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GROWTH AND DEVELOPMENT

Correlation with Welfare Policies

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ABSTRACT

Murroni Federico: ”Growth and Development: Correlation with Welfare Policies”
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The purpose of this thesis is to go to demonstrate how nowadays, the countries that manage to achieve solid, lasting and sustainable long-term economic growth are the same ones that commit themselves to supporting welfare policies by investing in their citizens through policies that aim to increase their human capital and social inclusion. The starting point will be the existing literature, to then demonstrate the different theses and conclusions through the help of empirical evidence and concrete examples.
To do this, concepts of economic growth and economic development will be examined and explained clearly and rigorously. In a given historical period, the phenomenon of economic growth will be contextualized and all the factors that contribute to its evolution will be analyzed. For this analysis we will start from the "classic" theories of economists Smith, Malthus, Ricardo, Schumpeter. Once the point of view of the classical economists regarding the phenomenon has been broadly explained, Solow's "neoclassical" model will be examined, which, following two changes compared to the original version, is still in existence. today one of the clearest and most comprehensive growth models.
Subsequently, the topic "economic development" will be introduced, highlighting the differences compared to the concept of "economic growth". Often the two words were used as interchangeable synonyms, but the concept of development is much more complex than that of growth. In fact, if growth is estimated and analyzed through economic factors, in order to evaluate the degree of development of a country, it is necessary to also analyze social factors.
Through literature and empirical evidence they will be defined by factors that determine the degree of development of a country. Going to explain and define these factors that are used as development indices, it is shown how the key value that most represents the degree of economic growth of a country, or GDP per capita, is only an indicator of well-being in material terms , but does not appear to be completely exhaustive regarding the socio-economic situation of a country. Factors such as social inclusion, education, health and income inequalities will be examined and in particular the different economic policies adopted by States will be examined. In this regard, the different welfare systems will be compared between countries in Northern Europe (Finland, Norway, Sweden, Denmark) and lost countries in Mediterranean Europe (Italy, Spain, Portugal, Greece). From this analysis, a substantial difference will emerge in terms of the priority of public expenditure interventions, which will fall on the economic growth factor.

Keywords: Economic Growth, Economic Development, Welfare Policies, Social Inclusion, Education, Health, Income Inequalities, Classic Theories, Social Factors, Northern Europe, Mediterranean Europe

Contents

1 Introduction

The study of economic growth and development is relatively recent. The reason is that for millennia, in fact, humanity has practically not experienced any economic growth, therefore it has always been a topic that has attracted the interest of few economists. One of the economists interested in this topic was the economist and historian Maddison, who, after a long experience at the OECD, since the 1960s has infused an incredible commitment in research into the history of national accounts. His historical series on per capita product, on the productivity of labor and capital, on hours worked, published in 2001 in his essay "The World Economy: A millenial perspective", are an invaluable source for research on long-term economic growth period, on its ultimate causes, on the relationship between socio-economic institutions and increased well-being. His studies show that over the past millennium, world population rose 22 – fold. Per capita income increased 13 – fold, world GDP nearly 300 – fold. This contrasts sharply with the preceding millennium, when world population grew by only a sixth, and there was no advance in per capita income. From the year 1000 to 1820 the advance in per capita income was a slow crawl - the world average rose about 50 per cent. Most of the growth went to accommodate a fourfold increase in population. Since 1820, world development has been much more dynamic. Per capita income rose more than eightfold, population more than fivefold, other studies also argue that the material living conditions of a citizen of the Roman Empire were substantially no different from those of a European citizen of the sixteenth century. (Maddison 2001, p.17)

This however does not mean that during that period there were no moments of economic growth and improvements in living conditions but, on average, the succession of favorable periods, wars and famines did in fact stop the trend of this growth. As a result, nobody has ever worried about a phenomenon that did not actually exist. Tendentially, historians and economists are all in agreement in making the beginning of economic growth coincide with the Industrial Revolution, despite a slight hint of economic growth occurred during the conquest of the American colonies. Since then many economists began to wonder about the causes of it, because the economy of different countries increased positively year after year and therefore tried to study this "phenomenon" but above all tried to understand what the causes were. After a succession of studies and theories (classical and contemporary) it was concluded that economic growth is a phenomenon or macroeconomic context, mainly related to modern economic systems, characterized by an increase in the medium-long term of the development of society with generalized increase the level of macroeconomic variables such as wealth, consumption, production of goods, provision of services, employment, capital, scientific research and technological innovation, contrasting instead with opposite situations of stasis and economic crisis such as stagnation and recession. In particular, GDP is the most immediate and intuitive parameter with which the economic growth of a country is measured because it represents the ability of the system itself to produce and sell goods. An even more specific parameter is per capita GDP, which is usually used to express the level of wealth per inhabitant produced by a territory in a given period, allowing comparisons to be made between areas of different demographic dimensions. If it is difficult to compare two countries with GDP because their size in terms of number of inhabitants comes into play, with GDP per capita it is much simpler. This value, being inherent in the wealth of a single individual, seemed to explain very well the situation of individual well-being. Only more recently (as we will see in the following chapters) has the idea that per capita GDP is sufficiently exhaustive to explain the well-being of individuals been abandoned. With this trend, the two concepts of growth and development begin to be considered as two quite distinct concepts.

Although in fact for a long time there has been talk of growth and economic development indifferently, the two concepts present some differences. For growth, in fact, reference is made to real GDP growth and, in rarer cases, to that of other economic variables quantifiable such as consumption, labor income, total factor productivity. In all these cases, the variable subject to attention is: strictly economic, measurable. This modality, however, neglects other factors present in daily life and which contribute to improving or worsening people's quality of life. When these dimensions become the main object of the analysis, beyond simple economic evaluations, we start talking about development. In short, growth refers to strictly economic and measurable phenomena, such as income growth, the accumulation of physical capital, the increase in the productivity of labor and capital. Development embraces a much wider range of phenomena and its study includes changes in the economic, political, social and institutional framework that can in various ways and in different ways influence individual and social well-being. The study of economic growth is therefore based on the causes of GDP growth and per capita GDP. GDP growth measures the percentage change in this indicator between two consecutive years:

$$g_{Y,t+1} = \frac{Y_{t+1} - Y_t}{Y_t} \tag{1.1}$$

Where Y_{t+1} is the GDP in the year t + 1, Y_t is the GDP in the year t and finally, $g_{Y,t+1}$ is its growth rate between the two years considered. If instead of considering it in absolute terms, we consider this parameter divided by population N, we would obtain the growth rate of per capita GDP:

$$\gamma_{y,t+1} = \frac{y_{t+1} - y_t}{y_t}$$

(1.2)

Where $\gamma_{y,t+1}$ is the per capita GDP in the year t + 1, y_t is the per capita GDP in the year t and $\gamma_{y,t+1}$ is its growth rate between the two years considered. Unlike previously mentioned, growth and development are neither opposite nor separate concepts. The distinction, however, remains important because at its base there are different approaches, different types of analysis and different answers to the question why in some countries we live better than in others and because within the same country some people live better than others . The goal is to analyze the two approaches and to summarize the contributions in order to understand, as far as possible from the current state of economic literature, how and why economies grow and develop and what the consequences are for the lives of citizens of the planet. Trying to simplify this complex topic as much as possible, we can say that economic literature identifies three "types of development": 1) development understood as growth; 2) development understood as human development and 3) development understood as structural change. In the first case, the goal is to allow all human beings to reach a certain level of per capita income. In the second case, it is a matter of understanding development as what individuals can achieve and starts from the idea that poverty is not only in terms of money, but also in terms of the absence of various types of possibilities. An example may be access to education, health and essential services. Finally, the third concept of development presents an even wider meaning than the previous ones and involves production models and relationships, consumption models and social structure.

2. Economic growth, classical theories

As previously mentioned, economists did not begin to study the phenomenon of growth until the early 1800s, following the Industrial Revolution. Since the industrial revolution was a phenomenon that took place in England and british are the top three economists who are responsible for studies and theories of economic growth.

2.1 Smith

Adam Smith [1776], considered the father of economic thought, in his famous essay "The wealth of nations" maintains that economic growth derives from the production and accumulation of commodity-wage surpluses. Wage goods are those goods that are produced for the consumption and subsistence of workers and which, produced at time t, are consumed at time t + 1. The surplus is therefore defined as the quantity produced that exceeds the quantity necessary to maintain the status quo, therefore the amount of wage goods that remain after remunerating all workers, who, according to the English economist, receive a wage that they use to buy wage goods that are needed for their subsistence. The basic idea of this theory is basically that where a surplus of subsistence goods is produced, this surplus can be used to feed a greater number of workers than those employed at time t. As the surplus grows, the workforce will consequently grow with respect to time t. This is a primordial form of capital accumulation, which occurs through savings. Savings are the basis of economic growth in this theory. Another force is represented by labor productivity. An increase in it increases the level of production, all this is possible according to Smith through a division and specialization of the work. The last salient point concerns unproductive work or that work employed in the production of goods not belonging to the category of wages-goods which therefore are not useful to expand the workforce. Obviously, however, part of the labor force is employed to produce "unproductive" goods. This reduces the surplus of productive goods useful to expand employment in the productive sector. According to Smith, therefore, the size of the unproductive sector should be limited as much as possible. Smith's thought, like that of Malthus and Ricardo, is very important because in addition to being a milestone in economic science, it offers excellent food for thought on a phenomenon (economic growth) that has not yet fully asserted itself but which is on the way to do it.

2.2 Malthus

The reflection of Malthus [1798] in his famous essay "An essay of the principle of the population as it affects the future improvement of society" derives from the observation of an exponential increase in demographic level that England was experiencing as a consequence of the revolution industrial. Malthus noted that some agricultural production is needed to feed a certain population. If production increases, the population also increases accordingly. However, agricultural production can only increase in two ways: increasing the yield of already cultivated land and cultivating new ones. Clearly both strategies give positive results but present a problem. First of all, the production of a land already cultivated cannot be increased beyond a certain threshold, moreover the quantity of arable land available is finished. If, in the face of these problems, the population starts to grow at a rate higher than that of agricultural production, at a certain point there will be a very serious famine which would cause the death of millions of people by starvation. In short, if the earth produces a food surplus, production grows and consequently the population also grows. However, when we find ourselves in a situation where agricultural production is just enough to feed the population, it ceases to grow. In fact, in this model a positive shock of food production causes a greater population level in equilibrium with respect to the conditions prior to the shock, but the per capita income remains unchanged. Even considering the "innovation" topic, the Malthusian theory would seem to hold up. The potato, in fact, introduced in Europe following the discovery of America, has a nutritional yield per hectare about triple that of wheat. This means that if the production of a field is converted (from wheat to potato), the population grows exponentially. This is the case of Ireland, in which from the end of the 1600s onwards it saw a tripling of its population. However, the Malthusian theory also emphasized a process hitherto unknown: economic growth.

2.3 Ricardo

David Ricardo [1817] in his essay "On the Principles of Political Economy and Taxation" takes up Malthus' theory with an emphasis on the marginal productivity of land. Referring also to Smith's theory, he notes that precisely because of this characteristic, the accumulation of capital in the form of commodity-wages and the profits of entrepreneurs are destined to decrease over time. In fact, moving from highly productive soils to less productive soils, the total yield with the same surface and workforce decreases. However, costs do not decrease (assuming that workers are always remunerated at subsistence wages), which make a decrease in term profit and surplus shares in terms of ever-higher wage-goods. As a result, entrepreneurs will have wage-goods reserves to take on ever-decreasing new workforce, and as a result, employment growth will slow down. It will come to a point where profits and wage-goods surplus will be zero. Ricardo, however, goes beyond the two previous theories by abandoning the idea of a fixed salary at a level of subsistence that does not vary over time and extends his reasoning to a multisectoral economy, not only linked to agriculture. By leaving the idea of a fixed wage limited to subsistence, Ricardo argues that as production increases, the level of subsistence also increases, i.e. it is necessary to increase real wages. The growth process, however, in a certain sense seems to be acting against itself: the more the economy expands, the more subsistence wages increase and the faster the surplus of goods-wages available to increase resources is eroded. Ricardo's second innovative aspect is the transition from an agricultural economy to a multisectoral one, in which the emerging industry coexists with the cultivation of fields. Ricardo therefore introduces the "fixed capital", which joins the "circulating" capital represented by wage goods. Fixed assets are represented by plants and machinery. Ricardo also extends the hypothesis of decreasing marginal returns to the industrial sector. This implies that industrial entrepreneurs also face a world where their profits are eroded as production grows, to the point of canceling out at some point. The industrial dynamic, however, is more complex than the agricultural one: if in the latter sector, in fact, all workers produce wage-goods and therefore contribute to the accumulation of the surplus necessary for growth, in the industrial sector part of the labor force is used fixed capital production. This immediately implies that the production of wage-goods (industrial consumer goods) decreases as the mechanization of production increases, since to increase mechanization it is necessary to produce more fixed capital and therefore to allocate more workforce to the production of machines. and less to the production of wage goods. A second aspect of industrial production is that machines can replace the workforce: since subsistence wages also increase with economic growth in industry (exactly as in the agricultural sector), in order to defend their profits, industrial entrepreneurs tend to replace work with capital (given that the cost of using a machine is fixed and does not grow as the economy expands). In the short run, this causes unemployment, as businesses need fewer workers. However, they will become more productive thanks to the help of fixed capital, thus increasing productivity in the long run. This approach turns out to be a rudimentary theory that underlies "business cycles".

2.4 Schumpeter

The Austrian economist Joseph A. Schumpeter [1912] and [1942] stands against these archaic theories based on capitalism. According to him, the engine of economic growth is represented by breaking innovations. Starting from a neoclassical balance, an entrepreneur gives rise to a breakthrough innovation (often a new product that previously did not exist, or a new production process), which determines either a new market or a strong revision and change of production systems. The innovative entrepreneur is therefore able to record very high profits, which attract new entrepreneurs to follow in their footsteps by adopting innovation in turn. A key role in this phase of the process is played by banks and institutions which for the first time, within a growth theory, play a role. The bankers therefore have the task of supporting the innovation process by anticipating the entrepreneurs the capital they need to develop and later adopt the innovation. This breakthrough innovation starts a phase of economic growth, in which the aggregate product exceeds the level of the equilibrium product.

The phase following the introduction of breakthrough innovation requires it to spread as entrepreneurs adopt it. Initially, there are institutional constraints that protect innovation and the responsible entrepreneur, subsequently the market becomes more competitive. As competition increases, prices decrease, with an erosion of company profits, which will tend to reduce costs by decreasing the use of the most flexible production factor, work. This will lead to a phase of recession, which will end when a new entrepreneur brings an innovation that will trigger an expansionary cycle. A key element of Schumpeter's theory is therefore the innovative entrepreneur, who risks his capital by engaging in an innovative production process.

2.5 Classical growth theories: Conclusions

These classic theories contribute to highlighting some aspects which will then be crucial within the growth models proposed by contemporary economists. The first relevant aspect is that growth positively depends on the accumulation of capital. Whatever the form (commodity-wages or capital goods), accumulated capital opens the door to growth stages of production, employment and therefore aggregate income. But the capital stock is the sum of the investments made in it over time, and these investments are financed by savings, or by the part of the product that, in each period, is not consumed, but set aside to produce greater consumption in the periods later. A second theme introduced by the classics, in particular by Malthus, is that of demography. For Malthus, population growth following economic growth, the result of the Industrial Revolution, would necessarily have led to the final collapse of the economic system, following a great and inevitable famine. The problem of the growing demand for food and their unequal distribution between rich and poor countries is one of the crucial issues of the development economy. So far the Malthusian trap has been overcome thanks to technological innovation, however the growing need for food and the imbalances in the distribution of production do not exclude that Malthus could be right. Finally, it is worth highlighting an element that none of the classical economists explicitly highlights: the transfer of workers from the countryside to the cities, or from agriculture to industry. It is a historically well-known phenomenon of extremely significant dimensions, which has involved billions of people. Economic theory, however, often does not underline an important fact: the nourishment of the population is entirely produced by the agricultural sector. It is therefore evident that the transfer of large masses of workers from the countryside to the cities has not caused devastating famines. This suggests that the agricultural product needed to feed the planetary population requires less labor than was originally used in agricultural production. In the pre-industrial world unemployment did not exist because everyone had a job, but since the transfer of huge masses of workers from agriculture to industry did not alter agricultural production, this implies that many of the workers employed in agriculture at the beginning of the Industrial Revolution had a marginal productivity of zero. However, this worker stolen from agriculture had a positive marginal productivity once his work was employed in the industrial sector. Still today, a large part of the growth of the countries with large quantities of workers with marginal productivity in the agricultural sector is still based on this phenomenon.

3 Economic growth, contemporary models

Those models born after the Great Depression with the aim of providing economic sciences with interpretative paradigms of the phenomenon of growth in order to conceive economic policies to support it are usually called "contemporary growth models". The aim is to outline on the one hand the evolution of the theoretical thinking of the economic sciences in this research area, on the other hand to explain why, especially in the past, certain "recipes" have been followed to promote growth in the countries underdeveloped. Theoretical models fall into two categories: exogenous growth models and endogenous growth models. The substantial difference derives from the fact that the first typology of models is that which sees growth as a phenomenon linked to exogenous factors, external to it. The second type of models, on the other hand, taking into consideration the first category mentioned, instead theorize that growth is a phenomenon that, at least in part, feeds on itself, that is, it depends on itself. Returning instead to the comparison between classic models and contemporary growth models, an important difference is that the classic models developed at the same time as the early stages of economic growth and therefore sought to interpret and model a new phenomenon that was being born under the eyes of economists themselves. So they didn't care about the long run, nor what policies would be needed to keep an economy on the road to growth. Contemporary models, on the other hand, deal with accounting for the historical phenomenon itself, but also with proposing and suggesting ways through which to support growth.

Among the contemporary models, the most complete and exhaustive one seems to be the model of Robert Solow (1924, -) an American economist and Nobel prize winner for economics << for his contributions to the theory of economic growth >>. Three versions of its model can be distinguished: the first without taking technological progress into account, the second taking technological progress into account, the third taking human capital into account.

3.1 The Solow model without technological progress

The model proposed by Solow in his essay "A contribution to the Theory of Economic Growth", written in 1956, inaugurates a series of models "with capital accumulation". First of all, however, it is necessary to specify what the model consists of:

> *In modern economics, a model is a mathematical representation of some aspect of the economy. It is easiest to think of models as toy economies populated by robots. We specify exactly how the robots behave, which is typically to maximize their own utility. We also specify the constraints the robots face in seeking to maximize their utility. For example, the robots that populate our economy may want to consume as much output as possible, but they are limited by how much output they can produce given the techniques at their disposal. The best models are often very simple but convey enormous insight into how the world works.* (Jones 1998, p.19)

This is the description of the economic model given by the economist Jones, in which he highlights a characteristic very common to economic models: the desire to simplify the real world. Returning specifically to the Solow model, it starts from the production function Y = F (K, L), assuming constant returns to scale and marginal productivity of the single positive and decreasing factors. (Jones 1998, p.20)

The product is therefore a function exclusively of the quantities of capital and labor used in the production process. Work, however, being modular according to needs, is not a key factor in this model. The key is the capital (K), in particular the capital endowment per unit of work. The production function can also be written in its intensive form, or in the form that expresses the different variables not in absolute terms, but in terms of product and capital per unit of work. It starts from:

$$Y = F(K, L) \tag{3.1.1}$$

and dividing everything by the amount of work L, we obtain:

$$\frac{Y}{L} = F\left(\frac{K}{L}, \frac{L}{L}\right) =$$

$$y = f(k,1) = f(k)$$

(3.1.2)

lowercase letters denote the values of the variables per unit of work. In this way we can interpret the dependent variable y as per capita GDP. It is noted that as capital increases, production increases. The change in the amount of capital is determined by the investment (I). However, a distinction must be made between gross investment and net investment: the first corresponds to the amount of new capital purchased by the company, the second instead refers to net of depreciation (D). Depreciation represents the amount of capital that, at the end of each period, becomes unusable because it is old and worn out. In the model, the second type of investment will be considered. Where does the money needed to finance it come from?

From household savings. Families receive an income (deriving from work), with which they finance their consumption. However, in the real world, families do not consume the entire income but save a part of it that they usually deposit in the bank. Banks collect these savings and use them to finance businesses in the form of loans. Since, as mentioned before, y represents per capita income and we have also said that people save part of their income, saving in terms of income is written as sy, in which s represents the percentage of income that comes, in average saved. This value of s is between 0 and 1, therefore it is expressed as a percentage since it has been assumed that individuals can neither consume nor save their entire income. It is also hypothesized by the model that the percentage s is constant over time. At this point we can provide a graphic representation of the model, which is made up of three ingredients:

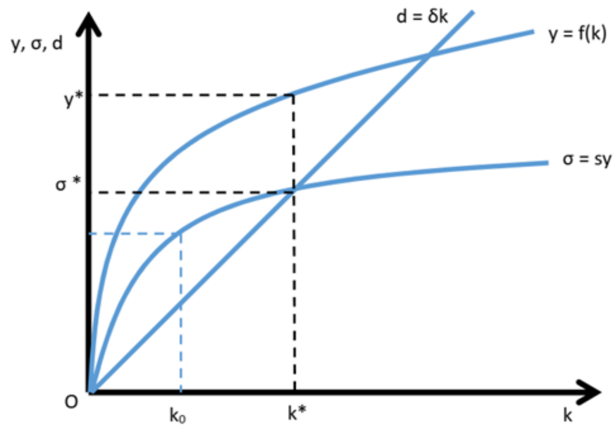
1) The intensive production function, which presents decreasing marginal productivity in its production factor.

2) The saving function which, it should be noted, is equal to the intensive production function multiplied by s, in fact the saving is equal *to* $sy = sf(k)$ since $y = f(k)$.

3) The depreciation function. This function represents the value of the capital per employee which becomes unusable every year as a result of usury. If every year a fraction δ (between 0 and 1) of the capital per employee must be replaced, we obtain: D = δ K, which in its intensive form becomes *d* =

δk. We now represent these three functions on a single Cartesian plane, placing depreciation, savings and output per employee in the ordinate and the value of the capital per unit of labor on the abscissa.

