Nobel Growth: Understanding 2025's Economics Nobel

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Abstract:

This year's [2025] Economics Nobel is provided for finding out the cause of innovation-destructive creation of new ideas. It is also highly individualistic. First, it neglects the welfare of those who lose the race and are destroyed. Can they assimilate this new knowledge and how? If not, then… Second, it neglects the very quality of creative destruction. In a capitalist society as Harrai (2014) argues innovation is always profit motivated. The discoverer of ORS, the simple thing that saved lives of million during dysentery is not recognized. Innovation of vaccine against malaria and dengue are still on a very primitive stage. Development of learning techniques that help first generation learners have taken a back seat to the hype in Artificial Intelligence.

The idea of creative destruction is appropriate to understand the evolution of the new world through a serious of continuous innovation and creation of new techniques, replacing the old ones. However, still there remain some broader aspects which the so-called growth theorists miss out. Yuval Noah Harari tries to point out some of the areas uncharted by the growth theorists. But, the ultimate vision of growth, as provided in the Mahayana doctrine is to lift all in a great vehicle.

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Jel Classification: O31, O33, O40, N13, E22, B51

1. Introduction

Growth is always an important issue in Economics. It transcends the boundary of economics to politics, social science, philosophy and even to the talks of common man in the markets and their offices. Many political parties claim their votes on the argument that they have fostered growth. The opposition parties criticize the ruling government for not having sponsored growth or stifling it. GDP or GDP growth has almost become a magic word touching our emotions as much as a red rose touches the emotions of a lover. It is very dicey and attractive to the extent of being sensually alluring to many of us. This attraction is so much that the Nobel Committee cannot but be free from it. This is probably the fourth Nobel Prize in growth theory. The first was bestowed to Simon Kuznets who got the Nobel in 1971. Robert Solow grabbed it in 1987, which was followed by Paul Romer in 2018. Numerous other Nobel-winning economists, who earned their Nobel in other fields in economics, made a strong contribution to the growth theory also. In this line we find the great Kenneth Joseph Arrow (1962 'learning-by-doing') and Robert Lucas (2002 'Lectures on Economic Growth'), to name only a few. In order to understand the contribution of 2025 Nobel Prize winners - Joel Mokyr, Philippe Aghion and Peter Howitt - in the growth theory, we have to look into this long tradition.

The paper is divided into four sections. Section 2 touches the earlier contributions. Section 3 concentrates on the 2025 Nobel laureates' work. The section 4 deals with the growth picture in the long run in the light of Harari and section 5 concludes.

2. A Brief Review of the History of Growth

Thinkers from the very ancient times were concerned about growth. However, it was the mercantilists who first ventured into finding out the reasons that can make a nation rich. The mercantilists argued that acquisition of bullion was a sure way of growth. This was appropriated through export surplus. Working in the arena of emerging merchant capitalism and the flow of gold and precious metals from America, the mercantilists naturally argued for state monitoring of the process so as to maximize growth.

The physiocrats tend to deny the over importance of bullion. They emphasized on economic activity and its expansion as the natural cause of nation's welfare. François Quesnay, the French economist and intellectual leader of the physiocrats, was first to give an idea of national income accounting through his Tableau economique (1758). Unfortunately however the physiocrats emphasized only on agriculture as a potential source of output generation. They neglected industry, relegating it to a supplier of luxury items to a few which do not add to the society's output. Again their ideas should be understood in the context of Europe and the pre-modern world where most of the artisans lived by supplying crafts and other materials to the aristocrats and the rich classes. Demand of the people was very meager and it contributed a very small portion of the national output.

In his epochal work 'An Inquiry into the Nature and Causes of the Wealth of Nations' Adam Smith (1776) corroborates the ideas of physiocrats by including all types of economic activities as the source of economic growth and welfare. Adam Smith argued that the growth of a country depends on the expansion of the economic possibilities for its citizens and not bullion acquisition. In fact, he was against the state protectionism advocated by the mercantilists. He also attacked the physiocrats by arguing that agriculture is not a very advance sector pointing out to the metayage system in France and the consequent controversy of tenancy inefficiency that plagued it [1]. According to Adam Smith, capital accumulation and production is a sure way of achieving growth. According to Smith, just an acquisition of property by the private party will lead to an expansion of output from an old primitive stage [2].

Next came David Ricardo who also advocated the capital accumulation process. But in his view this process cannot go on infinitely. The reason that he stated is that there is an inherent tendency of profit share to fall as accumulation rises. In the recent years, Barkai (1967) has demonstrated this beautifully. In the Ricardo's work workers are paid a fixed wage in accordance to their subsistence level. The rentiers get the rent just because of their private ownership of land [3].

