

The Wealth of Nations, by Adam Smith, inspired future economists and statisticians to dig deeper into various topics in economics. Human Capital was one such topic. In this essay, I will mostly be examining the writings of Farr, Senior and Marx on their view of the value of a labor and how it contributes towards the wealth of a nation.

Farr, a reputed medical statistician and epidemiologist of the 19th century, attempts to provide an estimate of the economic value of the population. He approximates the value of the people of United Kingdom and suggests it should be added to the total capital holdings of the county (Farr, 2001). Alternatively, Marx acknowledges that different people have different skills and education and thus we have variation in labor productivity. However, he says that there is a problem in the distribution of the return on the human capital. He believes that capitalists are the ones reaping benefits of the higher skills and abilities of labor rather than labor itself (Harvey, 2014).

3.1 William Farr (1807-1883) – Human beings should be regarded and taxed as capital

In his essay, The Income and Property Tax, Farr is quick to point out that human beings have value in themselves. He writes, "*But anything which yields produce that will sell of money is property, although it may be itself inalienable; consequently, all the free labourers, artizans, professional men, of the United Kingdom, having within them this power of production, are as essentially property as the things usually designated by that name. . . . . .Exclusive of all his external property, every man is worth something. I propose to call the property inherent in a man his Inherent Property; and all other property of which he is in possession, External Property (Farr, 1853).*" In his view, capital is of two kinds, human (Inherent) and physical (External). Farr argues that since human capital is Inherent property, it should be taxed. Furthermore, he states that the state should impose a tax on the services provided by the capital as well as on the holding of the it as a property.

Like Smith and Say, Farr believes the accumulation of human capital as an investment which yields a return in the future, perhaps evidence of the influence of Smith to subsequent economists. In chapter VII of his book, The Income and Property Tax, Farr says, "*The labour of the parents, and the expense of attendance, nurture, clothing, lodging, education, apprenticeship, practice, are investments of capital, at risk extending over many years; and the return appears at various ages 12, 15 . . . . . .probably up to the age of 50 or 55 (Farr, 1853).*" Unlike previous economists, Farr thinks that investments in human capital have risks. Is he implying that because these investments have risks, not all human capital (skills and education) would result in a return; that some investments may incur a loss. He goes on the say that capital invested in life is like capital invested in the soil. For some, it

could be profitable by ten, twenty, or even hundredfold and for others, it could barely return or entirely lost by death, sickness, vice, idleness, or misfortune (Farr, 1853).

William Farr, using the then available tools of statistics, computes the present value of a man by using the discounted sum of expected future earning minus cost of maintenance such as living expenses. In table VII, he extensively calculates the value for an agricultural laborer from age 0 to 80 (Farr, 1853). Farr approximates the value of the people of United Kingdom to be £5,250 million and insists that it may be added to the other forms of capital such as land, houses, cattle or stock, and other investments (Farr, 2001). His belief in human capital as a form of property leads him to argue that this capital should be taxed as well. While the idea of taxing inherent property (human capital), like taxing external property, may sound absurd (at least calculating it would be a daunting task), one cannot help to see an economic argument made by Farr. By not taxing the inherent property, the state is encouraging people to invest in human capital.

Farr also had an influence on future writers who wrote on Human Capital. In 1867, an economist by the name of Theodore Wittstein proposed that Farr's present value of net future earnings should be used to compensate for claims involving loss of life. Additionally, Farr's method was adopted by economists such as Louis Dublin and Alfred Lotka, some eighty years later (Kiker, 1966).

3.2 Nassau W. Senior (1790-1864) – A free man sells himself for a certain period, whereas the slave is sold for a lifetime

Senior, like Smith, believes that human capital is a form of fixed capital investment. He believes that the acquired skills and abilities constitute human capital. In his book, An outline of the Science of Political Economy, Senior writes, "*The same remark applies to the acquired abilities which Adam Smith has properly considered a capital fixed and realized in the person of their possessor. In many cases they are the result of long previous exertion and expense on his own part; exertion and expense which might have been directed to the obtaining objects of immediate enjoyment, but which have, in fact, been undergone solely in the hope of a distant reward (Senior, 1836).*" Although Senior thinks skills and education are an integral part of human capital, he does not believe all skills and education is intended towards acquiring additional human capital (or not all skills and education would lead to an increase in the value of human capital) (Kiker, 1966).