Figure 3.1: The Solow model without technological progress



The graph represents the Solow model without technological progress, in particular the steady-state value of the product per employee and capital per employee. They are located at the point where the depreciation equals the savings. In fact, at this point, the capital stock per unit of work no longer grows because the gross investment is exactly equal to the value of the depreciation. Since the stock of capital per employee is constant, the value of the product per unit of work will also be constant. The economy has thus reached the steady-state point. Furthermore, the curves that describe the product and savings are concave: given the hypothesis of decreasing marginal productivity of capital per unit of work, the addition of a unit of k increases the product per unit of work, but this increase becomes gradually smaller as the stock of k increases. This determines the concave form of the two functions. The amortization function is instead linear in k in the sense that in each period a constant fraction of the capital stock per unit of work must be replaced. Obviously, as the value of the latter increases, the value of the depreciation also increases. Note also that the curve that represents the function of saving per unit of work lies below the curve that represents the product per unit of work: this is due to the fact that saving is a fraction of the income and therefore, for any given income level, savings are below the value of income. Note that the straight line δk represents the stationary condition of the physical capital per employee, or represents the points where, being the investment exactly equal to the depreciation, the allocation of physical capital per unit of work remains constant.

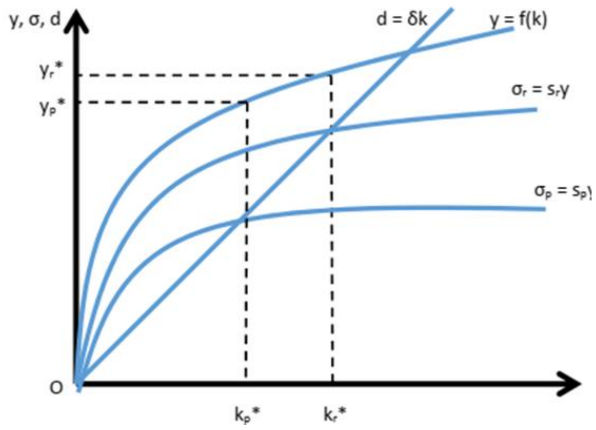
Let's now see how the ecomomy reaches the stationary point starting from any point to the left of $k*$ (for example k_0). At this point the depreciation is less than the savings value; now, since the savings coincide with the gross investment, if this is greater than the depreciation, the net investment is positive and therefore the capital stock per unit of work is growing. This means that the product per employee grows and the economy moves (graphically) to the right along the income and savings curves. In short, the stock of capital per unit of work, the level of income per unit of work and the level of savings per unit of work are growing. If the capital stock increases, the depreciation also increases. Due to the decreasing marginal productivity of capital, the depreciation value increases faster than the savings value. This implies that, starting from a situation where savings are greater than depreciation, at a certain point the second reaches the first. When the depreciation coincides with the saving, the stock of capital per unit of work ceases to increase and the same happens to the value of the product per unit of work. What is the implication of all this for economic growth theory?

The economist Ignazio Musu, in his essay "*Economic growth*" claims that once the steady state is reached, the capital for the worker is constant and the per capita product is also constant. Since the population is constant, during the transition path towards the steady state, the product grows, but the growth rate decreases more and more until it disappears. This means that product growth stimulated by pure accumulation of capital is not permanent growth, but only transitory: the economy tends towards a steady state. (Musu I. 2007, pp. 19-20)

This reasoning leads us to one of the fundamental conclusions of the Solow model: convergence between countries. Solow's model says that all countries, obviously in different ways and timelines, will all come to a steady-state point in the long run. However, no convergence has been recorded to date between the countries that today are defined as rich and poor countries. If rich and poor countries are characterized by different steady-state levels, then they converge towards different situations. What then determines the different steady-state levels between groups of countries?

The answer offered by the Solow model is that each country has a different savings rate. If the savings rate is not the same between countries, but different, investments will consequently also be different. Graphically we are therefore in this situation.

Figure 3.2: Differences between rich countries and poor countries



The rich country is represented by σ_r, while the poor country is represented by σ_p . As can be seen from the graph, poor countries seem to be condemned to their condition of poverty compared to rich ones. Obviously if the savings rate increases, the curve of the poorest country rises graphically upwards towards the richest country. As can be seen, growth in this model is a transitory phenomenon; it is possible, through repeated increases in the savings rate, to generate successive waves of growth, but even these at some point will have to stop, as people cannot save more than the income they receive. Furthermore, they are unlikely to arrive at a savings rate of 100%, in any case having to spend part of their income to finance their consumption.

Speaking of consumption, the Solow model is able to indicate its excellent level. Consumption is obviously equal to the unsaved income, that is, for each unit of work $c = f(k) - sf(k) = (1 - s) f(k)$. To calculate the value of optimal consumption, therefore, it is necessary to calculate the optimal value of the savings rate and the corresponding value of the stock of capital per unit of work. For this we take the behavior of companies into consideration. It is convenient for them to continue investing to the point where the marginal productivity of capital (MPK) equals the depreciation rate, i.e. to the point where the cost of capital (represented by depreciation) is no greater than the return on capital. In fact, when the latter was lower, investing in capital would not be worthwhile since a unit of capital would produce less than what it costs to replace it once it has become obsolete: in this case the company would operate at a loss because, to replace the obsolete capital, it would have to pay more money than that capital has produced. This means that it is optimal for the company to invest until MPK = δ. The point where this equality is satisfied is exactly that of steady state, where the marginal productivity of capital (equal to the slope of the curve representing production, i.e. y = f (k), is equal to the amortization rate δ, which in turn it represents the slope (constant) of the straight line of depreciation. At that point, therefore, consumption is equal to the steady-state level: $c^* = f(k^*) - sf(k^*)$; substituting for state savings the steady state amortization level is stable (remember that at this point the savings are exactly equal to the depreciation), we have $c^* = f(k^*) - \delta k^*$. This last equation expresses what is generally called the *golden rule* of the ‘economy.

Why is this point also optimal for consumption? Let’s imagine starting from a point to the left of the steady state: in this case the net investment is positive because the marginal productivity of the capital is higher than the depreciation. This means that increasing the savings at that point results in an increase in income higher than the savings made. This is because invested capital generates an increase in income equal to the marginal productivity of capital, which, to the left of the steady state, is less than its cost. This implies that, as the change in income exceeds the cost incurred, income increases, thus increasing consumption. It should also be noted that, at the beginning of the transition process between a steady state (characterized by a lower saving rate) and the subsequent one (characterized by a higher steady state), consumption must decrease to give rise to the increase in savings necessary to trigger the transition. To the right of the steady state, where the marginal productivity of capital is lower than the cost of depreciation, saving to invest reduces consumption, as the cost of new capital exceeds marginal productivity and, therefore, the additional income that is obtained from the new capital is more than offset by the costs of new capital which not only erode the entire additional income, but also part of that previously destined for consumption, which must now be used to cover depreciation. In other words: to the right of the steady state, capital costs more than what it produces: $\delta\Delta K > \Delta Y$, from which $\Delta Y - \delta\Delta K < 0$; but since the capital (ie depreciation) must be fully covered, the entire additional production plus “something else” must be used. This “something else” is obtained by allocating a part of the previous income to cover depreciation rather than to finance consumption. Since $\Delta Y - \delta\Delta K < 0$ only by adding something in the left member it is possible that this is equal to 0: $\Delta Y - \delta\Delta K + X < 0$; in this case the additional resources represented by X can only be found at the expense of the level of consumption, which, in this way, decreases with respect to the previous level. Once again, this process converges these towards their steady-state level and, with reference to consumption, converges these towards their optimum level. To the left of the steady state, however, the same effect (an increase in future consumption) is obtained with an increase in current consumption (which corresponds to a decrease in savings and therefore to an economic decrease). In this second case, the higher current consumption is financed by the progressive reduction of the capital stock. Clearly, what has been observed for the convergence in the levels of income per unit of work, also applies to consumption per unit of work: Countries with lower savings rates converge towards steady states characterized by income and consumption lower than those that characterize the steady states of Countries with high savings rates. The conditional convergence hypothesis has been tested empirically. This means that some economists, after collecting the necessary data, verified that what was observed in reality was compatible with the Solow model. The conclusions were negative, in the sense that although the accumulation of capital and the differences in savings rates explain part of the observed differences, they are unable to explain the whole phenomenon. Not only that, but even considering a single country, the Solow model without technological progress can explain only about half of the observed growth. Considering, for example, the accumulation of capital in the USA between 1870 and 1960 and using the Solow model to calculate the level of income per unit of work in 1960, the values obtained are approximately half of those actually observed. It is therefore necessary to look for other factors that complete the model and account for the “missing” growth.

3.2 The Solow model with technological progress

One of the variables that was not taken into account in the previous model is technological progress. Over the years, in fact, the technologies used in the production processes have made many progress following numerous innovations, which have radically changed the production methods. Technical progress usually has the effect of making capital more productive, therefore it cannot be extraneous to the process of economic growth. In formal terms, therefore, the production function becomes:

$$Y = F(K, AL) \tag{3.2.1}$$

where A represents technological progress. In the presence of technology, since this is considered exogenous and multiplicative of the factor with unit returns to scale, the previous expression can be rewritten in this way:

$$Y = AF(K, L) \tag{3.2.2}$$

since doubling the level of technology also doubles the value of the product. Furthermore, an important property of technological progress is that its marginal productivity is constant and not decreasing. It would make no sense to assume that as technological progress increases, this becomes less and less effective. As done previously, we now write the function in intensive form:

$$y = af(k) \tag{3.2.3}$$

where a is the value of technology per unit of work. This factor is, from the mathematical point of view, a constant that increases the productivity of the work. As technology increases and for given amounts of capital and labor used in the production process, an increase in the technological level produces an increase in production and product per unit of work.

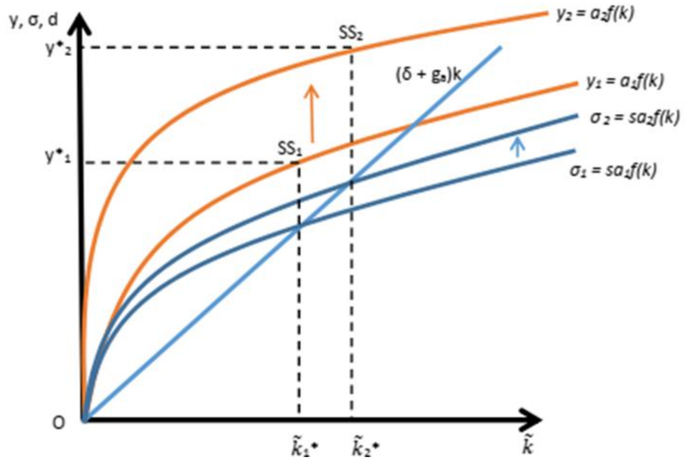
Explained in these terms, the model takes on typical Schumpeter characteristics, that is, that there are "jumps" due to breakthrough innovations. The formulation of the Solow model, on the other hand, hypothesizes it continuous over time, that is, it assumes that parameter A grows constant over time. In this case, the model predicts that the growth rate of the steady-state economy is equal to the growth rate of technology g_a. We hypothesized that technological progress has a multiplicative effect on work; this is equivalent to saying that, as technology increases, the capital stock per effective unit of work is reduced. Solow defines the quantity AL as "effective work"; we can now define the stock of capital per effective unit of work ($\check{k}$), in a similar way to that made for the stock of capital per unit of work:

$$\check{k} = \frac{K}{AL} \tag{3.2.4}$$

Capital per unit of efficient labor, therefore, decreases in each period due to two forces: on the one hand, the already known depreciation of capital which has become too worn to be used further; from above, the growth of technology, which increases the value of the numerator, decreases the $\check{k}$ value over time. Hence the need for savings to cover both depreciation and technological progress (as in the case of discrete increases in the technological level).

From a graphic point of view, an increase in the technological level corresponds to a shift towards the top of the production function, while a decrease in the technological level produces the opposite effect. In economic terms, the interpretation is as follows: a technological innovation allows to produce more efficient machines, that is, which, for the same quantity and use in terms of time, allow the same work unit to produce more than before. This implies that, for the same factorial endowment (i.e. for the same amount of capital per unit of actual work, which, remember, we represent with $\check{k}$), the quantity produced is greater after the introduction of the innovation than before. From a graphic point of view, we are in this situation:

Figure 3.3: Solow model with technological progress



Before the introduction of innovation, the steady state of the economy is represented by a level of capital per unit of work equal to $\check{k}_1$* and an income per unit of work equal to y_1*. The introduction of innovation shifts the production function upwards, so that for each level of capital per unit of work, the product is greater than before. Since savings are a function of the product, the savings function also undergoes an upward shift. The result is that steady state shifts right and up from SS1 to SS2.

The introduction of an innovation therefore has a double effect on production: on the one hand it increases its value for each given quantity of capital per unit of effective labor ($\check{k}$), on the other, thus increasing income, for each value of $\check{k}$, it also increases the level of savings, thus increasing the optimal capital stock and moving the steady state point to the top right. It is important to note that the depreciation function has also changed: it is no longer simply δk but is now $(\delta + g_a)k$, where g_a represents the growth of technology. In the presence of technological innovation, in fact, it is necessary not only to replace capital that has become obsolete, but also to equip all workers with new technologically advanced capital. Therefore, the capital must be replaced at a rate equal to the sum of the depreciation rates (which takes into account the deterioration of the capital used) and technological development.

Solow's model with technological progress adds an ingredient to the explanation of both the growth and the differences between poor and rich countries. Meanwhile, growth now also depends on technological progress; unlike saving, then, this has the advantage of not being limited, but potentially infinite: if it is true that 100% of the income cannot be saved, there is no theoretical limit to technological progress. Consequently, the "infinite" growth observed in reality can be easily explained through technological growth. It is true that the model predicts the existence of stationary states in this case too, but it is equally true that innovation can be faster than convergence. In other words, the fact that no country is observed in a steady state can be explained by the fact that the introduction of new technologies occurs every time before the economy has reached its steady state and, consequently, it is always found on the path of transition and convergence towards a steady state that always moves to the top right before being reached. At the steady-state point, where savings are equal to depreciation plus technological growth, what remains constant is the stock of capital per effective work unit, since savings cover both depreciation and growth in the technological level. But this implies that, always in a steady state, the capital stock per unit of work $\frac{K}{L}$ increases at the same rate at which technological progress increases, in fact $\frac{K}{L}$ decreases only as a result of the amortization δ, but savings, in addition to cover depreciation, it also covers technological progress, so the accumulation of capital takes place at the rate δ + g_a.

However, the capital per unit of labor (k) and not per unit of actual labor ($\check{k}$) appears in the production function. This implies that both k * and y * grow, in steady state, at the same growth rate as technology (i.e. g_a).

The model thus modified also accounts for the differences in per capita income between rich and poor countries: the latter innovate less and have less access to technology than the former. Consequently, the latter grow faster and are richer than poor countries, and this is also true for identical savings rates. Although knowledge is, on a technical level, a public good and therefore although there should be no technological differences between countries once an innovation has been introduced into the production process, intellectual property protection systems generate delays in the diffusion of innovation (e.g. patents). These delays allow innovative economies to have a higher technological level than economies that innovate less. Although Solow's model with technological progress is much more realistic than that without such a factor, it is still able to explain only half of the economic growth observed. In other words, using the available data on capital growth and technological growth, the Solow model predicts per capita income levels that are equal to half of those observed. This means that the understanding of the phenomenon of economic growth still lacks the ingredients. The addition of these variables, which among other things are increasingly struggling to be considered as exogenous, however, makes us slowly slide from an approach closely linked to GDP growth to an approach that begins to take into account development in the strict sense. In this regard, economist Jones in his essay "Introduction to Economic Growth" makes an assessment of the Solow model:

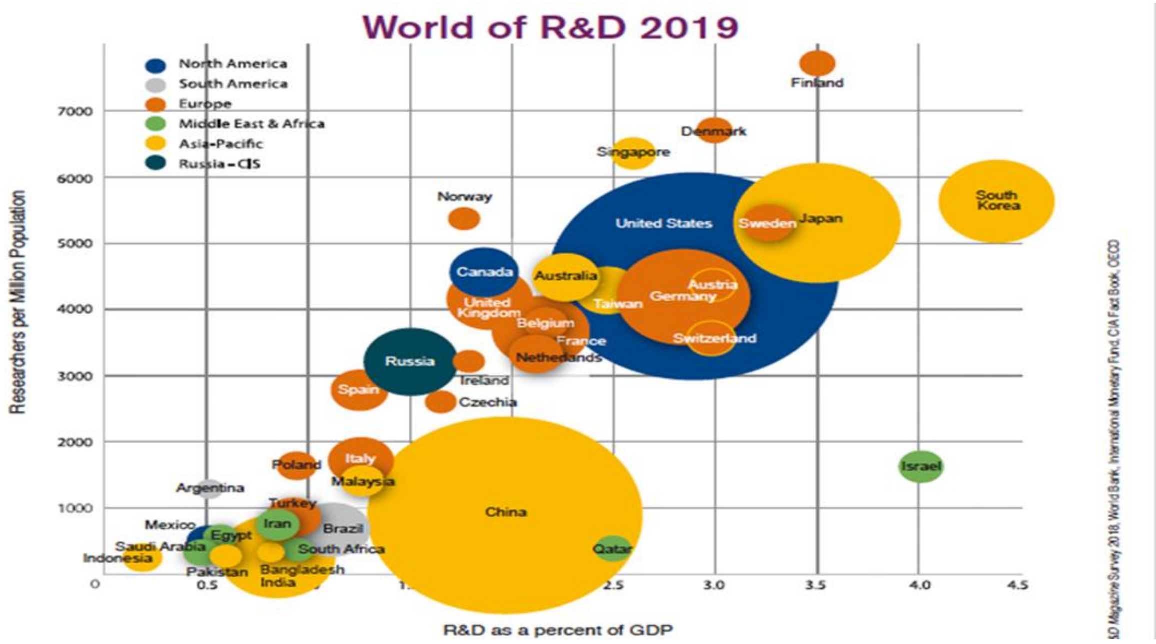
> *How does the Solow model answer the key questions of growth and development? First, the solow model appeals to differences in investment rates and population growth rates and to exogenous differences in technology to explain differences in per capita incomes. Why are we so rich and they are so poor? According to the Solow model, it is because we invest more and have lower population growth rates, both of which allow us to accumulate more capital per worker and thus increase labor productivity. Second, why do economies exhibit sustained growth in the Solow model? The answer is technological progress. As we saw earlier, without technological progress, per capita growth will eventually cease as diminishing returns to capital set in. Technological progress, however can offset the tendency for the marginal product of capital to fall, and in the long run, countries exhibit per capita growth at the rate of technological progress. How, then, does the Solow model account for differences in growth rates across countries? At first glance, it may seem that the Solow model cannot do so, except by appealing to differences in (unmodeled) technological progress. A more subtle explanation, however, can be found by appealing to transition dynamics. We have seen several examples of how transition dynamics can allow countries to grow at rates different from their long-run growth rates. For example, an economy with a capital-technology ratio below its long run level will grow rapidly until the capital-technology ratio reaches its steady-state level. This reasoning may help explain why countries such as Japan and Germany, which had their capital stocks wiped out by World War II, have grown more rapidly than USA over the last fifty years. Or it may explain why an economy that increases its investment rate will grow rapidly as it makes the transition to a 22conom output-technology ratio*. (Jones 1998, pp. 39-40)

Before further complicating the model, however, it is good to dwell on another question to which the discussion of innovation led us: the role of institutions. In fact, innovation is a public good, but as mentioned above, patentability actually transforms it into a private good. In addition, governments also have the power to incentivize savings and therefore, the accumulation of capital. The role of public institutions therefore appears to be fundamental for the economic development of a country. As economist Roland says:

> *Institutions, or the rules of the game in society and the economy, play a big role in determining how costly or inexpensive it is to pursue 23conomic transactions such as buying or selling goods and services, or getting a loan to start a business. In some countries, institutions make economic transactions easier and establish a climate in which property rights are protected and the rule of the law prevails. Such institutions have a positive effect on development. In other countries institutions make economic transactions very difficult: property rights and investments are not protected, corruption is rife and laws are either flawed or not well enforced. These institutions have a negative effect on economic development.* (Roland 2014, p. xiii)

Institutions were mentioned because Solow's model with technological progress defines the latter as a sort of linear and exogenous process: once produced, the innovations spread automatically and immediately in the economic fabric. However, the production, diffusion and adoption of new technologies does not work in such a simple way. First of all, knowledge has a production cost: companies wishing to innovate must often invest large sums of money in the research and development (R&D) process. Secondly, and precisely because of the investments, companies try to protect the knowledge produced in order to appropriate the profits deriving from it for as long as possible. Another problem is that although an investment is made for technological innovation, not all innovations have an outlet on the market. In addition, the timing with which innovation actually has its effects is often not short. For example, workers accustomed to a certain type of work tool will have to be trained in the use of the new technology. This takes time and, in particular during the hypothetical training period, workers will be less productive than before, despite the fact that they apply their work to technologically more advanced tools than the previous ones. From an empirical point of view, confirmation is found in this hypothesis: when an innovation starts to spread, the companies that adopt it record a drop in production and profits (evidently caused by the drop in productivity of the workers being trained). Thirdly, new products are more expensive than the previous ones (eg mobile phones); this is an additional factor that slows down their adoption within the production process and is a very important factor for poor countries. The reason why an innovation produced in an advanced country does not spread to poor countries is that companies do not have enough money to acquire the new technology, much less to pay the specialized technicians who teach workers how to use the new ones. Technologies. In addition to the three causes already mentioned, there may be other socio-cultural factors both on the part of entrepreneurs and workers, who could be faithful to old production systems and averse to innovation. There is also the question raised by the Hungarian economist Michael Polanyi (1891-1976) regarding two types of knowledge: tacit knowledge and codified knowledge. In his essay The Tacit Dimension (1966) starting from the affirmation from the affirmation that “we know more than we know how to say” the Hungarian scholar recognizes the distinction of two interdependent dimensions of knowledge, in the sense that the explicit dimension of knowledge accompanies or it is always based on a previously internalized tacit dimension. Although knowledge can be properly articulated and explained, the explicit dimension always includes the implicit one. In fact, the coded knowledge is that contained in the “instruction booklets” accessible to everyone, in the manuals and patents. Tacit knowledge, on the other hand, is that developed by individual users of the technology, through a learning-by-doing process, or through the process of using the technology itself. Often a technology cannot be applied in a standard way but adapted. These adaptation measures are usually transmitted orally from worker to worker. In short, innovations as crucial as they are within the economic growth process, do not spread homogeneously and quickly, as required by the basic growth models. Another noteworthy factor is the following; inventions and, therefore, the process of technological advancement have historically been the result of isolated inventions made by scientists who for personal interest and for the availability of resources and time have been able to produce and implement new ideas that they then made available in the productive world. Starting from the Industrial Revolution and increasingly in recent years, however, the search for new products and new technologies has been systematized. This means that both businesses and governments have created research centers whose job it is to produce innovation. To this end, the private and public sectors give large amounts of money to research and development (R&D) and hire specialized personnel with the aim of conducting research projects. As in the case of any investment, the increase in the amount of money invested in a given asset increases the probability that it will be profitable. In the case of R&D, remuneration consists of the number of applicable inventions developed.