The classical economists thus posited a stationery state, where after initial growth there is a stalemate. The incentive to growth dies down and the per capita income though lying at a higher level remains stagnant. This comes from their dependence on the law of diminishing marginal productivity of land as postulated by Ricardo (1817). Land being fixed in supply cannot sustain unlimited growth. For them it would not be possible to produce infinite amount of output from a finite amount of land.

It was Solow (1957) who took up the issue of growth. However, this arose not in vacuum. It was WW Rostow (1960) who first posited a non-communist manifesto (by stating the stages of growth and ultimately its movement movement to a high consumption society). Rostow's (1960) idea stirred the otherwise placid economic world on the impact of growth. There was a lot of debate (In the conference organized by the International Economic Association held at Konstanz in September 1960) in this regard. In the conference, it was Solow who lamented on the lack of quantitative evidence to formulate a rigorous theory of growth. To the credit of Rostow's idea, though interesting but was not suiting the

newly arrived love of Mathematics that was growing in Economics with the advent of a number of first-hand mathematicians into this field after the Second World War.

In the meanwhile, Simon Kuznets (1966) has written an excellent summary of the main features of modern economic growth (Modern Economic Growth: Rate, Structure, and Spread, 1966). In this work, he summarized the main quantitative and qualitative features that accompany modern economic growth. Among the qualitative features he emphasized on the structural changes in occupation, in the residence (rural and urban), in the type of jobs and in the nature of the commodities consumed. He also documented some changes in the organizational set up of business such as the rise of the joint stock company, the importance of finance and so on. Alongside with it, he also stated the political changes, the rise of nationalism and nation state, invoking of common law and the equality before law and other features. Many international aspects were also traced by him. These included the changes in the international trade, transactions and reformulation of relation between nations. He was awarded the Nobel Prize for this in 1971. Kuznets also documented some quantitative changes.

It was however Nicholas Kaldor (1961) who first postulated some stylized facts of growth, taking a lesson from the US economy. These included the constant share of labour in the national income, a constancy of the long run rate of interest and a persistent rise in per capita income. These formulations aided the mathematical economists who have been trying to mathematize the growth experience. The constancy of labour and capital share ultimately transpired into the famous Cobb-Douglas production function. The constancy of rate of interest transpired into the formulation with a stable factor price of capital and labour. It is the stability in prices that can explain much of the growth theory devoid of the demand consideration.

It was Harrod (1939) and Domar [4] (1946) who first formulated the growth theory but from a Keynesian perspective. They emphasized the importance of demand and the problem to long-run growth when demand is not met. They have shown that the economy is in equilibrium when the warranted growth, the natural growth and the actual growth are same. The warranted growth is the ratio of saving propensity and the income co-efficient to the change in investment as indexed by the accelerator. The natural growth is the growth of population. The actual growth is the actual change in income. In the Harrod-Domar model there is no reason why they should be equal. The warranted growth depends on two different factors – the consumers' decision to save and the technical factors that led income to investment. The natural rate depends on demographic factors. The actual rate is what that is observed and is often perturbed by short-run fluctuations.

In the neo-classical growth model developed by Solow (1956) and Swan (1956), all these problems are put into a nice black-box. The natural rate is assumed to be constant. Since there is no demand problem, the adjustment of warranted rate to natural rate is manipulated by constant substitution of labour to capital, as mitigated by the constancy of the factor ratio. In the Solow model of capital accumulation, the per capita income grows but grows for a while. This is because of the diminishing return to capital which paves the way of further growth. This diminishing return arises because of the limited size of firms that use the capital. In Solow's steady state, the growth of per capita income is zero, though may be at a heightened level. Any changes in the technology or saving propensity brings about only a short-run change in the level of per capita income, but in the long run it brings no growth. Also the negativity of the return to capital ensures the so-called convergence where the low growth countries will catch up the high growth countries. Numerous empirical exercises were also conducted to test this.

The Nobel was awarded to Solow in 1987 for his contributions to the growth theory. This Nobel was a balanced injustice to Prof Trevor Swan who independently built the growth model from Australia. Some argue that Swan used the Cobb-Douglas function, while Solow used a more general function.

The argument carries no weight since the assumptions of Solow model and the properties of Cobb-Douglas function are identical to any homogeneous production function with unitary elasticity of substitution. This makes the so-called Solow general production function practically a Cobb-Douglas one. This asymmetry in awarding the prize is a reflection of American chauvinism and an inclination towards the other side of the Atlantic neglecting the others.