Nevertheless, Senior argues that human capital (especially education) is vital in

determining the wealth of a nation. Later, in his other writing, Suggestions on Popular Education, Senior claims that the state had an important role in providing proper education to all as he believed education was as much necessary to a child as food (Sandonà et al., 2010). According to Senior, it could explain as much as two-thirds of the wealth. He uses this argument to establish the superiority of England over that of neighboring countries like Ireland. Senior writes, "*The bulk of the national revenue is profit, and of that profit, the portion which is mere interest on material capital probably does not amount to one-third. The rest is the result of personal capital, or, in other words, of education. It is not on the accidents of soil or climate, or on the existing accumulation of the material instruments of production, but on the quantity and the diffusion of this immaterial capital, that the wealth of a Country depends. The climate, the soil, and the situation of Ireland have been described as superior, and certainly are not much inferior, to our own (Senior, 1836).*"

Furthermore, Senior believes there is little difference when talking about the value of a freeman and value of a slave. He goes on to say that a free man sells himself for a specified period, whereas the slave is sold for a lifetime (Senior, 1836). It is easy to see that Senior would have agreed with William Petty on the theory that all human beings have economic value. He says, "*that the personal qualities of the slave are a portion of the wealth of his master; those of the freeman, so far as they can be made the subjects of exchange, are a part of his own wealth (Senior, 1836).*" It is clear by now that human capital is a well-recognized form of wealth in economics.

3.3 Karl Marx (1818-1883) – Human Capital impoverishes the worker and reduces him to a machine

Marx recognizes that people have different skills and education and so labor productivity depends upon it. In Das Kapital, he says, "*The value of a commodity would, therefore, remain constant if the labour-time required for its production also remained constant. But the latter changes with every variation in the productiveness of labour. This productiveness is determined by various circumstances, amongst others, by the average amount of skill of the workmen, the state of science, and the degree of its practical application. . . .(Medema and Samuels, 2004).*" Marx, like Smith, divides capital into two parts but unlike Smith, categorizes value of labour-power (sum of total wages) as variable capital. He defines the total social capital as the average of the various individual capitals in all branches of production (Medema and Samuels, 2004).

Marx's primary concern with the idea of Human Capital was that it was a tool used by capitalists to reap higher benefits out of labor. He is critical of the "division of labor" that Smith described as a tool to gain additional human capital. Marx says, "*Whilst the division of labour raises the productive power of labour and increases the wealth and refinement of society, it impoverishes the worker and reduces him to a machine (Basu, 2007).*" Consequently, capitalists would exploit humans as machines by longer working hours to reap extraordinary benefits. Marx's problem seems to arise from the unfair distribution of profits from division of labor. He views division of labor not as a productive tool but a major cause of the class division of the society. Marx further writes, "*What characterizes the division of labour inside modern society is that it engenders specialized functions, specialists, and with them craft-idiocy (Basu, 2007).*" Marx would also be concerned about the suggestion made by Farr on taxing human capital.

Marx reasons that for the worker to realize the profit from his holding of human capital, the worker needs to work for the capitalist who is always looking to exploit the labor. As a result, the capitalist reaps the most benefit of the higher productivity of the worker (Harvey, 2014). Marx claims that if the skills and education obtained by labor constituted some form of capital, then the worker should be able to sit back and live off the interest without doing a single day's work.

4 Human Capital during and after Marginal Revolution (1870-1940)

In the history of economic thought, the Marxist revolution was followed by a great deal of progress through the Marginal Revolution, American Institutional Economics and the birth of Macro-Economics. Economists such as Marshall, Sidgwick, Engel, Walras, Fisher, Pigou all contributed to the idea of Human Capital and its importance to the individual as well as the nation. Just like preceding economists, health and education were essential in the discussion of human capital. In his book, Principles of Economics, Marshall writes,

"*But a good education confers great indirect benefits even on the ordinary workman. It stimulates his mental activity; it fosters in him a habit of wise inquisitiveness; it makes him more intelligent, more ready, more trustworthy in his ordinary work; it raises the tone of his life in working hours and out of working hours; it is thus an important means toward the production of material wealth; at the same time that,*

regarded as an end in itself, it is inferior to none of those which the production of material wealth can be made to subserve (Marshall, 1888)."