Figure 3.4: Government's investment in R&D based on each country GDP



The graph illustrates percentage investments in R&D, based on each country's GDP. The economic miracles of South Korea and Japan can, at least in part, be explained by the very high levels of investment in R&D of the two countries.

3.3 Solow's model with Human Capital

Although Solow's second model, the one that took technological progress into account, was more complete, exhaustive and more able to explain the country's growth data. In particular, with reference to the first form of capital, the physical one, it was noted that productivity was decreasing and not constant (in addition to a certain threshold). Therefore, unless technological innovation occurs, growth seems to cease. In this regard, economists Mankiw, Romer and Weil in their essay *"A contribution to the empirics of economic growth*" argue that with the addition of human capital, the margins of production are not decreasing.

> *Including human capital can potentially alter either the theoretical modeling or the empirical analysis of economic growth. At the theoretical level, properly accounting for human capital may change one's view of the nature of the growth process. Lucas [1988], for example, assumes that although there are decreasing returns to physical-capital accumulation when*

human capital is held constant, the returns to all reproducible capital (human plus physical) are constant. (Mankiw et al.1992, p.415)

The concept of human capital refers to the set of formal, informal knowledge and experience acquired by workers. Part of their knowledge is provided "formally" through the school education process, which has the task of transferring knowledge from teachers to students. Another very important part is acquired "on the field", that is, within the world of work, in part because the older colleagues educate the younger ones on how to perform the tasks better. Furthermore, human capital not only includes the set of knowledge possessed by an individual, but, following more recent theories that actually mix growth and development, also the individual's state of health. Physically healthy individuals are more productive both in the workplace and in the ability to absorb knowledge (*mens sana in corpore sano*). This type of capital, like physical capital, requires investments to be produced: attending school, studying, learning from more experienced colleagues or through training courses, taking proper care. Consequently, human capital is in all respects a factor of production such as labor and physical capital. Its importance for the growth and development of a country is also highlighted by the president of the world bank, who in his speech in 2013 claimed that:

To end poverty and boost shared prosperity, countries need robust, inclusive economic growth. And to drive growth, they need to build human capital through investments in health, education and social protection for all the citizens (Jim Yong Kim, World Bank President, 2013)

The new model proposed by Mankiw (et al.) Assumes a production function of the Cobb-Douglas type:

$$Y(t) = K(t)^{a}\, H(t)^{b}\, (A(t)\, L(t))^{1-a-b} \tag{3.3.1}$$

Where "H" represents the stock of human capital in the economy, and the coefficients "a" and "b" represent, respectively, the fraction of physical and human capital in the output. By defining "sK" and "sH" respectively as the fraction of income invested in physical capital (sk) and the fraction of income invested in human capital (sH), it is obtained that the evolution of the economy is determined by the following equations:

$$h(t) = sH\ y\ (t) - (n + g + \sigma)\ h\ (t)$$

$$k(t) = sK\ y\ (t) - (n + g + \sigma)\ k\ (t)$$

(3.3.2)

Where "h" represents the actual human capital per worker, and the other variables are defined as in the previous paragraph. It is also assumed that the same production function applies to consumption, human capital and physical capital, so that a unit of consumption can alternatively be invested in both human and physical capital at no additional cost. Finally, for the sake of simplicity, the rate of depreciation is considered equal for both physical and human capital. Then placing both capitals with decreasing returns to scale, a + b <1, the economy will converge to a steady state described by the following equations, obtained starting from:

$$k^* = [(sk^{1-b}\ sh^{1-a}) / (\boldsymbol{n} + \boldsymbol{g} + \sigma)\ ]^{1/(1-a-b)}$$

$$h^* = [(sk^{a}\ sh^{1-a}) / (\boldsymbol{n} + \boldsymbol{g} + \sigma)\ ]^{1/(1-a-b)}$$

(3.3.3)

Substituting within the production function, and applying the logarithms, we obtain the equation of income per worker, in which it is evident that the product per worker depends on population growth and accumulation both of physical capital and of human capital.

$$\ln \frac{Y(t)}{L(t)} = \ln A\ (0) + gt - \frac{a+b}{1-a-b} \ln(\boldsymbol{n} + \boldsymbol{g} + \sigma) + \frac{a}{1-a-b} \ln(sk) + \frac{b}{1-a-b} \ln(sh)$$

(3.3.4)

Since in the model it is assumed that the production factors are paid for by their marginal product, the equation also allows for coefficients to be predicted as a function of "a" and "b".

Empirical checks estimate that the fraction of physical capital "a" is approximately one third. As regards the fraction of human capital, on the other hand, a value that fluctuates between a third and a half for the developed countries is estimated with less certainty. From this equation it is possible to make two important predictions. First, if we assume a = b = 1/3, the logarithm coefficient of "sK" is equal to one, confirming that higher savings lead to an increase in income. This in turn leads to an increase in the level of steady-state human capital, from which it can be deduced that the presence of the accumulation of human capital generates a greater influence than the accumulation of physical capital on income. Secondly, since the coefficient of ln (σ + n + g) is in absolute value greater than the coefficient of ln (sK), a high population growth leads to a reduction in income per worker, as the capital stock human and physical should be distributed over a larger population.

In summary, Mankiw (et al.) Confirms the provisions of the Solow model, stressing, however, how the effect of the accumulation of physical capital and population growth have a stronger effect on income than calculated in the model of the 1956. The empirical verifications of the three authors, carried out in the same work of 1992, show that the international evidences are adherent to what Solow predicted only if we also consider the effect of human capital. Subsequent research must therefore investigate the variables that in this model are taken as exogenous, whose differences generate substantial gaps in the steady-state income level. The three authors of the model tested the convergence predicted by the Solow model through regressions where the independent variable is the logarithm of income per worker from 1960 to 1985. The regressions are carried out with respect to the logarithm of income per worker in 1960, with and without investment control, working age population growth, and school enrollment. The data found by Mankiw (et al.) Show how the inclusion of human capital in the regression confirms the provisions of the 1992 model, finding a significant convergence. The first regressions, carried out without the addition of human capital, show convergence, however lower than predicted by the 1956 Solow model. The results obtained with the addition of human capital are instead very close to what predicted by the augmented Solow model. The importance of including human capital in the model is also confirmed by the estimate of the convergence rate. The latter is in fact greater in the empirical results that include human capital, compared to the results found where there is only the presence of investments and population growth.

3.4 Human capital: the beginning of an endogenous vision of the phenomenon

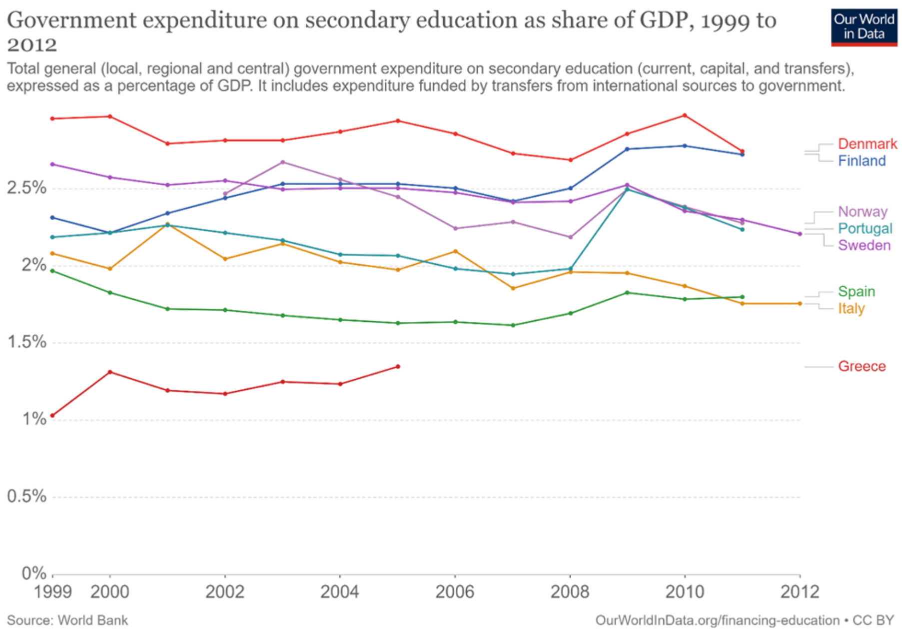
Based on what has been said so far, all the factors that have proved to be decisive for a country's economic growth have been defined by Solow as "exogenous", with the addition of the human capital factor within the model, however, we start to consider these factors not as exogenous and therefore already pre-established but as if they were the result of choices and policies made. Basically, it must be shown that Human Capital is positively linked to technological progress and economic growth.

Once this crucial point has been established, we will go in another direction that will open the doors to the concept of Economic Development. Although there is general agreement among scholars that the supply of human capital is a crucial component of the dynamics of industrialized and developing economies, the channels through which the former influence the latter are still widely debated. If a random sample of respondents were asked what the fundamental factor of economic development is, the most frequent answer would probably be the following: a more educated workforce. In this regard, Romer writes in his essay *Two Strategies for Economic Development: Using Ideas and Producing Ideas* that a person with education and experience is the crucial input in the trial and error process, experimentation, intuition, training and articulation of the hypotheses that, ultimately, it generates a valid new idea that can be passed on and used by others. (Romer 1992, p.71)

He also claims that "One person may be more productive than another, just as one machine may be more valuable than another." (Romer 1992, p.70)

Higher levels of education and a general growth of workers' skills and professional abilities are considered, almost by definition, the main road to a better society and a more efficient economy. It could also be argued that the importance of education is greater the more the role of scientific and technological knowledge extends in developed economies since new technologies require an intensive use of conceptual skills normally incorporated in human capital. The agreement of opinions of theoretical economists on the decisive role of this factor is quite wide and dates back at least to the sixties with the introduction of human capital within the Solow growth model (already explained in the previous paragraphs) in an attempt to increase its explanatory capacity. More recently, the developments of the new theories of endogenous growth have brought human capital back to the center of the scene by stimulating in parallel a vast literature of empirical studies which, thanks to a greater availability of statistical data, has tried to verify the real contribution of human capital to the economic growth. Basically, it is necessary to establish the role that human capital plays in the processes of growth and economic development. Starting from Solow's growth model, it has been seen that an economy tends to place itself on a balanced and stable growth path. When the economy follows this path, its growth rate does not depend on that of the factors that can be accumulated such as capital but, rather, on the evolution of factors that cannot be controlled in economic terms such as the dynamics of the population and that of scientific discoveries and technology. The accumulation of capital is a determining factor only in the transitional phase of adjustment of the economy towards the path of balanced growth but, once this path has been reached, the growth of capital must adapt to that of the exogenous factors indicated above. This theoretical hypothesis has implications of considerable relevance. If the dynamics of exogenous factors were similar in different economies, they would have to tend towards a single and common growth rate. In reality this does not happen, empirical evidence shows that growth rates are very different among the various economies even in the long run. All this can be traced back to human capital, which has, as mentioned above, characteristics similar to physical capital. Just as in the case of physical capital, the accumulation of human capital is the result of an investment decision that meets profitability criteria. The investment in human capital has a cost represented by the expenditure to acquire the necessary education, and is carried out in view of a return consisting of the difference in wages that the educated worker is able to appear on the labor market compared to the uneducated worker . This occurs because investment in human capital has the effect of increasing worker productivity exactly like that in physical capital. This intuition gave rise in the sixties to a vast empirical literature aimed at opening the black box and better measuring the contribution of the various factors to economic growth through a real accounting of growth itself. The most important experiment of this type is that of the American economist Denison [1967]. Denison's procedure consists of estimating a production function that has capital and labor as input where the quality of the latter is measured by an index of the years of education acquired on average by the components of the workforce. Denison finds that education contributes positively to product growth and that this contribution can be estimated equal to a value between 15% and 25% of overall growth, moreover this contribution has increased over time. More recently Mankiw, Romer and Weil (1992) have rigorously extended Solow's model to include human capital (measured by secondary school enrollment rates) and being able to explain a fairly large share (approximately 2/3) of the variability of growth rates between different national economies. The analysis by Mankiw, Romer and Weil has been considered by many economists as a reassessment of the explanatory capacity of the Solow model in contrast to emerging theories of endogenous growth. However, the fact remains that, despite this extension, Solow's theory is able to explain growth only in the transition phases towards the equilibrium path. In fact, human capital behaves exactly like physical capital. Its growth rate cannot substantially exceed that of exogenous factors since its profitability would tend to decrease, discouraging investment. Under these conditions, even taking into account the role of human capital, the economy would tend towards a steady state with zero growth if the latter were not supported by the dynamics of technological progress. In the 1980s, latent dissatisfaction with Solow's theory could only result in a revolution destined to profoundly change its conclusions. In this revolution, human capital conquers the center of the scene together with the development of scientific and technological knowledge. Unlike physical capital whose driving force tends to decrease until it disappears as accumulation proceeds, human capital can be an inexhaustible engine of growth. In other words, investment in human capital (which is the result of decisions by economic agents) can give rise to continuous growth over time and dependent on factors internal to the logic of the functioning of the economic system. For this reason, the mechanics of this growth process can be defined as 'endogenous'. What makes human capital so different from physical capital? The fundamental intuition from this point of view is due to Robert Lucas [1988]: the former, unlike the latter, produces positive externalities. In general, a positive externality occurs when the choices of one economic agent cause benefits for another agent without the first receiving any reward. In our case, this occurs when an individual's investment in human capital increases the productivity of other individuals. It is more than logical to support the benefits of working in contact with educated and competent people. Positive externalities don't stop there, the fact that more individuals invest in human capital increases the return on the same investment for other individuals. The mechanism works as follows: the greater the number of engineers and those doing research and development, the faster the production of new technological knowledge and the more important it becomes to acquire such knowledge through education and learning to obtain a higher remuneration in the labor market. That's not all yet. The fundamental input in the production of human capital is human capital itself. Education requires educated teachers and learning at work depends on proximity to workers with experience and capable of passing it on. This means in practice that the investment in human capital increases the supply of inputs necessary for further production and lowers their costs. In terms of a supply and demand model, the effect of this mechanism is to increase the demand for education because it increases its performance and, at the same time, also the supply for the reasons indicated. The result is an increase in the optimal rate of investment in human capital in the economy. In this way, human capital, interacting with the evolution of technological knowledge, becomes the engine of constant growth over time and entirely determined by the decisions of economic agents, that is, endogenous growth. An educated and highly experienced workforce is a crucial input in basic and applied research. It is necessary to invest in hand capital to generate new ideas and technologies. It is interesting to note how this interaction can be invoked not only to explain the growth of the industrialized economies but also the stagnation of the backward ones. If human capital is the fundamental input in research and development, an economy with a low level of education of the workforce would have difficulty producing new technological knowledge. This, in turn, would reduce the incentive to invest in human capital by precipitating the economy into an underdevelopment trap. Robert Barro [1991] carried out an analysis of this type trying to verify the existence of a correlation between growth rate in a certain period and education levels in a very large sample of countries. He finds that the growth rate of the gross national product is positively correlated with the educational level of the population at the beginning of the period considered. Barro interprets this result in the sense that the higher the initial level of education, the more externalities are generated and the more the economy grows. Furthermore, very strong indications in this direction also come from some microeconomic analyzes that analyze investment decisions in human capital and their performance. The main exponent of this line of analysis is Jacob Mincer who tried to estimate the relationship between the level of education of each individual and the remuneration of his work. Mincer [1974] found that this relationship is positive and highly significant. In other words, those who are better educated earn more. Mincer's results have brilliantly passed the critical examination of the scientific community and are considered very robust. Certainly the results observed on the microeconomic level cannot automatically apply also on the macroeconomic level, however in this case the extension of these results is immediate: if those who are more educated produce more income it is plausible that a greater diffusion of education in the population will you associate with a higher level of income in the whole economy. Income differences between groups of individuals with different educational levels can be used to estimate the expected value of education itself not only for the more educated individual, but for the whole economy as an additional value produced by higher education at the aggregate level . In practice this means saying that every additional euro invested in education should give rise to an additional aggregate product equal to the return on education multiplied by the share of work in national income. This extension is questionable, as we will see later, but there is no doubt that Mincer's results, like the others mentioned above, offer solid support for the idea that human capital is a crucial element in growth processes. This extension is questionable because in reality we are talking about a variable that makes up human capital in a partial way. In addition to education, the knowledge necessary for the use of technologies also derives from learning processes that take place within the working activity (learning by doing). Furthermore, it is logical to think that such skills depend not only on the quality of education received but also on its quality. A degree in molecular biology is something different if taken in the USA than taking it in India. Until now, literature has said that the link between human capital and economic growth exists but partially. The first graph shows the expenditure of secondary education countries from 1999 to 2012. As we can see on average the secondary education expenditure of the various countries is around 2% of GDP. Furthermore, we can argue that there is a gap between the Nordic countries (Sweden, Norway, Denmark, Finland) and the Mediterranean countries (Italy, Spain, Portugal, Greece).

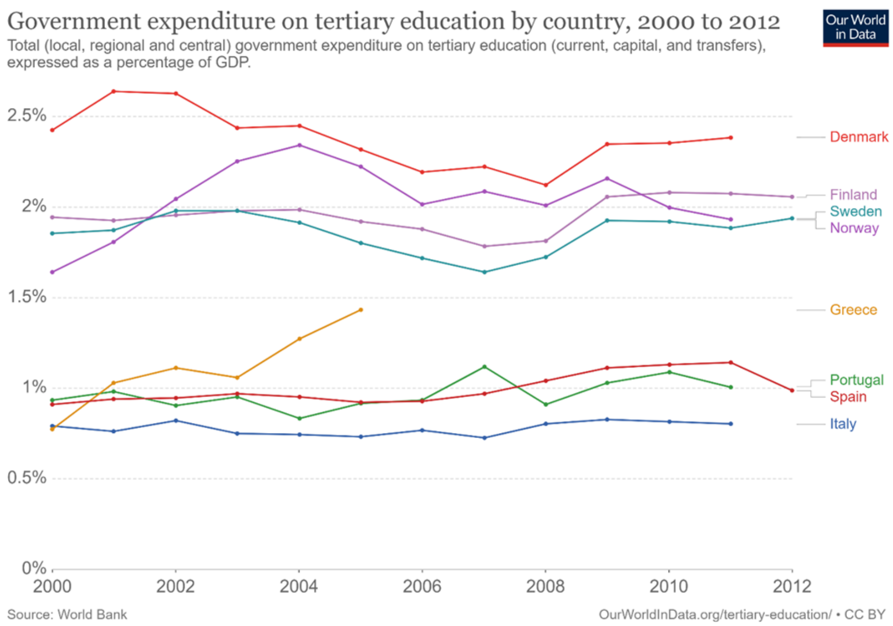
Figure 3.5: Government expenditure on secondary education as share of GDP, 1999 to 2012



Source: World Bank

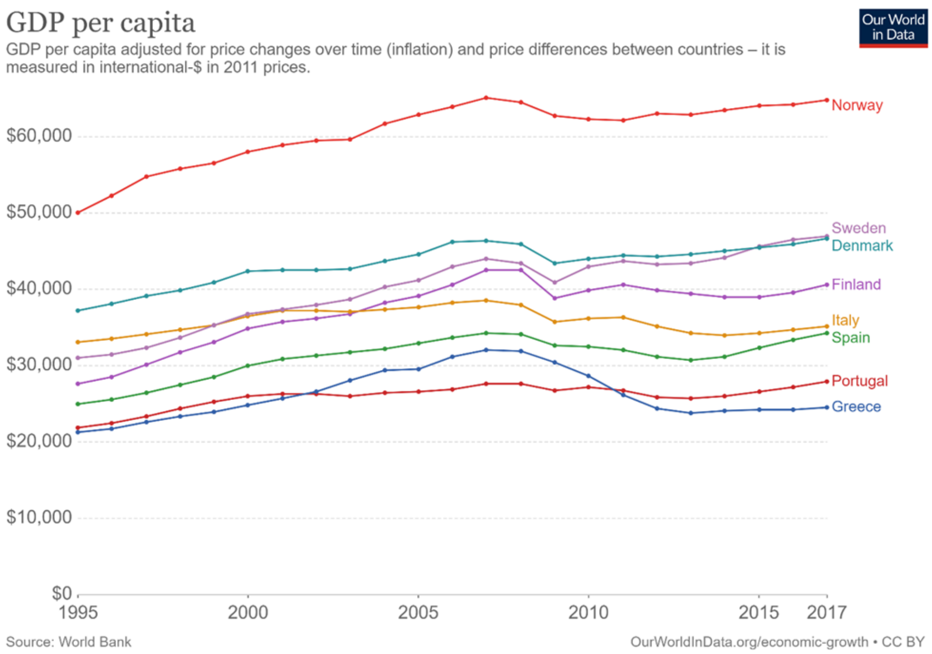
The second graph is a similar graph, which concerns the investment of the various countries for tertiary education, or for university. Again, we can find that the Nordic countries are those that invest more in education than the Mediterranean ones.

Figure 3.6: Government expenditure on tertiary education by country, 2000 to 2012



The order of countries remains practically unchanged if we place the GDP per capita as the object of study. In fact, all the Nordic countries have a higher per capita GDP than the Mediterranean countries. Therefore, what is evident, without going into the details of a hypothetical causal link, is that countries that invest in education and therefore in human capital are the same countries that have a higher per capita GDP.

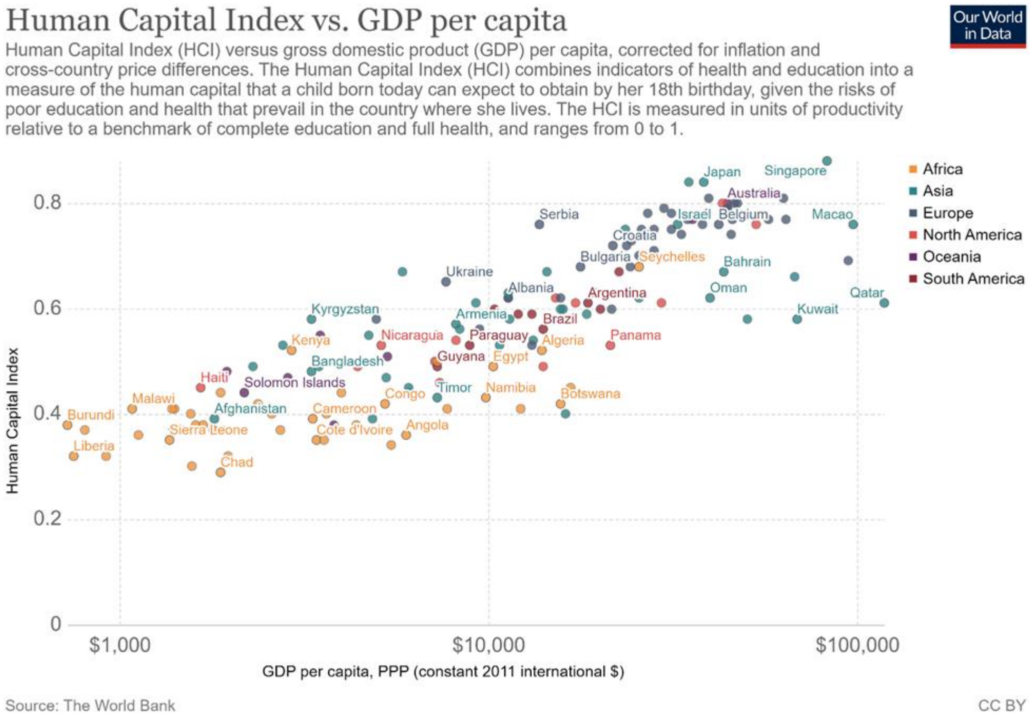
Figure 3.7: GDP per capita



Source: World Bank

The analysis carried out so far suggests an answer to the question asked at the beginning of the paragraph: does human capital positively influence economic growth? The answer is basically yes, provided that there are the right conditions. Some economists have identified some crucial factors from this point of view. One of them is certainly the degree of openness to international trade. Why should openness to trade make the educated workforce more productive? For two good reasons, especially in developing countries: firstly because producing for international markets means using more advanced technologies and therefore the availability of human capital is important. In addition, because the market in the export sectors becomes wider and this allows for better remuneration of human capital, thus creating incentives for investment in that direction. The first point is quite evident and has already been discussed. There is no doubt that a country more open to trade exports even more to the markets of industrialized countries where its goods compete with other technologically sophisticated goods. Furthermore, in many cases these productions are the result of foreign investments by multinationals. In both cases, the technologies adopted are on average more advanced than those used in the sectors they produce for the local market, because they often come from the same advanced countries and therefore require a higher level of both education and training in the workforce. Using technologies produced elsewhere is very important for a backward economy because it is much easier to advance technologically by imitating others' ideas and taking advantage of their mistakes, rather than learning at one's own expense by committing one's own. A country with these characteristics would be able to better exploit the low labor costs and penetrate competitively with its exports in the markets of the rich countries. Here a virtuous circle is triggered, as often happens in the mechanisms of development: the increase in exports increases the demand for the exporting sectors and increases their production. This in turn increases the experience of the workforce and favors the adoption of ever new technologies to keep up with very demanding markets. Productivity increases and, with it, the remuneration of skilled workers, people invest more in human capital and productivity increases further, and so on until it generates, in some cases, real economic miracles such as happened in Korea, Taiwan and other countries. Let's talk now about the slightly less intuitive second point. What makes a talented individual engage in one activity rather than another? Market extension is crucial: being a star in a larger market is more profitable than being a star in a smaller one. As long as there are increasing returns people are encouraged to enter that market. In an open economy, the return on human capital can be higher because the market is bigger. Human capital is constrained by the presence of decreasing returns as would happen in a smaller local market, therefore the opportunities to exploit a specific talent are greater. If education grows in a stagnant market sooner or later the remuneration of educated workers would be affected by the increase in supply, this happens, or it happens much less if the market grows. In conclusion, on the theme "open economy", individuals with talent or skills created by education or experience will be more incentivized to engage in activities that contribute to the growth of the national product. It is therefore necessary to create boundary conditions that allow to better exploit the productive potential of human capital by guaranteeing skilled workers a high remuneration in those activities that offer an equally high contribution to development and economic growth. Opening up to wider markets may be a way to achieve this, but it would be at least equally important to enhance research and development activities by making them more attractive to young talents. The graph that has human capital and per capita GDP as variables shows everything that has been said in a fairly clear and intuitive way.

Figure 3.8: Human Capital Index vs. GDP per capita

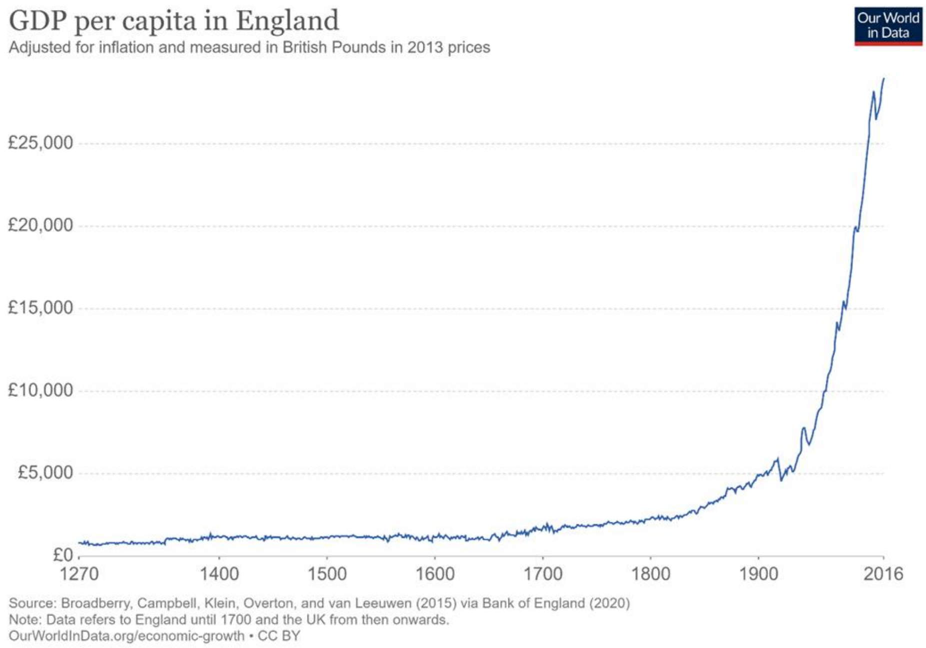


Source: The World Bank

4. Economic development

Up to now there has been talk of economic growth, understood as a substantially new phenomenon since it began with the Industrial Revolution. In fact, the graph below shows that for 600 years, per capita income in the United Kingdom (the country that first experienced this phenomenon) did not exceed £ 5,000. From the end of the 19th century to the present day, per capita income went from £ 5,000 to over £ 25,000.

Figure 4.1: GDP per capita in England



Source: Our World in Data

Various classical theories have been formulated by the most famous economists in history (Smith, Malthus, Ricardo, Schumpeter), in which they have tried to give an explanation to this phenomenon which could not have gone unnoticed by now. These theories were taken up, improved and expanded by Robert Solow, who theorized a growth model that became a milestone for neoclassical models. However, the fact that he explained this phenomenon through factors considered by him to be exogenous, or disconnected from everything else, such as the saving of families deriving from their excellent choices, or technological progress as something trivially reduced from above, does not he found total confirmation with what the empirical evidence showed instead. It was economists who theorized Endogenous growth models to clarify the subject by introducing a factor that revolutionized all the cards on the table, Human Capital. This factor, once shown that it had a positive correlation with economic growth, partially revolutionized what, after all, is mainstream economic thinking. Fundamentally, economic thinking has always been based on fixed pillars and apparently destined to be such over time. In other words, as theorized by the one who is believed to be the founding father of the economy Smith, the world works and finds itself in a point of balance if each one acts selfishly (the invisible hand).

Each individual tries to use their capital to produce the maximum possible value. In general, he does not intend to promote the public interest, and does not even realize the extent to which they promote it but acts exclusively for his own safety and for his own benefit. And in this he is guided by an invisible hand that leads him to pursue an aim foreign to his intentions. In doing his own interests he often promotes those of society in a much more effective way than when he proposes to promote them. (Smith 1776, p. 442).

A decidedly complete and exhaustive definition of what is economic science was formulated by Robbins, who in his essay An Essay on the Nature and Significance of Economic Science, stated that economics is the science that studies the optimal allocation of scarce (limited) resources between alternative uses in order to maximize the satisfaction of the economic entity. (Robbins 1932)

From this concise but exhaustive statement, the goal of the economic action is maximization, i.e. the achievement of the highest possible degree of satisfaction by an economic entity with the use of the least amount of resources available. The economic agents are families, businesses, and finally the state; everyone would tend to achieve maximum utility. Furthermore, as observed by the economists Marchionatti and Mornati, “it is assumed that the behavior of individuals is rational, that is, that they evaluate, on the basis of their preferences, supposed to be ordered, the costs and benefits of the alternatives, all fully known and that choose the alternative that allows them to maximize their satisfaction. " (Marchionatti and Mornati 2012, p. 18)

Individuals therefore seem to have a perfect rationality, since having all the information available, they can only make the correct choice using the calculation of costs and benefits. If these are the cardinal principles of economic science, the perspective in which Solow analyzes economic growth can only be through exogenous factors, almost as if the future of a country's economy is already written (achievement in short or long times , depending on the initial situation, the steady state). The empirical evidence that deviates from what the neoclassical models theorize, and the introduction of human capital has meant that all this was seen in a different perspective. In other words, a country's economic growth does not depend solely and exclusively on a country's initial capital endowment and technological progress, but also on other factors (human capital) and on the policies that are implemented to create and increase them. This reasoning gave birth to the concept of economic development. The term "development", as mentioned in the introductory part of this essay, was initially associated with the term "growth" as a synonym. Subsequently these two terms were contextualized, and similarities and differences were highlighted. Economic growth is a concept related to the ability of an economic system to increase the availability of goods and services to meet the needs of a given population. It is assumed that the availability of goods and services must increase over time, as production tends to grow (thanks to the continuous investments generated by savings and thanks to technological progress), consequently the population, and with it the demand for goods. Economic growth is therefore the economic indicator most used by economists, governments and international economic organizations. Often, however, the mistake is made of associating economic growth with the well-being of the population. In fact, although this relationship is taken for granted, it is complex and controversial. In this regard, a very intuitive starting point is offered by the Economic Development essay written by economists Todaro and Smith:

> *Shifting to another part of the world, suppose we were to visit a large city situated along the coast of South America. We Would immediately be stuck by the sharp contrasts in living conditions from one section of this sprawling metropolis to another. There would be a modern stretch of tall buildings and wide, tree-lined boulevards along the edge of a gleaming white beach; just a few hundred meters back and up the side of a step hill, squalid shanties would be pressed together in precarious balance. If we were to examine two representative families- one a wealty and well-connected family and the other of peasant background or born in the slums- we would no doubt also be stuck by the wide dispatities in their individual living conditions. The wealthy family lives in a multiroom complex on the top floor of a modern building overlooking the sea, while the peasant family is cramped tightly into a small makeshift dwelling in a shantytown, or favela, on the hill behind that seafront building. For illustrative purposes, let us assume that it is a typical Saturday evening at an hour when the families should be preparing for dinner. In the penthouse apartment of the wealthy family, a servant is setting the table with expensive imported china and high-quality silverware. Russian caviar, French hors d'œuvres, and Italian wine will constitute the first of several courses. The family's eldest son is home from his university in North America, and the other two children are on vacation from their boarding schools in France and Switzerland. Annual vacations abroad, imported luxury automobiles, and the finest food and clothing are common place amenities for this fortunate family in the penthouse apartment. And what about the poor family living in the dirt-floored shack on the side of the hill? They too can view the sea, but somehow it seems neither scenic nor relaxing. The stench of open sewers makes such enjoyment rather remote. There is no dinner table being set; in fact, there is usually too little to eat. Most of the four children spend their time out on the streets begging for money, shining shoes, or occasionally even trying to steal purses from unsuspecting people who stroll along the boulevard. The father migrated to the city from the rural hinterland, and the rest of the family recently followed. He has had part-time jobs over the years, but nothing permanent.*

Government assistance has recently helped this family keep the children in school longer. But lessons learned on the streets, where violent drug gangs hold sway, seem to be making a deeper impression. (Todaro and Smith 2015, pp. 5-6)

This example made by the authors leads to a question: can we say that the country in which the two families reside is a "developed" country?

But first we need to give a clear and rigorous definition of what development is; according to Todaro and Smith it is "the process of improving the quality of all human life and capabilities by raising people's levels of living, self-esteem and freedom." (Todaro and Smith 2015, p.7)

From this definition we understand how in addition to treating the situation of people in purely monetary terms, we want to go further, going to deal with human factors. In conclusion, we can say that growth (dealing only and exclusively with economic factors) is in fact incorporated into what development is, since development is oriented towards the well-being of people not only from a monetary point of view.

Development economics has an even greater scope. In addition to being concerned with the efficient allocation of existing scarce (or idle) productive resources and with their sustained growth over time, it must also deal with the economic, social, political, and institutional mechanisms, both public and private, necessary to bring about rapid (at least by historical standards) and large-scale improvements in levels of living for the peoples of Africa, Asia, Latin America, and the formerly socialist transition economies. In comparison with the more developed countries (MDCs), in most less developed countries, commodity and resource markets are typically highly imperfect, consumers and producers have limited information, major structural changes are taking place in both the society and the economy, the potential for multiple equilibria rather than a single equilibrium is more common, and disequilibrium situations often prevail (prices do not equate supply and demand). (Todaro and Smith 2015, p.10)

The economy, therefore, is falling within a social system. A social system is the organizational and institutional structure of a societhy, including its values, attitudes, power structure and traditions. For the social system, therefore, interdependent relationships are tended between economic and non-economic factors. This trend, according to the Indonesian intellectual Soedjatmoko, appears to be quite recent as "Looking back over these years, it is now clear that, in their concern with growth andits stages and with the provision of capital and skills, development theorists have paid insufficient attention to institutional and structural problems and to the power of historical, cultural, and religious forces in the development process. " (Soedjatmoko 1985, p.11)

Certainly, unlike growth, the development of a country is still difficult to measure today as it also includes difficult non-economic factors to measure.

4.1 Indicators for measuring development

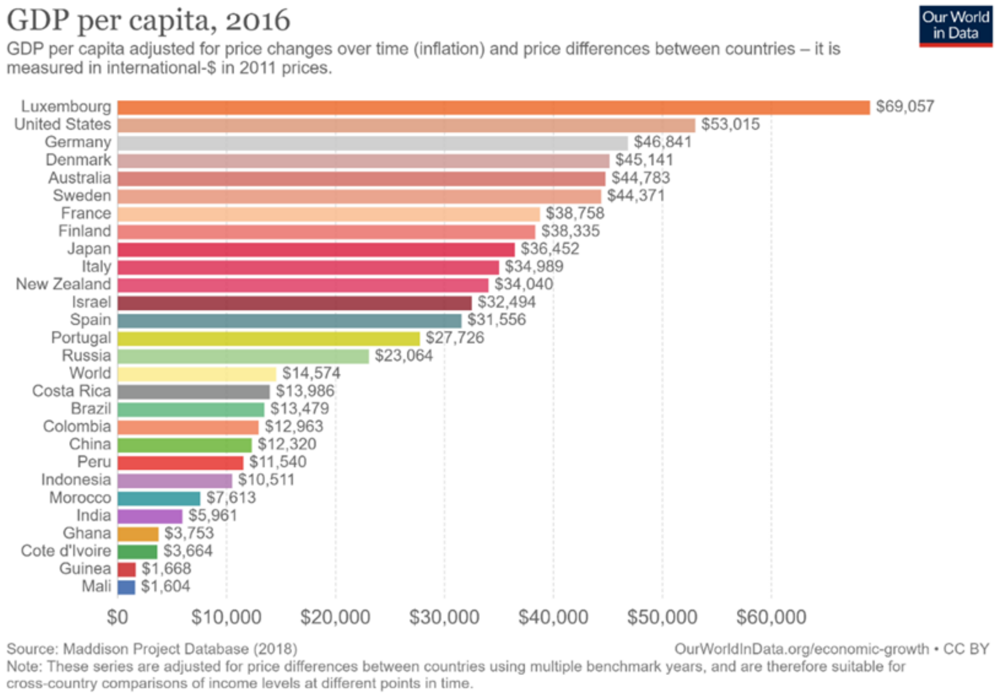
In the previous paragraph the difference between "growth" and "development" was clarified and a clear and rigorous definition of the second was given. Now, however, it is necessary to understand how to measure the development of a country, to understand by what criteria a country can be considered more or less developed than another country. The economist Roland [2014], in his essay "Development Economics" speaks of "development gap"; this gap is understood in terms of income, life expectancy, health, education and level of urbanization. These five factors have been analyzed by the author since they are the ones that briefly describe, but equally complete, the socio-economic well-being situation of a country. In addition, three of these five indicators will be, as we will see, those that will make up the HDI index; the index with a score from 0 to 1 which defines the development of a country.

This gap has been evolving over time, decreasing for some countries while increasing for others. For example, in recent decades some Asian countries such as China and India have successfully undertaken a vigorous process of development and have begun to close the gap with the richest countries. Obviously, there is still a long way to go, but it is encouraging to see that there are some major success stories in developing nations, and they may help us better understand why the development gap has unfortunately increased in many other poor countries. Another important fact we must consider is that development is not irreversible: rich countries can be engaged in a process of economic decline (for example Argentina). (Roland 2014, p.4)

4.1.1 Income Gap

The first and most obvious factor that is measured when it comes to the development gap more generally when one wants to analyze the economic situation of a country is per capita GDP. This first indicator refers to economic growth, in this regard the following graph shows a representation of the average income of a sample of different countries.

Figure 4.2: GDP per capita: year 2016

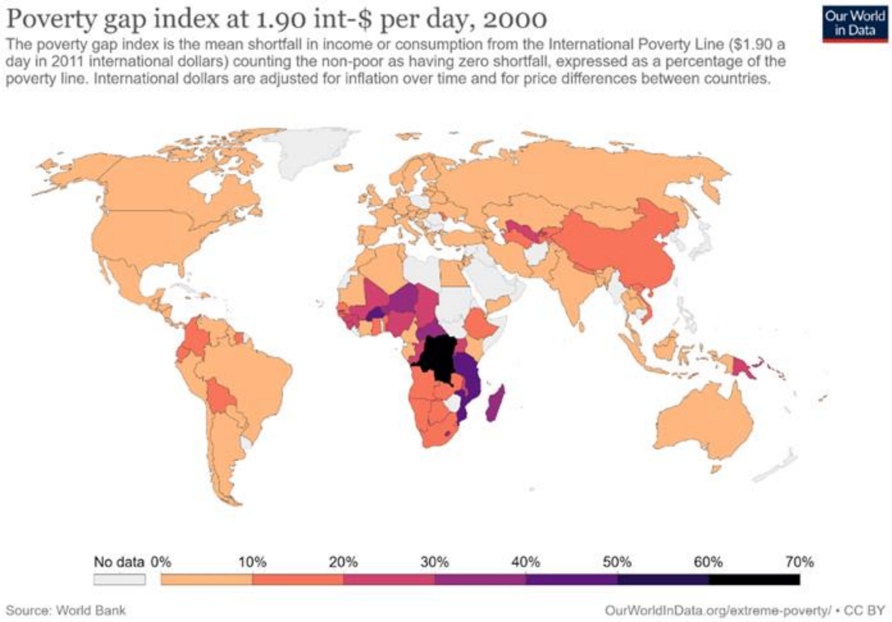


Looking at the values shown in the graph, we immediately notice that the countries that are above the world average ($ 14.574) are the European and North American countries, while the countries that are below the world average are the African countries, of Latin America and Asians.