Although Marshall views the benefits of good education as indirect, he is certain that it adds enormous economic value to the society. Another neoclassical, Irving Fisher, discusses the loss of human capital in the United States due to death from preventable diseases.

4.1 Alfred Marshall (1842-1924)

Alfred Marshall was one of the pioneers of Marginal Revolution. He helped set up the foundations of the microeconomic core of neoclassical economics. Marshall was also the most vocal neoclassical in the topic of human capital. In his works, Marshall extensively discusses the role of education and skills in achieving economic progress of a country. In his book, The Economics of Industry, Marshall defines wealth into two categories, material and personal. Personal wealth, or in modern terms Human Capital, for Marshall, is all the manual skill, intelligence and moral qualities of men that makes them productive. He writes, "Personal of non-material wealth consists of those human energies faculties and habits, physical mental and moral, which directly contribute to making men industrially efficient, and which therefore increase their power of producing material wealth (Marshall, 1888)."

Marshall has a very similar view of human capital to preceding economists such as Adam Smith, and Nassau Senior. According to Marshall, if these are personal wealth, then they should be convertible to personal capital. So, just like material capital, labor and businesses can reap benefits off this capital. Other economists who also view human beings as capital include Irving Fisher and von Thunen (Kiker, 1966). In contrast, many early economists were also skeptical of exploring human beings as a form of capital and labeled the concept as 'sentimentalism' (Appiah-Adu and Bawumia, 2016).

Furthermore, Marshall goes on to say, "*Capital consists in a great part of knowledge and organization: and of this, some part is private property and other part is not. Knowledge is our most powerful engine of production; it enables us to subdue Nature and force her to satisfy our wants. Organization aids knowledge; it has many forms, e.g. that of a single business, that of various businesses in the same trade, that of various trades relatively to one another, and that of the State providing security for all and help for many (Marshall, 1890).*" The idea that human beings can be labeled as a form of capital is controversial. It would mean that both the working class and

capitalists would earn their share of the rate of return on the capital they possess. Karl Marx would disregard this concept as it would justify the existence of inequality in the society. His theory that the capitalists extract from the working class and that it is the primary cause of inequality would seem less relevant if there was indeed such thing as human capital.

4.2 Henry Sidgwick

Just like Marshall, Sidgwick also viewed that education was crucial to expanding one's knowledge and skill. He believed that investment in education gave a higher quality skilled labor. But, Sidgwick also claims that ordinary people did not realize the importance of education and hence favored for government intervention to induce parents into sending their kids to school (Sandonà et al., 2010).

Sidgwick writes,

"*But further; there may be the same general economic justification for cheapening by governmental aid the special training required for skilled labour, as there is for cheapening elementary education: that is, the community may gain an adequate return for its expenditure in the greater abundance and better quality of the skilled labour so provided.*"

Sidgwick was also a progressive of his era. He promoted the need for educating women; not just limited to his writing but also by acting towards achieving it. He helped establish Newman College, the first residential college for women in Cambridge University (Sandonà et al., 2010).

4.3 Irving Fisher

Another neoclassical, Irving Fisher, standing on the shoulders of giant William Farr, was concerned with the loss of human wealth resulting from death. While Marshall discussed the contribution of education to Human Capital, Fisher developed a model to calculate the loss of Human capital due to poor Health. Fisher used Farr's approach to estimate the value of an average American. As Fisher was also a pioneer of econometrics, he then used the age distribution of deaths and probability of preventing deaths to calculate the economic loss of preventable disease to the society (Kiker, 1966).