4.1.2 Poverty Gap

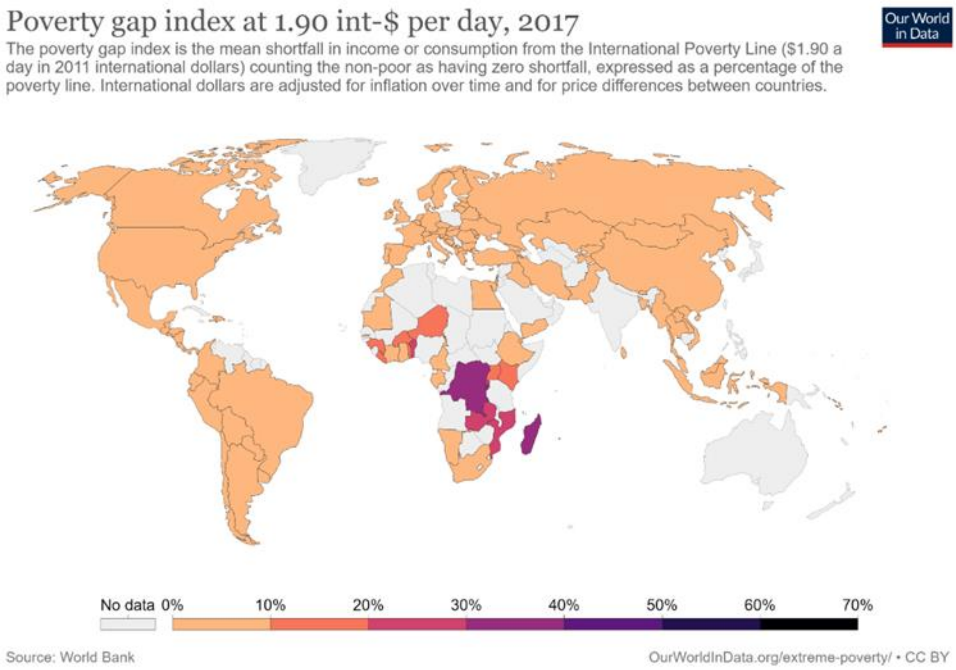
The Income gap showed how several countries are below the world average, some even have a per capita GDP that is 1/10 of this average. However, this indicator does not make the right idea that there are people in the world living in conditions of extreme poverty. Therefore, the second indicator that Roland goes to analyze is the poverty gap, to provide data in absolute terms regarding the countries that have high percentages of people living in extreme poverty. Extreme poverty or absolute poverty is the hardest condition of poverty, in which the primary resources for human sustenance, such as water, food, clothing and clothing, are not available - or with great difficulty or intermittence - home. In 2018, the World Bank considers the poverty of those living on less than $ 1.90 a day to be such. The World Bank itself estimated the number of people on Earth who lived in extreme poverty in 2018 at around 750 million. The first graph shows the global situation in 2000:

Figure 4.3: Poverty gap index at 1.9$ per day: year 2000



As can be seen from the graph, the countries of Southeast Asia, Latin America but especially Central Africa are the poorest ones. However, if we go to analyze the same chart in the year 2017, we can note how fortunately the situation has definitely improved. By 2030, in fact, the global goal is to eliminate it worldwide.

Figure 4.4: Poverty gap index at 1.9$ per day, 2017



The "absolute poverty" parameter is certainly important in order to understand the economic situation of a country; however another fundamental factor for our analyzes is to measure the distribution of wealth. In other words, it is good to understand how many contribute to a possible increase in per capita GDP; if this increase occurs thanks to many people or to a few people who increase their income. If in a country, the people who increase their income are few, while most of the other people continue to live in the same conditions, can it be said that it is a country that is developing in the right way?

One of the objectives of the development economy is precisely to eliminate too many income disparities, which then lead to social inequalities. In this regard Todato and Smith explain how these inequalities are measured.

> *Economists and statisticians therefore like to arrange all individuals by ascending personal incomes and then divide the total population into distinct groups, or sizes. A common method is to divide the population into successive quintiles (fifths) or deciles (tenths) according to ascending income levels and then determine what proportion of the total national income is received by each income group. For example, the Table shows a hypothetical but fairly typical distribution of income for a developing country. In this table, 20 individuals, representing the entire population of the country, are arranged in order of ascending annual personal income, ranging from the individual with the lowest income (0.8 units) to the one with the highest (15.0 units). The total or national income of all individuals amounts to 100 units and is the sum of all entries in column 2. In column 3, the population is grouped into quintiles of four individuals each. The first quintile represents the bottom 20% of the population on the income scale. This group receives only 5% (i.e., a total of 5 money units) of the total national income. The second quintile (individuals 5 through 8) receives 9% of the total income. Alternatively, the bottom 40% of the population (quintiles 1 plus 2) is receiving only 14% of the income, while the top 20% (the fifth quintile) of the population receives 51% of the total income.A common measure of income inequality that can be derived from column 3 is the ratio of the incomes received by the top 20% and bottom 40% of the population. This ratio, sometimes called a Kuznets ratio after Nobel laureate Simon Kuznets, has often been used as a measure of the degree of inequality between high- and low-income groups in a country. In our example, this inequality ratio is equal to 51 divided by 14, or approximately 3.64. To provide a more detailed breakdown of the size distribution of income, decile (10%) shares are listed in column 4. We see, for example, that the bottom 10% of the population (the two poorest individuals) receives only 1.8% of the total income, while the top 10% (the two richest individuals) receives*

28.5%. Finally, if we wanted to know what the top 5% receives, we would divide the total population into 20 equal groups of individuals (in our example, this would simply be each of the 20 individuals) and calculate the percentage of total income received by the top group. In the Table, we see that the top 5% of the population (the twentieth individual) receives 15% of the income, a higher share than the combined shares of the lowest 40%. (Todaro and Smith 2014, pp 219-220)

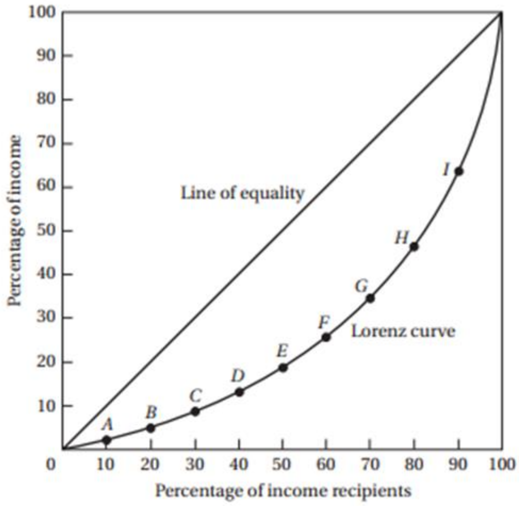
Table 4.1: Typical Size Distribution of Personal Income in a Developing Country by Income Shares – Quintiles and Deciles

Individuals	Personal Income (money units)	Share of Total Income (%) Quintiles	Deciles
1	0.8		
2	1.0		1.8
3	1.4		
4	1.8	5	3.2
5	1.9		
6	2.0		3.9
7	2.4		
8	2.7	9	5.1
9	2.8		
10	3.0		5.8
11	3.4		
12	3.8	13	7.2
13	4.2		
14	4.8		9.0
15	5.9		
16	7.1	22	13.0
17	10.5		
18	12.0		22.5
19	13.5		
20	15.0	51	28.5
Total (national income)	100.0	100	100.0

Source: Todaro and Smith 2014 "Economic Development" p.219

Another way of representing in a more intuitive way what is reported in the table is the Lorenz curve. This type of graph, structured on a Cartesian plane allows you to see by eye which country has a fair distribution of wealth and vice versa, which country has a strong income inequality. The vertical axis (Y axis) represents the percentage of income while the horizontal axis (X axis) represents the percentage of people who receive it. In the middle of the axes, a straight line with 45 ° inclination is drawn which represents the situation of complete equality (line of perfect equidistribution); the ideal situation. Below the equidistribution line, there is the Lorenz curve which is drawn by joining the various points.

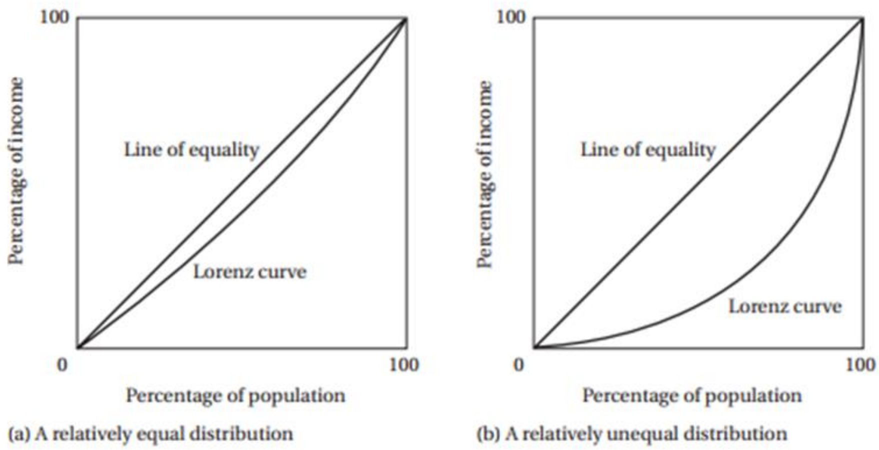
Figure 4.5: The Lorenz Curve



Source: Todaro and Smith 2014 "Economic Development"

These points represent the correspondence between the various population deciles and the respective income received. The larger the area composed of the Lorenz curve and the straight line, the more income disparities there are. Conversely, if the Lorenz curve is close to the straight line, the income disparities are minimal.

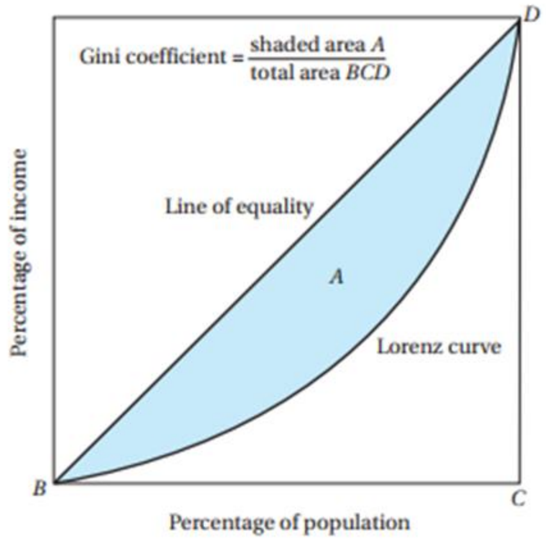
Figure 4.6: The Greater the Curvature of the Lorenz Line, the Greater the Relative Degree of Inequality



Source: Source: Todaro and Smith 2014 "Economic Development"

Finally, a method to summarize and measure the degree of income disparity is provided by the Gini index, introduced by the Italian statistician Gini. It is basically a number from 0 to 1. Zero indicates a situation in which all citizens have the same income, while the value 1 corresponds to the situation where one person receives all the income of the country while all the others have zero income. In other words, the lower the value, the more equal the distribution. Sometimes the Gini index is multiplied by one hundred, thus becoming a value between 0 and 100, easier to visualize graphically and to understand in its growth or decrease trend. Being a relationship between the two respective areas, the lower the coefficient, the more you are in a favorable situation, if instead this coefficient is high, you are in a situation of strong income inequality. It can be obtained from the Lorenz curve in this way:

Figure 4.7: Gini Coefficent



Source: Source: Todaro and Smith 2014 “Economic Development”

In this regard, taking a sample of 28 countries of which you have the most recent data (year 2018) if you create an Excel table you can compare different countries and find different aspects. The first aspect is that the lowest Gini coefficient belongs to Norway; very developed country. The higher Gini coefficient belongs to Brazil, this confirms the example of the two families thanks to which the topic of economic development was introduced. The Gini coefficient is therefore lower in more developed countries, however this is not to be considered a rule because there are several exceptions. Above all that of the USA which despite being a more developed country than Tunisia has a Gini coefficient greater than about 10 points. However, it can be said that a developed and economically stable country, apart from a few exceptions, has a low Gini coefficient. On the other hand, for the least developed and most economically unstable countries, a high coefficient is more likely.

Table 4.2: The Gini coefficient of a sample of 28 countries: 2018

Country (pt.1)	Gini Coefficent		Country (pt.2)	Gini Coefficent
Argentina	41,4		Kazakhstan	27,5
Brazil	53,9		Luxemburg	34,9
Canada	33,8		Mexico	45,4
China	38,5		Norway	27
Colombia	50,4		Peru	42,8
Denmark	28,7		Poland	29,7
Finland	27,4		Portugal	33,8
Germany	31,9		Spain	34,7
Ghana	43,5		Sweden	28,8
Greece	34,4		Tanzania	40,5
Indonesia	39		Tunisia	32,8
Ireland	32,8		Turkey	41,9
Italy	35,9		USA	41,4
Japan	32,9		Uruguay	39,7

Source: World Data Bank

4.1.3 The health gap

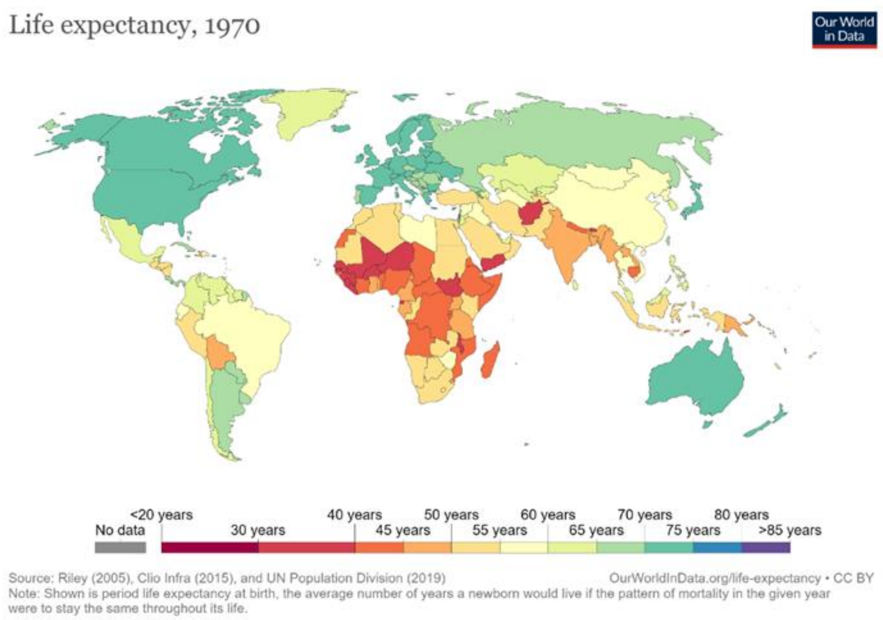
Even from the point of view of health, the differences compared to rich and poor countries are visible. To highlight these differences, the indicator chosen by Roland is that of "life expectancy" because a country with a population that lives on average 80 years is certainly more developed than a country where life expectancy is 50 years and above all where people can risk dying from diseases like fever, malaria, diarrhea. In addition, together with the economic factor "income", this index concerning health is the second index that makes up HDI. In this regard, Roland claims that:

> *People in developing countries are more prone to diseases, they do not live as long as people in developed countries, and many of their children die at a young age. In 2010, a child born in Japan could expect to live until 83, while a child born the same year in Sierra Leone could only expect to reach the age of 47. Life expectancy is defined as the average number of years*

a newborn infant would live if health and living conditions at the time of its birth remained the same thoughout its life. (Roland 2014, p.7)

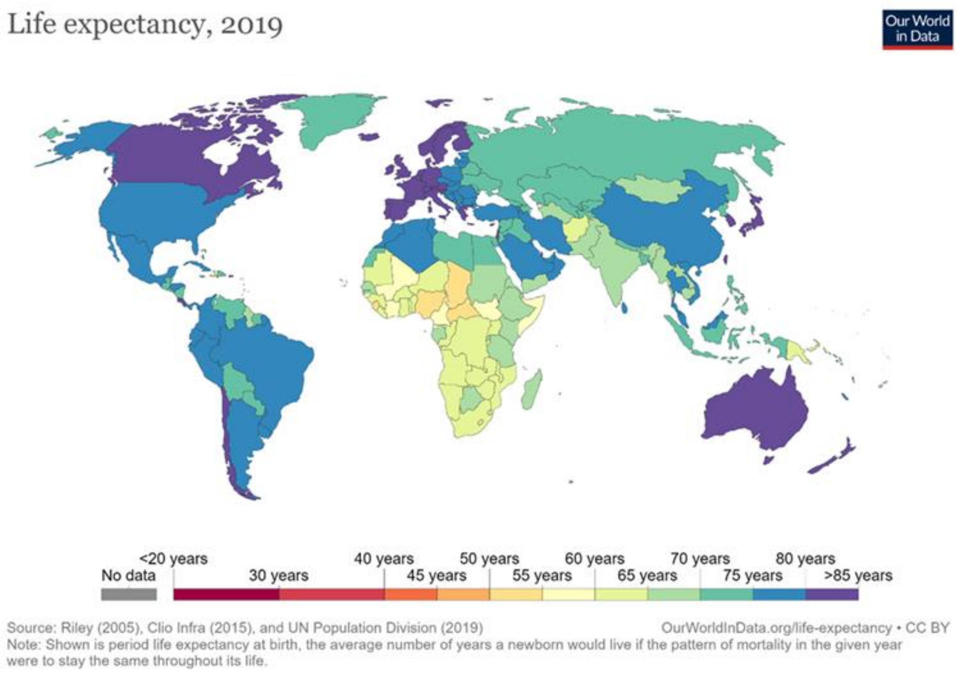
This map shows the life expectancy that the world population could have in 1970, it is evident that only the inhabitants of North America, Europe and Australia had a life expectancy of over 65 years, but below 75 years. The situation in Africa and Latin America, however, was disastrous: in some Central African countries, the average life expectancy was around 30 years. The world average was around 55 years old.

Figure 4.8: Life Expectancy: year 1970



About 50 years later, the data are very encouraging, as life expectancy has risen significantly. In underdeveloped countries it is around 55 years old, while in developed countries it can even exceed 80 years old. However in many countries, especially in Italy, this increase in life expectancy added to an ever-decreasing number of births is considered by experts as a negative factor, as an increasing number of elderly people will find themselves who without producing income will have to be assisted through pensions and in particular from the health point of view.

Figure 4.9: Life expectancy: year 2019

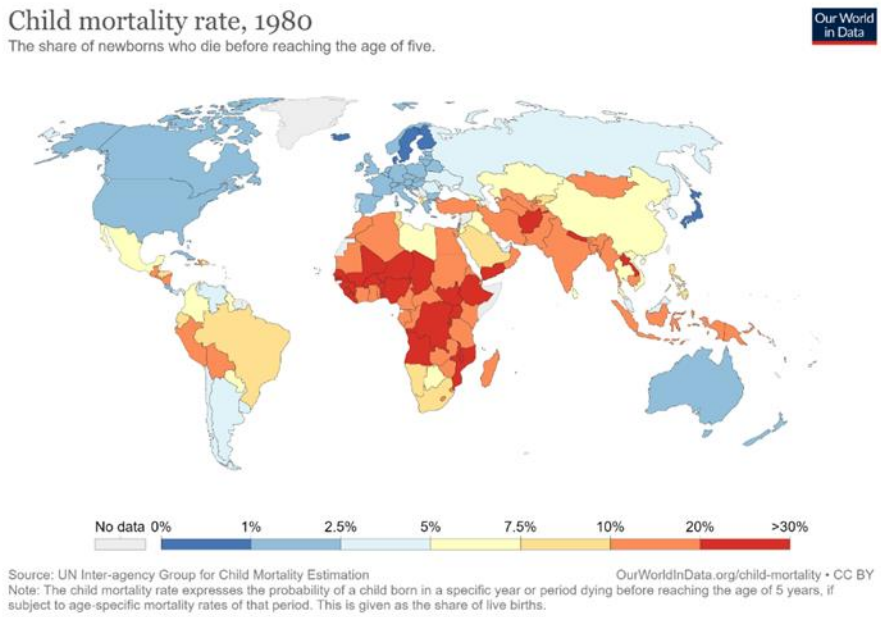


Another index to consider when talking about development is the infant mortality rate. The infant mortality rate is a statistical index applied in epidemiology and demography to calculate the mortality rate within the first year of life. This value is calculated by comparing the number of children who died within the first year of life with the number of children born alive and the result is multiplied by 1000.

$$M_i(a) = B_m(a) / B_n(a) * 1000$$

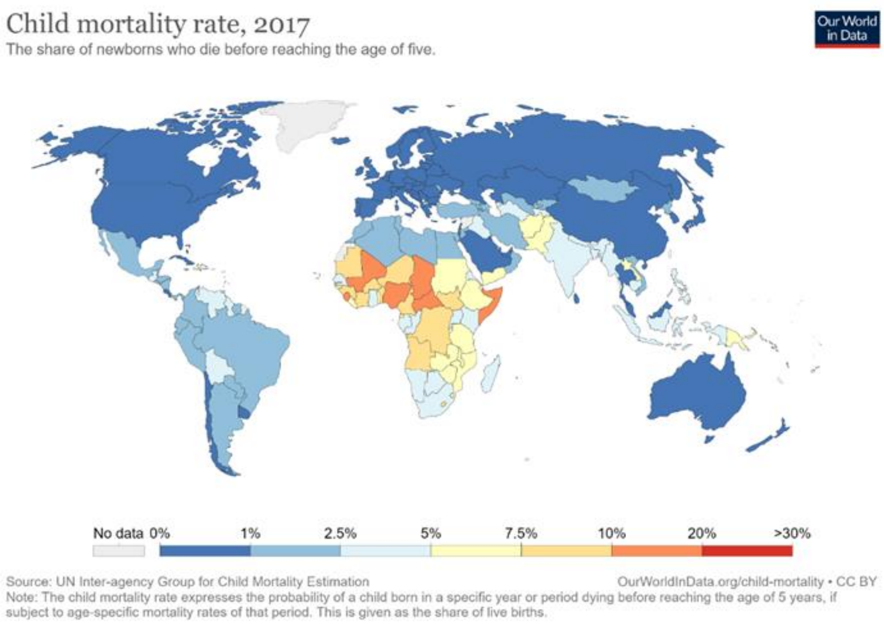
The first map shows the situation globally in the 1980s:

Figure 4.10: Child mortality rate: year 1980



The only countries in which the mortality rate was below the 1% threshold were the countries of Northern Europe. Under the 5% threshold instead all the countries of the European Union and North America, while instead over the 10% threshold part of Latin America and all Africa. As with life expectancy, the numbers relating to infant mortality rates have improved: in 2017 almost the whole world is below the 1% threshold. Even in the countries of Central Africa this percentage has dropped.