Fisher discusses the loss of economic value in his work, The Costs of Tuberculosis in the United States and Their Reduction (1908). He writes, "*We cannot estimate the cost of disease by the number of deaths merely. A death from cholera infantum of from*

Bright's disease is not as great a loss to a nation as a death from tuberculosis; for the reason that infants and the aged are of less value in a population than those living in the prime of life (Fisher, 1909)." Fisher is arguing that adults are of greater economic value to the society than children or elderly since they can contribute towards the production of goods and services. Later in the article, he calculates the money cost of tuberculosis and points out the loss in capitalized value of the future earning power due to death (Fisher, 1909). By calculating the loss of economic value to the society from tuberculosis, Fisher advocates that investment in health would reap great benefits. He writes, "*If only one-fourth, or 1,25,000 of the 5,000,000 lives to be lost from among the present generation alone can be saved, the effect of saving them will be worth a billion dollars (Fisher, 1909).*" Fisher calculates the average loss of capitalized value of the earnings to be 9100 dollars (Fisher, 1909).

Following the footsteps of Petty and Wittstien, Fisher includes man as a form of wealth. In his essay on capital, Senses of Capital, "*Man is 'material-' as truly as a horse or an ox. He is "appropriated" whether the owner be another person, as in the case of slavery, or himself as in the case of freedom. He is also "useful" to his owner. There is, of course, abundant precedent for thus including man as wealth (Fisher, 1897).*" Fisher is also the first known economist to use the term "human capital" (Fisher, 1897). He continually brings up the concept of human capital in his works related to capital but does not dwell further on the topic. He describes capital to be of three kinds human capital, land capital, and products (Fisher, 1897).

5 Human Capital outside of Economics – Dublin, and Lotka

It wasn't only economists who contributed to the discussion of Human Capital in the history of economic thought. Louis Dublin and Lotka, who were in the life insurance business, also discussed the value of a man and the loss incurred due to death. Dublin was a Jewish American statistician and president of the Metropolitan Life Insurance Company. He also served as president of the American Statistical Association in 1924. Lotka was a mathematician and statistician who was well known for his predator-prey model. In their book, The Money Value of a Man (1930), Dublin and Lotka write,

"*We are concerned here with man as a wage earner, the supporter of himself, and, in the normal case, of a family, through a large fraction of life. If such a man is removed by death, his family suffers, emotionally, a loss which escapes our powers of evaluation in figures; and with which we are, therefore, not here concerned. But the*

family suffers, in addition, an economic loss, for which a fairly definite estimate in dollars and cents can be given."

Dublin and Lotka give a practical example of calculating the money value of a man by calculating discounted net future earnings less the living cost of an individual (Dublin and Lotka, 1930). Their method of calculating Human Capital is like that of preceding economists such as Wittstein, Farr, and Fisher, who were also interested in calculating the worth of human life. Their approach was very mathematical, and estimates were made using the information available such as life expectancy, income, and others.

Another outsider, Solomon Huebner, who is the founder of the American College of Life Insurance at the University of Pennsylvania, discusses the value of human life in 1914. He like Smith and Fisher views labor as a form of capital. He says, "*Human life value should be afforded the same scientific treatment as is applied to conventional capital (Appiah-Adu and Bawumia, 2016).*"

As Kiker discussed in his paper in 1966, there are several motives for studying the concept of human capital. Of those, economists of this era have several; their first motive seems to be to determine the economic effects of health and education and the second to incite a conversation amongst the public about the significance of economic life. The works of Dublin and Lotka deal more with aiding the courts for fair compensation in cases of injury and death (Kiker, 1966). These discussions lay groundwork for mainstream economists to empirically explore the field the human capital and to formulate a better theory.

6 Human Capital post World Wars (1940-Present)

In the final section of this historical digging into the idea of human capital, I will be discussing how a few Chicago school economists shaped the discussion on Human Capital. Empirical as well as theoretical works by Jacob Mincer, and Gary Becker were crucial to the study of human capital. Investment in Human Capital and Personal Income Distribution (1958) by Mincer, and Investment In Human Capital: A Theoretical Analysis (1962) by Becker were pioneering works on Human Capital within a short period. In his paper, An economic personalist perspective on human capital: A compared anthropological interpretation, Sandona writes that this burst in the study of Human Capital was partly due to the discovery of residual of GDP by economist Robert Solow. Solow found that the residual was not explained by

the traditional determinants of economic growth, so he identified it as technological growth (Sandonà et al., 2010). It is also interesting to see that the Chicago school economists use the word "investment" in their title. While previous economists were more concerned about calculating the total value, these newer economists were more concerned with the return on investment on human capital through education, health, and information. There is a clear influence of the marginal thinking in this branch of economists.

6.1 Jacob Mincer (1922-2006)

Jacob Mincer is known as the father of labor economics for his extensive work on human capital and beyond. He helped lay the empirical foundations of the human capital theory. His early works emphasized on schooling and work experience to explain income inequality. In his dissertation paper, Investment in Human Capital and Personal Income Distribution, Mincer seeks an answer to causes of variation in personal income distributions. Mincer writes, "*Since income inequality is observable in terms of the shapes or parameters of statistical frequency distributions, theories of the determinants of personal income distribution, if they are to be operational, must predict features of the observable statistical constructs (Mincer, 1958).*"

Mincer takes an empirical approach to explore the relationship between the level of workers education and training and his/her wage and later formulates a general theory. He finds that "*About 60 percent of the inequality of distribution in the 1959 annual earnings of white urban males can be attributed to the distribution of investments in human capital (Mincer, 1975).*" It is important to note that the availability of better data and advanced econometric tools help modern economists, like Mincer, conduct innovative empirical work and formulate better theories based on it.

Mincer differed from an earlier analysis of human capital in that previous economists relied only on education (primarily number of schooling years) to calculate the return on investment while Mincer argued that post-schooling investment (on-the-job training and job experience) in human capital had a profound effect on earnings. In his later work, Schooling, Experience, and Earnings (1974), Mincer states, "*It is not surprising, therefore, that observed correlations between educational attainment, measured in years spent at school, and earnings of individuals, although positive are relatively weak (Mincer, 1974).*" He provides a comprehensive explanation of the variation in one's investment in human capital to, even between individuals of equal educational background (Granovetter, 1977). Mincer was a source of inspiration

for many interested in labor economics and human capital including Gary Becker. Becker, referring to the Mincer dissertation paper, writes, "*I am indebted to Mincer for a helpful discussion of the comparison and especially for the stimulation provided by his pioneering work (Becker, 1962).*"

6.2 Gary S. Becker (1930-2014)

While Mincer is known as the father of labor economics, Becker is the father of human capital theory. His partnership with Mincer was crucial in expanding economic thought in this area. In his paper, Investment in human capital: A theoretical analysis (1962), Becker seeks answers to the activities that influence future income "*through the embedding of resources in people.*" Becker, just like William Farr, divides capital into tangible (physical) and intangible capital. His definition of intangible capital includes not only conventional ones such as schooling, on-the-job training, and medical care, but also vitamin consumption, and acquiring information about the economic system (Becker, 1962). Furthermore, unlike previous economists, Becker also accounts for psychological health into the equation of human capital. He writes, "*One way to invest in human capital is to improve emotional and physical health . . . . . Moreover, emotional health increasingly is considered an important determinant of earnings in all parts of the world (Becker, 1962).*"

Becker divides his study of investment in human capital into four parts on-the-job training, schooling, information, and health. Just like Mincer, he focuses on the impacts of on-the-job-training as, according to Becker, "it clearly illustrates the effect of human capital on earnings, employment, and other economic variables (Becker, 1962)." Becker and Mincer formed a strong partnership in discussing human capital. Becker acknowledges this in his paper, "I benefited greatly from many discussions with my colleague Jacob Mincer, and also with other participants in the Labor Workshop of Columbia University (Becker, 1962)."

One notable aspect of Becker's work is his careful and thorough description of variables in his model. For example, in his description of schooling, Becker writes, "*A school can be defined as an institution specializing in the production of training, as distinct from a firm that offers training in conjunction with the production of goods. Some schools, like those for barbers, specialize in one skill, while others, like universities, offer a large and diverse set (Becker, 1962).*" Furthermore, he is clear in describing what he means by "acquiring information about the economic system." According to Becker, market information such as prices charged by sellers, wages

offered by firms, could also improve human capital of an individual (Becker, 1962). Also, he argues that if investment in information about employment yields a higher paying job, then they should be included in the calculation of human capital (Becker, 1962).