Figure 4.11: Child mortality rate: year 2017



4.1.4 The Education gap

The fourth index mentioned by Roland, which falls into the "access to services" category and which completes the HDI is the "Education Gap". This factor, as was said in the previous chapter on human capital, is essential for the growth and development of a country. It is difficult to determine whether it is a direct cause rather than a direct consequence of economic growth. Highly educated workers have been said to contribute positively to economic growth but it is also true that investing in education is much easier if you are a wealthy country. Clearly if a country is poor it is unlikely that it will be able to find public funds to reinvest in education.

4.1.5 The Urbanization gap

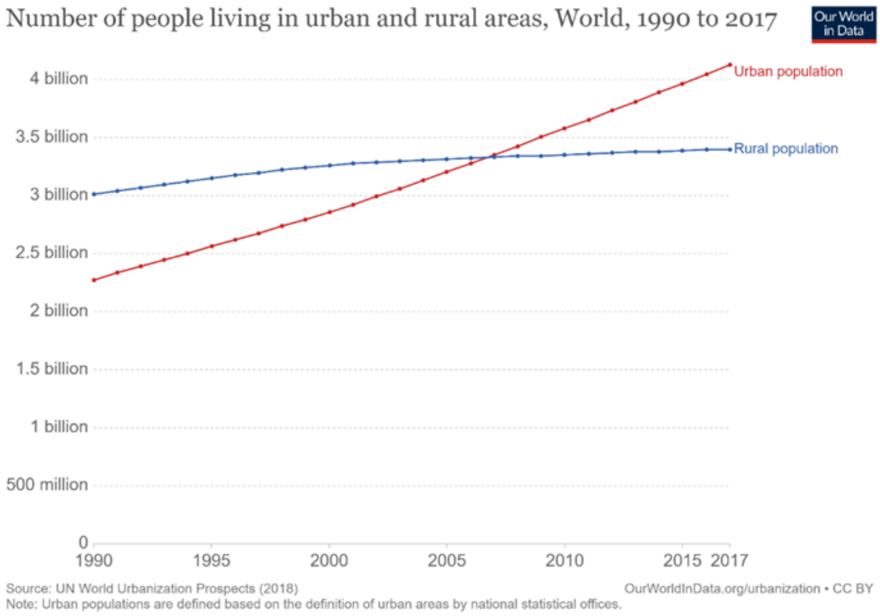
The latter index relating to the urbanization rate of a country has been chosen, there is the belief that countries with large urban areas that are well connected to each other are positively correlated with economic development (and also with economic growth). For this reason, the urbanization data are very valuable.

Economist Narayan [2014] says that "The level of urbanization and economic development are positively related. An increase in concentration of population at one place yield many positive externalities increasing productivity and efficiency. The relationship between two is extensively researched in many cross-country studies and cross-country income differentials are examined vis-a-vis the level and growth of urbanization. The empirical evidences suggested that relationship between urbanization and development changes with changes in the stage of development. " (Narayan 2014, p.901)

Romer confirming the theory argues that "Rich countries are typically very urbanized. The industrial Revolution developed in cities as workers came from the countryside to the city to earn a better living in factories rather than continue to toil on the land. Even today, the large service sector in rich countries is primarily located in cities. " (Romer 2014, p.11)

In the last 20 years there has been a turnaround, the population living in urban areas is greater than that living in rural areas.

Figure 4.12: Number of people living in urban and rural areas: from 1990 to 2017



Clearly an urban area has many more services to offer than a rural area, where the main activity is agriculture and often it is subsistence.

4.1.6 HDI (Human Development Index)

The most widely used measure of the comparative status of socioeconomic development is presented by the United Nations Development Programme (UNDP) in its annual series of Human Development Reports. The centerpiece of these reports, which were initiated in 1990, is the construction and refinement of its informative Human Development Index (HDI). Human Development Index (HDI) is an index that measure national socioeconomic development, based on combining measures of education, health, and adjusted real income per capita. In 2010 this index had a sort of upgrade and became New Human Development Index (NHDI). The New HDI, like its predecessor, ranks each country on a scale of 0 (lowest human development) to 1 (highest human development) based on three goals or end products of development: a long and healthy life as measured by life expectancy at birth; knowledge as measured by a combination of average schooling attained by adults and expected years of schooling for school-age children; and a decent standard of living as measured by real per capita gross domestic product adjusted for the differing purchasing power parity of each country's currency to reflect cost of living and for the assumption of diminishing marginal utility of income. There are two steps in calculating the New HDI: first, creating the three "dimension indices"; and second, aggregating the resulting indices to produce the overall New Human Development Index

(NHDI). After defining the relevant minimum and maximum values (or lower and upper “goalposts”), each dimension index is calculated as a ratio that basically is given by the percent of the distance above the minimum to the maximum levels that a country has attained.

Dimension Index = $\frac{Actual\ Value - Minimum\ Value}{Maximum\ Value - Minimum\ Value}$

As for health, life expectancy is taken into account. The minimum value is 20 years while the maximum value is 83.57 years. Taking Italy as an example (Actual value 83.4) we have:

Life expectancy index = (83,2 – 20) / (83,57 – 20) = 0,994

The education (“knowledge”) component of the HDI is calculated with a combination of the average years of schooling for adults aged 25 and older and expected years of schooling for a school-age child now entering school. As explained by the UNDP, these indicators are normalized using a minimum value of 0, and maximum values are set to the actual observed maximum value of mean years of schooling from the countries in the time series, 1980–2012, which is 14 years estimated for the United States in 2010. Taking Italy as an example (Actual value 10.2) we have:

Average years of schooling = 10,2 /14 = 0,72

We can think of this as saying that Italy is about 72% of the way to the global standard of average education. In considering expected future education, the highest value is given as 18 years (which we may think of as approximately corresponding to a master’s degree). For Italy, the expected number of years of schooling for a child entering school now is estimated at 16,3 years. The expected years of schooling subindex is then calculated as:

Expected years of schooling = 16,3 / 18 = 0,91

These two indices must be added and divided by two and therefore we have:

Education Index = (0,91 + 0,72) / 2 = 0,81

The standard of living (income) component is calculated using purchasing power-adjusted per-capita gross national income (GNI). For Italy, the income index then is (where ln stands for natural log):

Income index = [ln (34989) – ln (100)] / [ln (87478) – ln (100)] = 0,884

Using these three measures of development and applying the formula to data for all 187 countries for which data is available, the HDI currently ranks countries into four groups: low human development (0.0 to 0.535), medium human development (0.536 to 0.711), high human development (0.712 to 0.799), and very high human development (0.80 to 1.0). Italy ranks in the higher end because:

NHDI = $H^{1/3}E^{1/3}I^{1/3}$

NHDI (Italy) = $\sqrt[3]{0{,}994 * 0{,}81 * 0{,}86}$ = 0,884[1]

As for the index, a good summary of the indices mentioned above can be defined as it contains the indexes of the paragraphs: 4.1.1 Income, 4.1.3 Health, 4.1.4 Education.

4.2 A different approach: the measure of happiness

After the war, several nations achieved good growth levels, but people's living standards had not changed particularly. This was one of the first alarm bells that there was something wrong with the definition of development. In short, during the 1970s, the development economy was redefined in terms of reducing poverty, inequalities and unemployment.

[1] All the data used to calculate the NHDI was taken from the *World Data Bank.*

Regarding this, Seers asks a few questions:

> *The questions to ask about a country's development are therefore: What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three of these have declined from high levels, then beyond doubt this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if all three have, it would be strange to call the result "development" even if per capita income doubled.* (Seers 1969, p.3)

Still in this direction, in which development is seen not only as an objective to be achieved in economic terms but also above all in terms of human rights, Goulet stands:

> *Underdevelopment is shocking: the squalor, disease, unnecessary deaths, and hopelessness of it all! […] The most empathetic observer can speak objectively about underdevelopment only after undergoing, personally or vicariously, the "shock of underdevelopment." This unique culture shock comes to one as he is initiated to the emotions which prevail in the "culture of poverty." The reverse shock is felt by those living in destitution when a new self-understanding reveals to them that their life is neither human nor inevitable.…The prevalent emotion of underdevelopment is a sense of personal and societal impotence in the face of disease and death, of confusion and ignorance as one gropes to understand change, of servility toward men whose decisions govern the course of events, of hopelessness before hunger and natural catastrophe. Chronic poverty is a cruel kind of hell, and one cannot understand how cruel that hell is merely by gazing upon poverty as an object.* (Goulet 1971 p.23)

Development should therefore be understood as a multidimensional process involving major changes in social structures, popular attitudes and national institutions. It must represent the whole range of change through which an entire social system, tuned to the different basic needs, must evolve. Indian economist and philosopher Sen provide a very interesting approach based on "Capabilities". Sen argues that poverty cannot be properly measured by income or even by utility as conventionally understood; what matters fundamentally is not the things a person has-or the feelings these provide-but what a person is, or can be, and does or can do. Todaro and Smith explain Sen's thinking in these terms:

> *To make any sense of the concept of human well-being in general, and poverty in particular, we need to think beyond the availability of commodities and consider their use: to address what Sen calls functionings, that is, what a person does (or can do) with the commodities of*

given characteristics that they come to possess or control. Freedom of choice, or control of one's own life, is itself a central aspect of most understandings of well-being. A functioning is a valued "being or doing," and in Sen's view, functionings that people have reason to value can range from being healthy, being well-nourished, and well-clothed, to being mobile, having self-esteem, and "taking part in the life of the community. (Todaro and Smith 2018, p.18)

Sen identifies five sources of disparity between (measured) real incomes and actual advantages: first, personal heterogeneities, such as those connected with disability, illness, age, or gender; second, environmental diversities, such as heating and clothing requirements in the cold or infectious diseases in the tropics, or the impact of pollution; third, variations in social climate, such as the prevalence of crime and violence, and "social capital"; fourth, distribution within the family—economic statistics measure incomes received in a family because it is the basic unit of shared consumption, but family resources may be distributed unevenly, as when girls get less medical attention or education than boys do; fifth, differences in relational perspectives, meaning that some goods are essential because of local customs and conventions. For example, necessaries for being able, in Smith's phrase, "to appear in public without shame," include higher quality clothing (such as leather shoes) in high-income countries than in low-income countries. In short, the authors, with the help of Sen's thought, adopt a subjective approach on the topic of "development" arguing that it cannot be based on income or access to primary goods to be able to determine whether a country is developed or is not developed. Depending on the contexts and cultures, people's needs may change and may play a different role in a hypothetical scale of priorities and needs. To clarify this point, in his acclaimed 2009 book, The Idea of Justice, Sen suggests that subjective well-being is a kind of psychological state of being—a functioning—that could be pursued alongside other functionings such as health and dignity. In the next section, we return to the meaning of happiness as a development outcome, in a sense that can be distinguished from conventional utility.

Sen then defines capabilities as "the freedom that a person has in terms of the choice of functionings, given his personal features (conversion of characteristics into functionings) and his command over commodities." Sen's perspective helps explain why development economists have placed so much emphasis on health and education, and more recently on social inclusion and empowerment, and have referred to countries with high levels of income but poor health and education standards as cases of "growth without development." Real income is essential, but to convert the characteristics of commodities into functionings, in most important cases, surely requires health and education as well as income. The role of health and education ranges from something so basic as the nutritional advantages and greater personal energy that are possible when one lives free of parasites to the expanded ability to appreciate the richness of human life that comes with a broad and deep education.

People living in poverty are often deprived—at times deliberately—of capabilities to make substantive choices and to take valuable actions, and often the behavior of the poor can be understood in that light. For Sen, human “well-being” means being well, in the basic sense of being healthy, well nourished, well clothed, literate, and long-lived, and more broadly, being able to take part in the life of the community, being mobile, and having freedom of choice in what one can become and can do. (Todaro and Smith 2015, p.20)

The topic of "happiness" understood as the well-being of the population begins to be part of the topic of growth and development, playing an important role in our analysis. The start of this process of "exceeding" GDP as an index of well-being was born in Bhutan, a small country between India and China at the foot of the Himalayas which, in 1972, replaced GDP with GNH (Gross National Happiness). The four basic pillars on which a people's happiness is measured are:

1) The existence of fair and sustainable economic development, which includes education, social services and infrastructure, so that every citizen can enjoy the same starting benefits.

2) Environmental conservation (particularly important in Bhutan where only 8% of the territory is usable for agriculture).

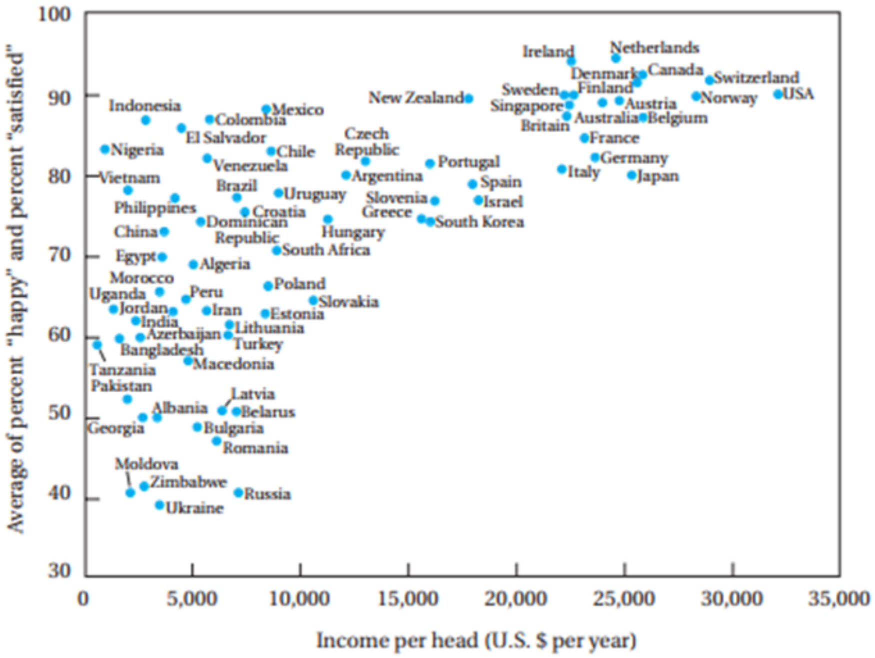
3) Culture, understood as a series of values that serve to promote the progress of society.

4) Good governance.

The system adopted to measure gross internal happiness is not limited to the level of income (and consumption) of a nation but introduces a series of parameters that support GDP enriching it. Parameters such as the level of education, access to drinking water, free health care, life expectancy, the quality of the environment, the crime rate become indicators of social well-being.

Since 1972 in Buthan, Gross Internal Happiness has been measured every year according to the needs and needs of the population, starting from the fact that happiness cannot be measured only by productivity in material terms. Based on the parameters of GDP, Bhutan is one of the poorest nations on the planet while, in reality, nobody starves, there are no beggars, no crime and most of the population has free access to health and public education. The Dalai Lama, speaking of Gross Internal Happiness, said: "As a Buddhist, I am convinced that the goal of our life is to overcome suffering and achieve happiness. By happiness, however, I do not mean only the ephemeral pleasure that derives exclusively from material pleasures. I think of lasting happiness which is achieved by a complete transformation of the mind and which can be achieved by cultivating compassion, patience and wisdom. At the same time, nationally and worldwide we need an economic system that helps us to pursue true happiness. The aim of economic development should be to facilitate and not hinder the achievement of happiness ". Economic science, increasingly abstract and formalized, begins to lose its rigorousness: it can no longer understand, explain, predict and correct. The statement by American Nobel laureate Stiglitz "if you don't measure the right thing, you don't do the right thing" inspired the idea of the English Premier Cameron to objectively "weigh" life satisfaction, in addition to the traditional indicators of well-being of a nation. In conclusion, the awareness of the insufficiency shown by GDP to represent the effective well-being of a nation stands out. As Robert F. Kennedy said in his famous speech << *Even if we act to erase material poverty, there is another greater task, it is to confront the poverty of satisfaction - purpose and dignity - that afflicts us all. Too much and for too long, we seemed to have surrendered personal excellence and community values in the mere accumulation of material things. Our Gross National Product, now, is over $800 billion dollars a year, but that Gross National Product - if we judge the United States of America by that - that Gross National Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children. Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans. If this is true here at home, so it is true elsewhere in world.*>> (Kennedy R. 1968)

Figure 4.13: Income and Happiness, Comparing Countries



Source: From *Happiness: Lessons from a New Science* by Richard Layard, copyright © 2005 by Richard Layard. Used by permission of The Penguin Press, a division of Penguin Group (USA) Inc. and United Agents Ltd. (www.unitedagents.co.uk) on behalf of the author.

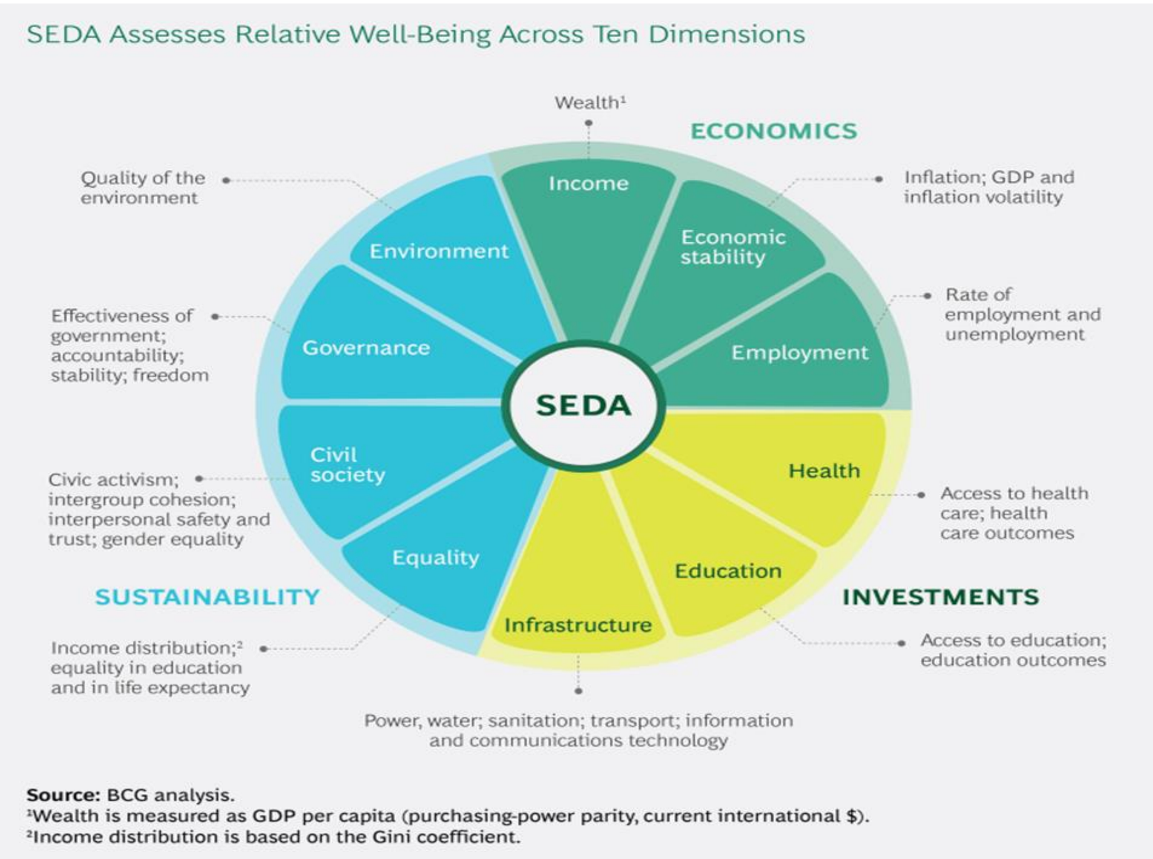
The following graph shows two aspects in particular. The first aspect concerns the connection between income and happiness in a positive sense. All countries with an income greater than $ 20,000 per capita have an average of happy and satisfied citizens in excess of 80%. The second aspect instead suggests that not necessarily "money makes happiness", because the same happiness threshold of countries with per capita income greater than $ 20,000 has been reached by countries with per capita income between $ 5000 and 20,000 $ (especially Latin American countries). On the other hand, the countries that appear "least happy" from the graph are the countries of Eastern Europe. Therefore this evident gap in terms of happiness between a country like Russia, Ukraine, Romania and countries like Brazil, Colombia and Chile is highlights that income is excluded, there are many other factors that influence this analysis; factors that often turn out to be not economic but social. In addition, the authors Todaro and Smith highlight the purpose of development economics, that is, going beyond the boundaries of political economy. The development economy, in addition to focusing mainly on economic mechanisms, also focuses on the social and institutional ones necessary to achieve rapid and large-scale improvements in people's living standards. Consequently, governments must deal with the formulation of adequate public policies aiming to achieve important economic, institutional and social transformations. The difficult part is to create something unique for all countries, in other words to move in the same direction. In fact, the authors metaphorically compare the world to the human body and the countries the organs: if one or more organs do not function properly, the entire system is affected. (Todaro and Smith 2015, pp. 28-29)

4.3 SEDA (Sustainable Economic Development Assessment)

A definitely innovative, clear and comprehensive approach is definitely the SEDA (Sustianable Economic Development Assessment) method. This assessment, made by BCG (Boston Consulting Group), is a diagnostic tool that provides countries with information on their economic and social conditions. SEDA defines well-being on the basis of ten dimensions grouped into three categories:

1) Economy (Income, Economic Stability, Employment)
2) Investments (Health, Education, Infrastructure)
3) Sustainability (Environment, Governance, Civil Society, Equality)

Figure 4.14: SEDA



Using indicators from publicly available sources, SEDA assesses the country's performance for each dimension. The assessment is based on a total of 40 indicators based on the latest available data. The measure of each indicator is normalized on a scale from 0 (the lowest score among 152 countries) to 100 (the highest). On the basis of these normalized indicators, a score is calculated for each of the 10 dimensions. Scores provide information on well-being in three ways. The aggregation of scores for the 10 SEDA dimensions provides an overall score at the current level for each country. This score is useful for comparing two or more countries. It is often the rich countries that score high, so the theory that there is no development without growth is also confirmed in this case. These 10 dimensions are also useful because they provide the country with information on the priorities for corrective actions, ie in which and in how many of these ten indicators a country is lacking. Armed with this empirical evidence, the various governments can begin to establish the necessary strategies to be addressed. Clearly, over the years, there are more and more significant data on which to base oneself and thanks to these data it is possible to understand in which direction a certain country is going by calculating its trend. Using these scores, BCG examines how countries are able to convert their wealth into wealth. Countries with coefficient 1 generate well-being in line with expectations, countries with coefficient> 1 provide higher levels of well-being than expected and finally those with coefficient 1 <offer lower levels of well-being than would be expected.