In contrast to classical economists, who only discussed the loss of value to the society due to loss of life, Becker argues that firms can generate economics value by investing in the health of employees. In addition to the decline in death rate, Becker writes, "*a better diet adds strength and stamina, and thus earning capacity; or an improvement in working conditions-higher wages, coffee breaks, and so on might affect morale and productivity (Becker, 1962).*" However, Becker considers the concept of health as human capital to be different than that of education or training (Becker, 2007). In his paper, Health as human capital: synthesis and extensions, Becker calculates the "statistical value of life." He uses the utility as a foundation to his calculation where agents try to optimize their utility by choosing actions that affect their survivor rates (Becker, 2007).

6.3 Michael Grossman (1942-Current)

Relative to human capital evaluation of education, only a few economists had given a serious thought on the health component of human capital. Grossman is one of the early modern economists who extensively studies "good health" as a form of capital. He assumes that individuals inherit a certain amount of health when they are born and that stock can be increased or decreased with further investment in healthy behaviors (Granovetter, 1977). He shifts the debate on human health capital in that; he differs it from other forms of human capital. He claims "*a person's stock of knowledge affects his market and nonmarket productivity, while his stock of health determines the total amount of time he can spend producing money earnings and commodities (Granovetter, 1977).*" So by his logic, investment is health indirectly affects future income through increased availability of productive time.

Additionally, he claims that returns to investment in health also differs from a return to investment in other forms of human capital. Grossman points out that investment in health is necessary for all individuals regardless of their involvement in the labor market. He writes, "*a person's stock of knowledge affects his market and nonmarket productivity, while his stock of health determines the total amount of time he can spend producing money earnings and commodities. Since both market time and nonmarket time are relevant, even individuals who are not in the labor force have*

an incentive to invest in their health (Granovetter, 1977)." The return to investment in health is in the form of time, so the monetary value of this investment depends on the productivity of that individual.

7 Conclusion

In conclusion, the concept of human capital has traversed a remarkable journey throughout history, evolving from rudimentary discussions on education and health to a multifaceted framework encompassing a spectrum of factors influencing individual and societal prosperity. From the pioneering insights of early economists to the seminal contributions of modern scholars, the narrative of human capital reflects an ongoing quest to comprehend the intricate dynamics between human capabilities and economic progress.

The emergence of human capital as a cornerstone of economic theory in the latter half of the twentieth century, propelled by the groundbreaking research of figures like Mincer, and Becker, underscores its pivotal role in shaping contemporary economic thought. With advancements in data analytics and econometric methodologies, economists have gained unprecedented insights into the mechanisms underpinning the formation, accumulation, and utilization of human capital, enabling more nuanced policy prescriptions and targeted interventions.

By delineating the historical trajectory of human capital discourse across distinct epochs, this paper has provided a panoramic view of its evolution, illuminating key milestones and intellectual currents that have shaped its conceptual contours. Moreover, it has underscored the enduring relevance of human capital in driving inclusive growth, fostering innovation, and mitigating socio-economic disparities in an increasingly interconnected world.

In essence, the journey of human capital is not merely a chronicle of economic theory but a testament to the enduring quest for human flourishing and societal advancement. As we chart the course ahead, let us heed the lessons of history and reaffirm our commitment to harnessing the true wealth of nations—the boundless potential of every individual. It is evident from the discussions above that human capital is an essential part of economics. In the early days, it helped economists calculate the total value of the country, or the loss of economic value from war, or the benefits of education and learning skills. In the more recent days, it has helped economists understand wage differentials, income inequality, or the impact of

education and health policies to the economy.

This quote from Marshall cannot better state for the discussion of human capital and its importance to economics,

"All that is spent during many years in opening the means of higher education to the masses would be well paid for if it called out one more Newton or Darwin, Shakespeare or Beethoven (Marshall, 1890)."

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