As has been said, this type of analysis allows you to compare the level of well-being of the different countries in a simple and intuitive way. From this table it can be seen how the Nordic countries have a higher SEDA coefficient than the Mediterranean ones. These coefficients are motivated and deepened by 10 variables that have been taken into consideration for their estimate. These variables are: Income, Economic Stability, Employment, Health, Education, Equality, Civil Society, Governance and Environment.

Tables 4.15: Data about Mediterranean and Nordic countries

Sustainable Economic Development Assessment Rankings
By 2019 score

Rank (SEDA Score)	Country	2019 Population (M)	2019 GNI per capita ($)	SEDA
1	Norway	5,3	75.990	87,7
4	Denmark	5,8	55.220	84,1
5	Sweden	10,1	52.590	84,1
6	Finland	5,5	44.580	84,0
23	Spain	46,6	27.180	72,5
26	Portugal	10,3	19.820	71,3
29	Italy	60,6	31.020	69,7
41	Greece	10,8	18.090	63,8

Sustainable Economic Development Assessment Rankings
By 2019 SEDA score

Country	Population	GNI per capita	Income	Economic Stability	Employment	Health	Education	Infrastructure	Equality	Civil Society	Governance	Environment	SEDA
Norway	5,3	75.990	81,9	95,0	68,9	90,3	90,6	82,4	95,6	100,0	97,5	59,3	87,7
Denmark	5,8	55.220	68,3	89,8	63,5	86,5	89,0	87,5	94,9	88,1	94,5	69,9	84,1
Sweden	10,1	52.590	66,7	84,4	62,0	88,9	78,3	88,5	94,0	98,4	97,7	75,8	84,1
Finland	5,5	44.580	59,4	82,2	50,7	86,8	88,3	89,8	98,6	99,4	97,8	72,8	84,0
Spain	46,6	27.180	50,1	85,9	28,7	87,8	82,6	87,6	73,5	73,5	72,9	64,3	72,5
Portugal	10,3	19.820	41,5	87,4	50,6	89,0	71,9	84,7	76,0	66,6	80,6	64,4	71,3
Italy	60,6	31.020	52,0	88,3	34,4	88,9	72,5	78,0	79,5	68,4	68,6	55,3	69,7
Greece	10,8	18.090	35,9	79,5	11,6	89,0	84,4	74,7	76,5	57,7	54,4	47,2	63,8

In particular, it is noted that the gaps are mostly at the level of: Income, Employment, Education, Equality.

5. Welfare Policies in Europe: a comparison between the Nordic and Mediterranean countries

In the previous chapter, the thought was stressed that the governments of the countries must not simply be spectators of market developments but must, when necessary, undertake policies and make decisions to improve the well-being of citizens. The objective of this chapter is to focus on the European area, in particular on the Nordic countries (Sweden, Finland, Denmark, Norway) and the Mediterranean countries (Italy, Spain, Portugal, Greece) by comparing their respective policies trying to draw the conclusions concerning a greater functioning and a greater wealth and well-being of the

Nordic countries compared to the Mediterranean countries. The European model is characterized by the presence of a welfare state capable of guaranteeing high social protection and providing social rights and services to all citizens. In Europe, Welfare policies tend to have very similar general characteristics among countries, however, some social models seem to be more developed than others. The Nordic model seems to be able to guarantee higher levels of social equality, in other words it possesses levels of social expenditure such as to obtain a greater reduction of poverty. It also ensures greater social protection, with particular attention to the labor market; it is no coincidence that high employment rates are observed in the Nordic model countries and unemployment rates are relatively low. The Mediterranean model, on the other hand, appears to be less developed than the Nordic model in terms of social assistance and labor market policies. The focus will therefore be to find an answer to the following question: can public spending (the Government), intervening within the economic system, bring benefits in terms of growth and development?

In other words, can one act and invest in the development of a country while promoting growth at the same time?

5.1 Comparison between welfare systems

Before comparing the countries, it is appropriate to provide a clear and rigorous definition of what is meant by welfare. The welfare state is the term with which we indicate a political, economic and social system in which the state assumes as its prerogative and responsibility the promotion of security and social and economic well-being of citizens. Among the many definitions, we remember that of the political scientist Ferrera M., according to which the welfare state includes all the public policies connected to the modernization process, through which the state provides its citizens with protection against predetermined risks and needs, in the form assistance, insurance or social security, introducing specific social rights and financial contribution duties. (Ferrera 2006)

These interventions give rise to specific social rights which correspond to as many duties in terms of financial contribution. The welfare state must therefore be understood as an institution integrated in a complex system of interdependencies with other institutions. In fact, the state's ability to produce well-being does not depend only on political choices, but is closely linked to the economic sphere on which the quantity and quality of resources available to the population depend and on the way in which society and in particular primary social networks such as the family, the parental network, the local community to which they belong, contribute to guaranteeing safety and protection for their members. The overall well-being in a society is the product of the co-participation of the three state, family and market institutions. In the tradition of "social policy" studies, three methods of classification are recognized with respect to the models of social status. One of the first scholars who tried to highlight the structural differences between the welfare state models was the British Titmuss, whose classification focuses on the type of state intervention, on the role of the state in regulation as well as on the criteria for defining entitled. A second classification, however well known and widespread, is that of Esping Andersen, who in his analysis, understands welfare as a "historically defined construction", with the aim of structuring the social contract between state and citizens in market economy societies. . He considers "that the sum total of social well-being is a function of the way in which state, market and family inputs are combined". Esping Andersen understood the importance of considering regulatory principles as an analytical element capable of explaining the differences between the various welfare systems. The welfare state alone does not guarantee the full realization of social well-being in capitalist society, given that the market and the family also contribute to this goal. The set of relationships, existing in a country, between state, family and market - aimed at the "production" of social well-being - constitute what Esping Andersen defines as "welfare regime". In 1993, Ferrera made a very significant contribution by proposing a typology based on a qualitative dimension. Traditionally, the analysis of the different welfare systems was concentrated on the quantitative dimension of protection and therefore on the quantity of benefits, expenses and beneficiaries. With the definition of "solidarity models", the Italian scholar proposes instead to answer the question related to "who is protected", rather than the traditional question related to "how much one protects". Within these models, it is possible to distinguish four types, inspired by different objectives and criteria. It is therefore clear that in Europe welfare systems have different characteristics within them, which reflect the different development of the various institutions and the different historical, political and economic experiences of individual European countries. The various systems differ from each other mainly with respect to the size and composition of public expenditure, institutional aspects, the types of services provided and the financing mechanisms envisaged. Social policies are classified on the basis of:

- Of the tools used

- Access rules

- The financing methods adopted

- Organizational-management structures

On the basis of these categorisations it is possible to identify some common points that the different systems have but at the same time the discordant factors.

5.1.1 Liberal welfare (UK, Ireland)

The liberal regime has as a priority the reduction of the spread of poverty and some phenomena including social exclusion. To achieve this goal, it adopts social assistance programs and subsidies, making their provision subject to verification of the means. Public social assistance programs are not universal in nature and state action is residual. The interventions are often categorical. The system is characterized by the prevalence of the market as the main risk socialization agency and by a low level of demercification. The methods of financing are mixed: health care, for example, is fully taxed (it is financed by taxes paid by citizens), while cash benefits are generally financed through social contributions (paid by businesses and workers).

5.1.2 Conservative welfare (Germany, Holland, France)

This regime is mainly oriented towards protecting workers and their families from risks: illness, disability, unemployment, old age. The model is inspired by the subsidiarity principle by laying the foundations in support of most of the procedures for the provision of services. This implies State intervention only in situations where the family's ability to provide for the needs of its members is lacking. Trade unions actively participate in the government of category benefits, thus maintaining greater autonomy in a system that is financed by social contributions. Demercification is average, as the state mitigates but does not cancel dependence on the market. Medium-low destratification is recognized for this model: there is a tendency to preserve the differences in status, class and gender.

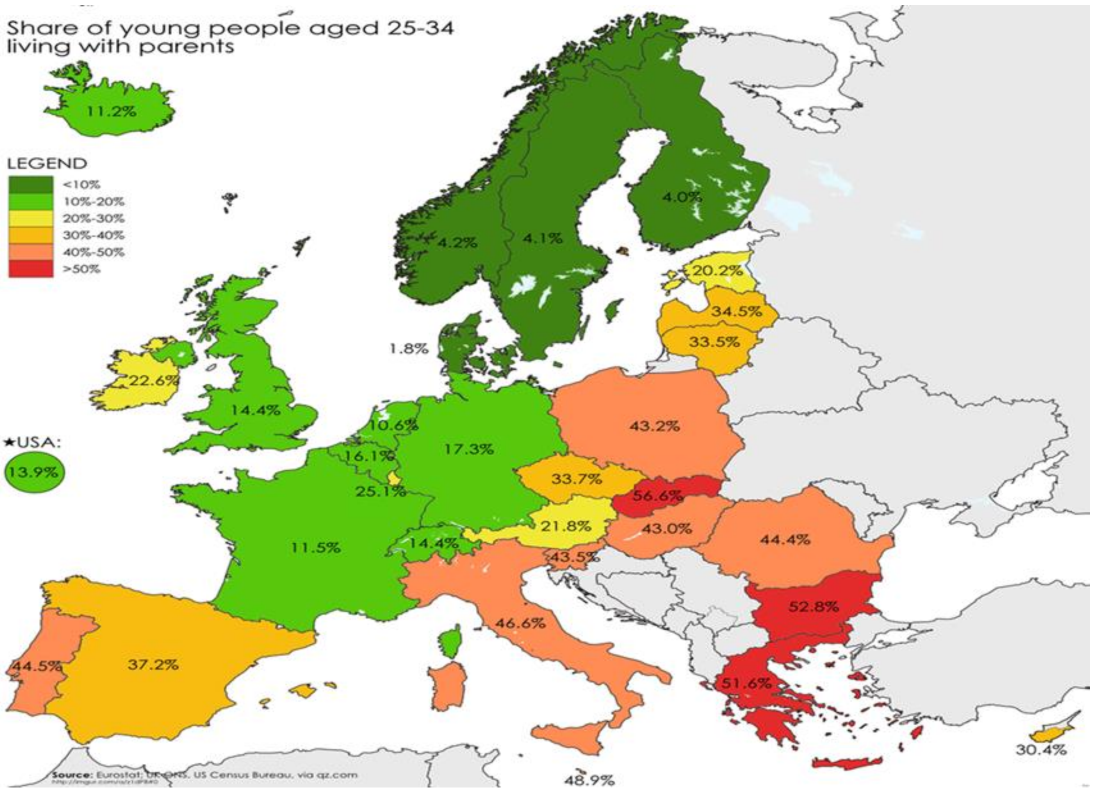
5.1.3 Social democratic welfare (Sweden, Denmark, Norway, Finland)

The social democratic regime adopts the principle of universalism as the main reference in the programming of social policies, with the aim of protecting everyone, indiscriminately, based on the individual's state of need. An element that distinguishes this regime from others is the active and often explicit effort to demercify well-being by minimizing dependence on the market. De-stratification is high as equality is recognized for all citizens.

5.1.4 Mediterranean welfare (Italy, Spain, Greece, Portugal)

In countries where a Mediterranean welfare regime is in force, we find a social and cultural structure that sees the family as a provider of care and assistance to its members. The role that the "family" institution plays within the life of a citizen of Mediterranean Europe is well known. In particular, in Italy, traditionally there is a strong attachment to the family; at the emotional level but also at the level of economic dependence, young Italians are among the most connected to the family unit. This is confirmed by the Eurostat data for the year 2018 which reveal: one young Italian out of two, between 25 and 34 years of age (age in which even those who have embarked on a university course should have completed it and start working), live at home with parents. The European average amounts to 30% (therefore 20% less than Italy), while in the Nordic countries the trend is completely different only 1.8% in Denmark, 4% in Finland, 4.2% in Norway, 4 , 1% in Sweden. As for the other "Mediterranean countries", the situation does not seem to be different (37.2% in Spain, 44.5% in Portugal, 51.6% in Greece). Certainly attachment to the family is a not negligible factor, but in the light of data so different between Nordic and Mediterranean countries, the different welfare policies play a decisive role. In other words, in the Nordic countries the conditions for going to live alone are much more favorable.

Figure 5.1: Share of young people aged 25-34 living with parents



Source: reddit.com

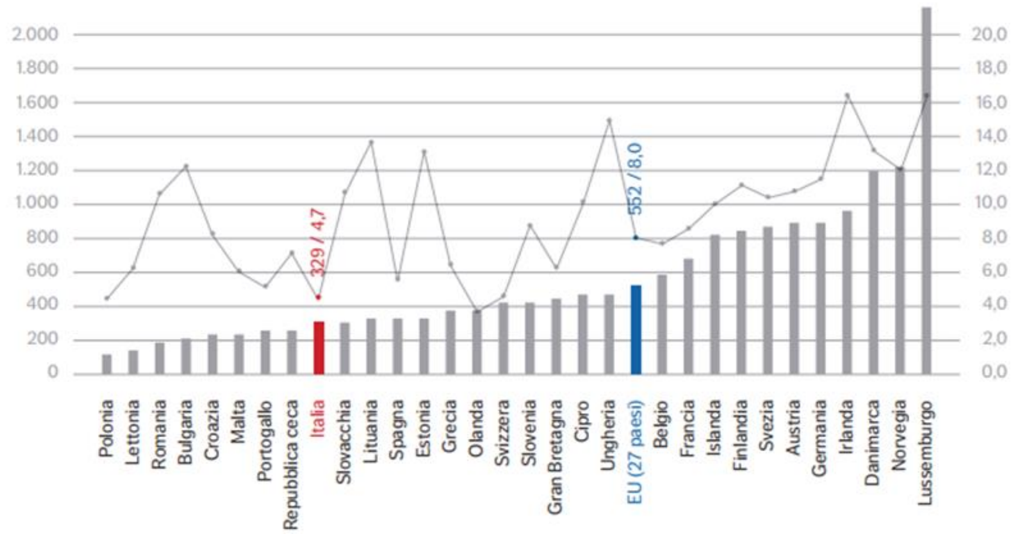
The state therefore seems to assume a "marginal" role, acting according to the principles of "passive subsidiarity", whereby the regulatory role of primary social networks is socially and legally recognized, without the state actively supporting them with subsidies or monetary transfers. The public intervention is therefore mainly residual and the welfare state protection mechanisms are activated only after the failure or impossibility of the primary social networks in providing assistance to individuals in a manifest condition of need. This causes a delay in creating a basic safety net. Demercification is unbalanced, high for some categories and low for others. In this model we observe a low de-stratification, which presents new transversal differences to the structure of the social classes.

5.2 Social spending in Europe: Analysis of Italy and Nordic and Mediterranean countries

The "Welfare State" essay written by Vogliotti S. and Vattai S. offers numerous ideas regarding the distribution of social spending at European level, focusing in particular on Italy. In Europe there are many models of social status, which also differ very markedly with respect to the social needs covered, the risks that are considered worthy of protection, the forms of provision of benefits (in cash or in services) and for many others features. "Social protection" is one of the cornerstones of the so-called European social system model which aims to bring about 20 million people out of a situation of poverty and social exclusion by the end of this year. As mentioned before, social protection systems are very different in the various EU member countries, in terms of history, demography, socio-economic conditions, level and composition of spending and for a whole series of institutional conditions. Social protection expenses have a strong value because they play a redistributive role throughout the life cycle (up to pensions) and for various levels of income. They also have a preventive role, in insuring individuals (for example, with commissions in the event of unemployment or checks for childcare, in the case of health with costs for medical treatment, illness and disability). On average in Europe 29% of GDP is destined for social spending, Italy ranks just above the average with 29.9%. Pension expenditure in Italy represents the largest item because it spends 15% of GDP against 11% of the European average. The causes can be attributed to a high number of elderly people as the percentage of people over 65 is 20.2% against the European average of 17.4%.

If instead we consider health expenditure, we see that Italy has health expenditure equal to 25.6% of total social expenditure, the European average is 29.4%. All the Scandinavian countries are above the European average. In terms of family and children, i.e. contributions in terms of money and / or services for families (e.g. family allowances), Italy spends 4.7% of social expenditure on the family with an average pro- per capita of € 329 against a European average of € 552. Together with Italy are all the other countries in the Mediterranean area (Portugal 263 €, Greece 388 €, Spain 350 €). Above the European average, however, we find all the Nordic countries.

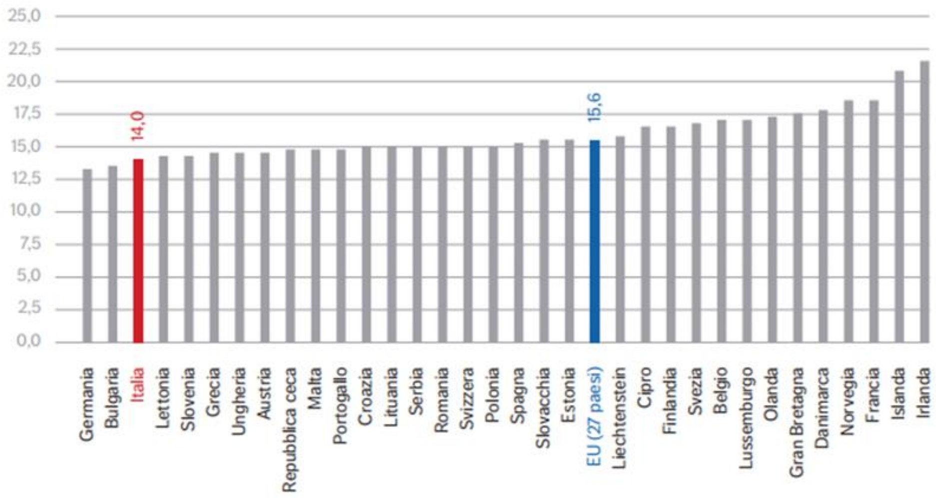
Figure 5.2: Expenditure on family and children in some European countries - Year: 2010



Source: Eurostat

To read these data, the average age of the population must also be taken into account, as in the case of pensions. It is clear that a "young" country has an expenditure destined for the family and children older than an old country ". The following chart provides a representation of the percentage of people aged 0-14 years in relation to the total population.

Figure 5.3: Share of population 0-14 years out of the total population, % - Year: 2010



Source: Eurostat

How much is spent on unemployment instead?

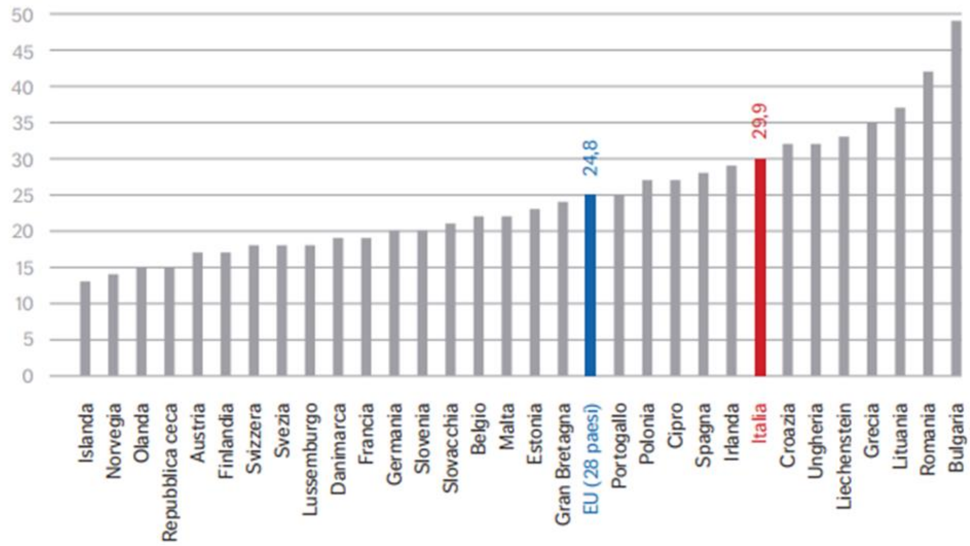
Even on unemployment, the authors are very clear and comprehensive; on average, € 415 per capita is spent in Europe. Italy with 206 € is in the lowest positions in the ranking. Above average the Nordic countries are found; in this case too, social spending for young and working-age people is higher in the Nordic countries. Also with regard to "social exclusion and disability", although Italy is positioned close to the European average of € 550 per capita, the Nordic countries occupy the top positions exceeding € 1000 per capita.

It is interesting to know how the recipients of these policies are identified. The countries that aim to evaluate the economic and financial situation through a "means test" are mainly the Mediterranean ones, while the Nordic countries instead provide the same benefits without "means tests", starting from the principle of citizenship, with generous and fixed-rate benefits. This can be considered a not indifferent indicator regarding the level of economic growth of a country because if it gives social benefits to all its inhabitants it means that it is very strong economically. In conclusion, the authors provide a distinction on the extent of these "social benefits": money or goods and services. In Europe, on average, the percentage is 35.4% of goods and services, while the remaining 64.4% of the services are provided in the form of money. Italy tends to provide social assistance in monetary terms (73% money 27% goods and services) while instead all Scandinavian countries exceed the 37% share of goods and services. (Vogliotti S. and Vattai S. 2014)

5.3 Effectiveness of welfare policies: risk of social exclusion in Europe

The concept of "risk of poverty or social exclusion" adopted in the community context refers to people who are in at least one of the following three conditions: monetary poverty, severe material deprivation, low-labor family. The first indicator (monetary poverty) is used to identify people at risk of monetary poverty, therefore it represents a measure of relative poverty. Whatever the level of the median national income, there will always be a share of the population that lives below this threshold just because of how the indicator is constructed. But this also implies that if the absolute level of national income changes due to a general impoverishment (as has happened in many countries of the European Union in the last five years) the absolute level of poverty tends to increase. The indicators "severe monetary deprivation" and "low labor-intensive family" are complementary and capture other aspects of the phenomenon, on the one hand the material deprivation of families, who are unable to pay current expenses and mortgage or rent , and on the other hand families who find themselves with underemployed or unemployed people, so compared to the work that the family could potentially do, it does not reach 20%. It is possible that some families find themselves in two if not three of these difficult situations at the same time. The graph shows how on average the risk of poverty or social exclusion affects almost 25% of the population. In Italy this risk is higher and is around 29.9%. In other words, three out of ten Italians are at risk of poverty and social exclusion. It is also noted that all the Mediterranean countries (Spain, Portugal and Greece) are above the value of the European average, while the Nordic countries are all below this threshold.

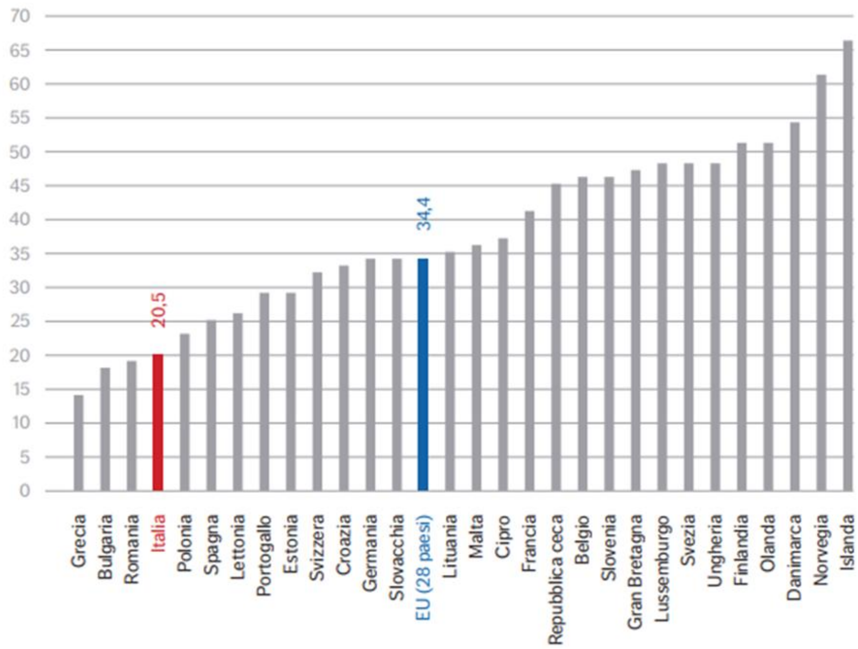
Figure 5.4 Social exclusion rate "At-risk-of poverty" in Europe, % - Year 2012



Source: Eurostrat

This indicator can be calculated before and after social transfers: in doing so, the generosity and effectiveness of public intervention is assessed, which represents a method for verifying whether the specific objective of these policies - i.e. reducing the risk for the weaker groups of the population - is achieved and to what extent. To do this, the risk indicators of poverty before and after social transfers can be compared: the difference measures the impact of social policies on reducing the risk of poverty. The following chart illustrates the situation after social assistance has been paid, i.e. the amount of people who manage to get out of this unfavorable situation.

Figure 5.5: Share of population leaving from the risk of poverty following social transfers, % - Year 2012



Source: Eurostat

In summary, what can be said is this: social transfers have more effect in the Nordic countries than in the Mediterranean countries since more people manage to get out of the situation of poverty and social exclusion.

Table 5.6: Effectiveness of social transfers compared to reducing the risk of poverty – Year: 2012

Country	Before transfers,%	After transfers, %	Risk reduction (%)
Greece	26,8	23,1	3,7
Italy	24,4	19,4	5
Portugal	25,2	17,9	7,3
Spain	29,6	22,2	7,4
EU-28	25,9	17	8,9
Sweden	27,3	14,2	13,1
Finland	26,9	13,2	13,1
Denmark	28,3	13,1	15,2
Norway	25,9	10,1	15,8

Source: Eurostat

Although Italy has a high social protection expenditure, it has emerged through some statistical surveys (based on interviews) that citizens are not very satisfied and evaluate it in a negative way. Vogliotti S. and Vattai S [2014] affirm that the Italian welfare is not very fair in the perception of citizens and therefore this lack of trust subsequently affects the payment of taxes and contributions. Italy is in fact one of the countries with the highest taxation but at the same time with the greatest tax evasion. In other words, citizens find themselves paying large sums to the state but are dissatisfied. In conclusion, social spending in Italy, although in line with the EU average, highlights three problems. The first problem concerns the destination of the funds which are mainly destined for older people (pensions) and not for families and young people who belong to that category of people of productive age and who can bring added value to the country. In addition, this state aid is mostly paid out in cash and not in goods and services. This second aspect is also relevant because for example there is a substantial difference in giving a € 300 allowance to a family compared to guaranteeing free school books or free university enrollment. In the first case, the € 300 could be destined for other purposes while in the second one is certain of the purpose of this state aid. Finally, the low percentage of people who improve their living conditions as a result of state aid is the demonstration that the policies implemented in the Nordic countries must be taken as a reference by the Mediterranean countries.

5.4 Social mobility: achieving economic growth through economic development

Up to now, there has been talk of growth and development in terms of the community and at a macroeconomic level. At the microeconomic level, if one focuses on the individual, equally important and relevant ideas and conclusions can be obtained. In this regard, an interesting reflection was made in 2011 by the Norwegian sociologist Harald Eia, who started his speech with the question:

"Where in the world is easiest to get Rich?"

His reasoning began by defining the concept of "rich", because if "poor" means a person who lives on less than $ 2 a day, the "rich" also needs to be defined clearly and rigorously. People who earn at least $ 30 million a year are considered rich. Eia shows two tables concerning the amount of rich people by country: the first in absolute terms, the second in relation to the number of inhabitants. In the first table shown by the sociologist to the public, the ranking was as follows: 1. USA, 2. JAPAN, 3. GERMANY, 4.UK, 5. CHINA. Subsequently he showed the second table, always concerning the number of rich people present in a country, but this time related to the number of inhabitants. The rankings had changed radically: 1. NORWAY, 2. SWEDEN, 3.NEW ZELAND, 4. CANADA, 5. DENMARK.

In per capita terms, the data once again showed a sort of superiority on the part of the Nordic countries. The sociologist Eia has motivated this great concentration of rich people in the Nordic countries in terms of "Social Mobility". Going deeper into this topic, concerning Social Mobility, you can see how it is the key factor that determines the development of a country and its long-term growth. Social Mobility is connected, as we will see, to all the indicators and development parameters mentioned in the previous chapter and in some ways, also to economic growth.

Before going to analyse the impact and relevance that Social Mobility has on the various countries, it is necessary to give a clear and rigorous definition. The German economist Scwab in "The Global Social Mobility Report 2020" describes today's scenario in these terms:

> *Globalization and the Fourth Industrial Revolution have generated great benefits to society, raising the living standards of billions and lifting millions out of poverty. But they have also exacerbated inequalities in our societies. Inequality is rising even in those countries that have experienced rapid growth. The social and economic consequences of inequality are profound and far-reaching: a growing sense of unfairness, precarity, perceived loss of identity and dignity, weakening social fabric, eroding trust in institutions, disenchantment with political processes, and an erosion of the social contract.* (Schwab 2020, p.4)

In short, Schwab argues that economic growth, particularly in countries where this phenomenon occurs rapidly, has the consequence of improving society's living conditions but also leads to different inequalities and inequalities in income. Indeed, if an economy grows, this growth is unlikely immediately from an equivalent level on the whole population; therefore, it is clear that in the short term there are inequalities and inequalities. These socio-economic inequalities between individuals, generated by strong and fast growth, can be eliminated through Social Mobility. Social Mobility basically means the hope that a young person can have to improve his starting economic situation. In other words, if a boy is born in a poor family, can he build a better future than his starting family situation? How much does being born into a poor family affect you? If you are born in a poor family, do you remain poor or can you improve your socio-economic condition? Social mobility refers to the movement of individuals either up or down the socioeconomic ladder relative to their current standing, such as a low-income family moving up to become a part of the middle class. This is the concept of Social Mobility: can a person born in a low-income family have the same ambitions and opportunities as a person born in a high-income family?

"Empirically, in countries with high levels of relative income mobility, there is still an advantage to being born into a high-income family; however, its impact on children's future income is relatively small. In Denmark or Finland, for example, if one's parent earns 100% more than another, it is estimated that the impact on a child's future income is around 15%, compared to about 50% in the United States." (The Global Social Mobility Report 2020, p.9) This statement highlights the efficiency of the political-economic system of the Nordic countries in terms of Social Mobility compared to a system based on pure capitalism such as that of the USA, within which all goods and services are paid and therefore are social inequalities are much higher. It is interesting to compare this factor between the Nordic and Mediterranean countries because it can give a further explanation regarding the greater development of the former compared to the latter. The figure 5.7 shows a partial ranking of the "the Global Social Mobility Index", examining the Nordic and Mediterranean countries.

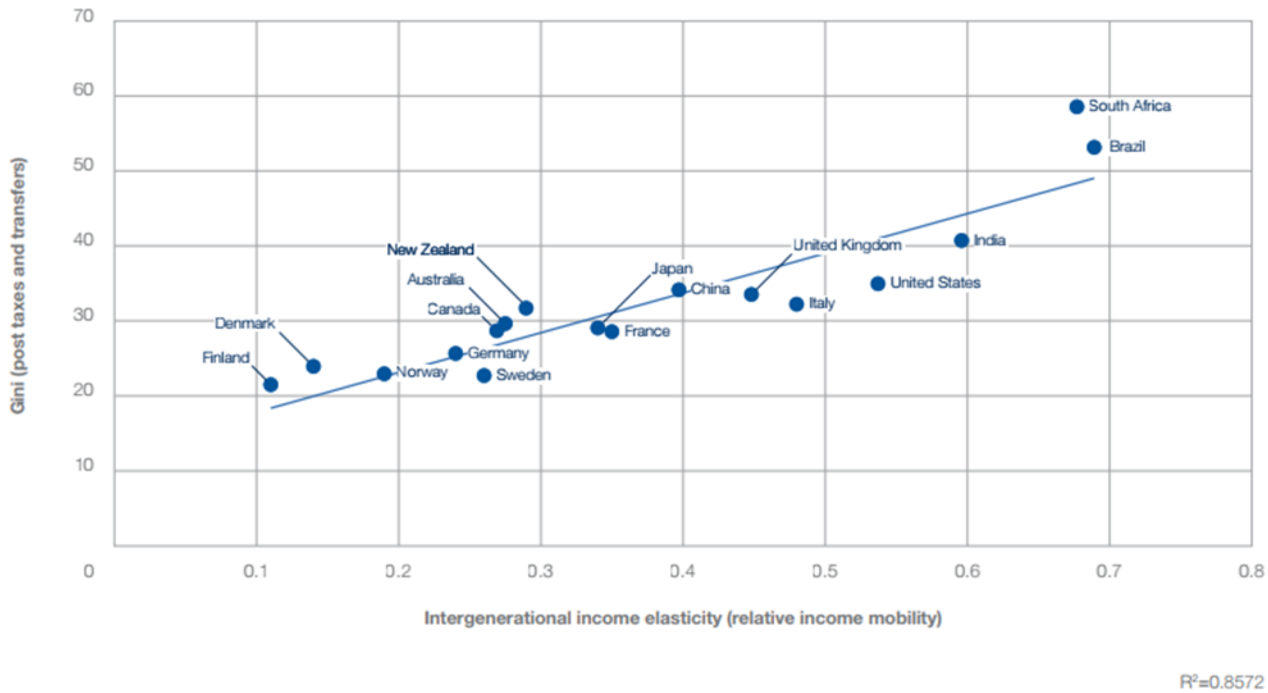
Table 5.7: The Global Social Mobility Index Rankings (Nordic and Mediterranean Countries) – year 2020

The Global Social Mobility Index 2020 rankings		
Rank	Country	Score
1	Denmark	85,2
2	Norway	83,6
3	Finland	83,6
4	Sweden	83,5
24	Portugal	72
28	Spain	70
34	Italy	67
48	Greece	59,8

Source: World Economic Forum

It can be seen that on a global level, the Nordic countries hold the top four positions while the Mediterranean countries appear about twenty positions later. Social Mobility directly affects income inequalities, as poor families in the Nordic countries take an average of two generations to get an income that falls within the average of the country. In the Mediterranean countries, on the other hand, it takes three or four generations for a poor family to reach an average income. "The Great Gatsby Curve" shows the correlation between Social Mobility and the low Gini coefficient (indicating a low rate of income disparity).

Figure 5.8: The Great Gatsby Curve 2020 - year 2020

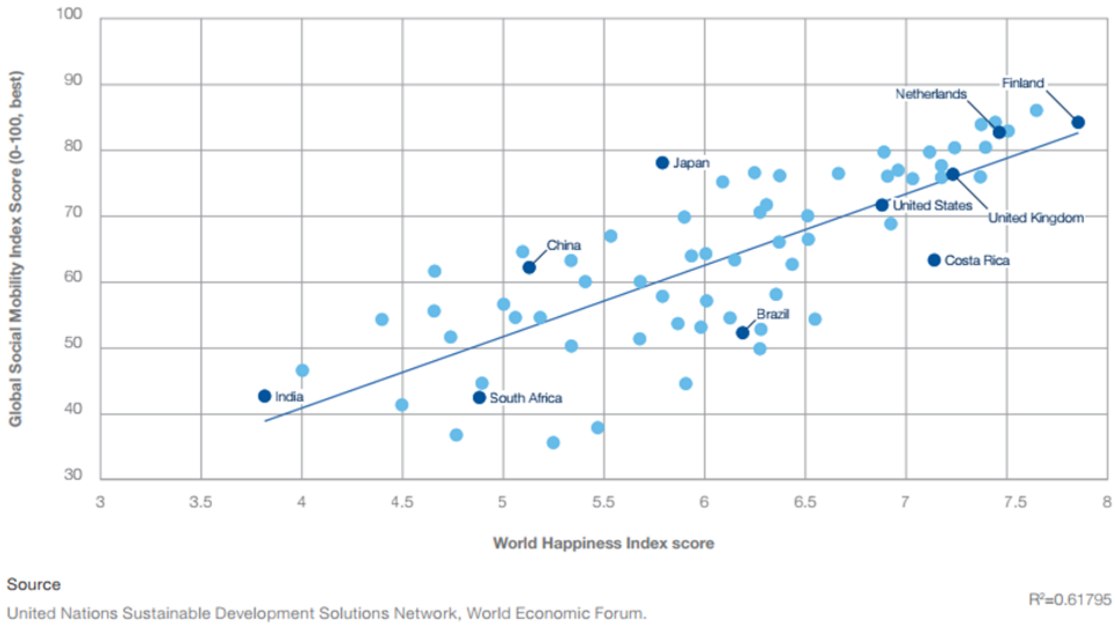


Source: World Bank

In addition to being visible graphically, the correlation is found by observing the coefficient R^2 . This coefficient, called the determination coefficient, measures how much the independent variable X (in this case the Social Mobility rate) influences the dependent variable Y (in this case the Gini coefficient) and can take values between 0 and 1. approaches the value 1, the more correlation there is between the two variables. In this case, being $R^2 = 0.8572$, it means that the more social mobility, the less inequality of income there is.

Another factor to which Social Mobility is linked is happiness and life satisfaction, as we can see from the figure:

Figure 5.9: Social Mobility and Happiness - year 2020



Also in this case, the figure shows a good correlation between the two variables: Social Mobility and Happiness. The R^2 coefficient = 0.61795 is in fact closer to 1 than to 0. It should also be remembered that often (as seen in Figure 4.13) the happiest countries are also with a higher per capita income. A sort of "virtuous circle" begins to take shape. At this point, it is good to go and define the pillars on which Social Mobility is based, in other words what are the factors that favor it. According to the "The Global Social Mobility Report", Social Mobility is based on 10 pillars:

Figure 5.10: Social Mobility Indicators

Once these pillars and factors closely related to Social Mobility have been determined, it will be easier for governments and companies to implement the right policies to support and improve it.

The health pillar measures a country's ability to provide quality health care for its population. Access to quality healthcare is a crucial factor that has a permanent impact on the ability to experience Social Mobility. Health inequalities are a factor that can have a direct impact on the ability to access employment. For example, in the USA, where healthcare is almost entirely privatized, the gap in life expectancy between the richest and poorest quantile is 15 years for men and 10 for women.

The pillar of education (Access, Quality and Equity, Lifelong Learning) measures a country's ability to give access to education and ensures that high-quality education is available to all its citizens, regardless of their socio-economic background. Strategies that encourage education and the development of human capital have been considered central factors that favor Social Mobility. In particular, it is essential to start from a solid and effective primary education which aims to discourage early school leaving, ending with a valid and free tertiary education. Education is also important for training high skilled workers, who unlike low skilled workers would be more difficult to replace by machinery in the future and therefore the employment rate remains at good levels. The pillars related to work are also of fundamental importance for ensuring Social Mobility, in particular it is essential that all citizens regardless of whether male or female, white or black have the same opportunities for access to job positions and the same wage equity . It can be said that the pillars inherent in work are the continuation of those inherent in education. In other words, after giving the opportunity to access education, it is good to make sure that the qualities acquired are optimized and fully exploited in the job market. The last two pillars of Social Protection and Inclusive Institution, inherent to the government, are important because it is thanks to them if the redistributive policies work and therefore also thanks to them citizens can have the same possibilities and the same accessibility to services. The following table shows the per capita GDP and the scores for the 10 pillars (from 0 to 100) achieved in the year 2020 by the Nordic Mediterranean countries:

Table 5.11: Performance Overview (Nordic and Mediterranean Countries) – Year 2020

Performance Overview 2020 (Nordic and Mediterranean Countries)								
	Denmark	Norway	Sweden	Finland	Italy	Portugal	Spain	Greece
Overall Score	85	84	84	84	67	72	70	60
Health	90	91	92	90	90	87	90	86
Education Access	85	87	85	82	68	69	72	60
Ed. Qualitu and Equity	86	85	87	84	79	77	74	75
Lifelong Learning	75	74	78	78	40	60	57	42
Technology Access	94	90	92	89	77	79	83	77
Work Opportunities	82	84	75	70	61	74	50	37
Fair Wage Distribution	81	77	74	85	65	50	60	61
Working Conditions	83	79	84	82	71	70	71	43
Social Protection	90	82	82	88	58	74	74	58
Inclusive institutions	86	87	86	88	64	81	70	61
GDP per capita	60,692.4 $	81,694.6 $	53,873.4 $	49,845.0 $	34,260.3 $	23,186.3 $	30,697.3 $	20,407.9 $

Source: Social Mobility Index 2020 Edition

The data show that excluding the "health" factor, between the two groups of countries, there is a significant gap on all the other pillars: Education, Work, Social policies. This gap affects the GDP per capita, which is much higher in the Nordic countries than in the Mediterranean ones; suffice it to note that between the lowest of the Nordics (Finland) and the highest of the Mediterranean (Italy) the difference is about $ 15,000.

In conclusion, the Global Social Mobility Report shows the virtuous circle that would be created by improving the score of these 10 pillars. Investing and implementing these 10 pillars would mean improving Social Mobility, which is closely related to long-term economic growth and, as we have seen in previous chapters, to a whole series of factors that contribute to the development of a country: life satisfacrion, wealth distribution. The Nordic countries, which first looked not only at profit and economic growth in the short term, but also at equity, social inclusion and sustainability, have shown that it is possible to promote the development of a country both from the point of view purely economic than from a social point of view.

6. Conclusions

In conclusion, this work went to touch on different issues and to analyze different factors inherent in the growth and development of a country. The concepts of growth and development are different but particularly connected to each other. Starting from economic growth, it was found that it does not derive from a shock of exogenous factors but from a series of economic and social factors and policies. In particular, it has been seen that human capital had a significant impact on the improvement of technology available to a company and above all on the performance of workers; this impact can also be seen in terms of economic growth. However, the growth factor alone is not enough to define the economic and social situation of a country; in addition to per capita GDP, there are many other factors that help to establish the degree of development of a country. GDP per capita only measures well-being in material terms, leaving out a whole series of other factors which together reveal whether one country is more or less developed than another. So, as has been shown by the data, if you have growth it is not obvious that at the same time you have development. On the contrary, however, a targeted analysis of the countries of Northern Europe (Norway, Sweden, Finland, Denmark), as opposed to the countries of the Mediterranean part of Europe, revealed that if the factors inherent in economic development are improved, consequently there is also solid and sustainable long-term economic growth. Through an excellent welfare system and above all through investments on factors that make up what is a person's human capital (health and education), brilliant results can be achieved. This goes in part against the principles of mainstream economic science, which aims to maximize the usefulness of the economic agent, leading him to make selfish choices. Taking the Nordic countries as an example, this individualistic view of the economic agent seems to be lacking by virtue of a great collaboration between economic agents. Citizens, satisfied with the current welfare system, are inclined to pay taxes as they know they will return them as goods and services. The government in turn invests in such a way as to guarantee equity among citizens and eliminate any type of social disparity. Finally, small and large companies undertake to pursue a sort of social responsibility (as well as simple profit). In short, investing in education and social protection is not a non-repayable investment but a means of pursuing solid and sustainable economic growth over time.

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