The anomalies of Solow growth model were soon deciphered. The absolute convergence that he stated was soon found to be insufficient. Though initially Baumol (1986) provided an empirical support for it, it was later proved to be a result of mismatch database that concentrated only on the OECD and developed countries. Extending the database, it has been demonstrated by DeLong (1988) that no such convergence exists. Lucas (1990) argued that capital never flew from rich to poor countries, cities began to grow and never became diluted to countryside, and concentration of wealth and power was on the increase. Clearly there was some basic limitation of this model. It is Karl Marx (1867), who gave a hint to it in Capital — A Critique of Political Economy. Solow and Swan did a great mistake in treating capital as a stock of goods used in production like other inputs. Marx realized that capital is not a commodity but it is the very structure of the economy that renders it something as capital (commodities, ideas, any other tangible or intangible objects etc). In the mainstream, the idea was first put by Arrow (1962). He made a major contribution in arguing that capital is not only an input but a catalyst in the expansion of human knowledge. This he termed as 'learning by doing'. When fire first came, it probably came as an antidote against wild animals. However with the use of fire, Man learnt many things. He learnt to cook, to draw paintings in the dark of the caves and finally the study of metallurgy changed civilization. Similarly, in the modern age, computer first came as a substitute to type-writing. But it is now a major companion in the search of knowledge, and in many day to day activities including the commerce and business. If we treat the second aspect of capital, then the diminishing returns to capital pales into insignificance. However, a problem rises here. Romer (1986) first noted it. The problem is that capital cannot be treated as a stock of commodities that can be used in production but as an accumulation of knowledge which is embedded in the new goods. Romer (1986) made a true revolutionary contribution. He removed the concept of capital as a good and made it a piling up of intermediary goods that is expanding human capacity. Secondly, he blasted the neo-classical theory of production by removing the distinction between input and output. Same capital which is coming as output is also used as input. It is more true for human capital, a term used by Theodore Schultz (1971) and Gary Becker (1964), both of them received the coveted Nobel prize [5].

According to Lucas (2002), the industrial revolution is marked not by big machines but a shift in the households' preference to their children's future. This idea is again taken from The Communist Manifesto of Marx and Angels (1848). [6] In the past, for an elite few, the prospect of good fortune of their children was imminent. This can be true from the old 5000 year ago Egyptian papyrus where a father is advising his son to take appropriate profession. This was however limited only among the elite classes. This 'elite capture' had been seen as a form of mental superiority of the elites. This is true of the slave owners of Greece and Rome, nobles of China, Persia and Egypt and the high castes of ancient India, elites in Mesoamerica and so on. Thus Nomit Arora (2007) quipped about the persons who did the manual jobs for the students and scholars in the ancient University of Nalanda - who shaved their hairs,

who washed their clothes, who cooked for them and who washed their utensils and who cleared their premises. Without the help of these people, the University of Nalanda could not have prospered. There is very scanty evidence of any 'low-born' having been admitted either as a student or as a scholar in the University of Nalanda, despite the fact that Buddhism appealed as an egalitarian religion. The situation was same in the other parts of the world. In ancient Alexandria, only slave owners' sons got admission to the great museum. In the medieval The House of Wisdom of Baghdad (also known as the Grand Library of Baghdad), we rarely find slaves or their acquaintances being admitted. Women in most cases were kept out of this sphere. Women could not vote in Athens and could not participate in most of the educational institutions. The exception was perhaps India where the Buddhist nuns got permission to study in the Nalanda University and other Buddhist Viharas [7]. This means that a huge section of the population could not attain education. This also means that these families could never dare to think that their sons and daughters would acquire education and earn positively to improve their living. The development of knowledge was thus limited and often engulfed by darkness because the illiterate and deprived mass never saw these institutions as their own. Unfortunately, this view is still prevalent among the caste-ridden society in India. There is a popular Santhali song where the Santhal laments that why the God has created him as a Santhal and not a doctor or a school master. The song reflects the utter ignorance of the Santhal that a doctor or a teacher is not born but emerges through acquired knowledge. This is perhaps because they have been traditionally shut up from the hallowed world of knowledge.

Lucas (2018) argued that industrial revolution changed this outlook. Now even an ordinary man can think that his son or daughter could acquire knowledge and earn a respectable living. This change in the human attitude opened up the human ingenuity that was shut up in the social slumber. The expansion of this view of probable human development among a larger section of the populace created a huge impetus towards learning and knowledge. This was also responsible for the supply of human capital and also a continuous spurt of human endeavor that drives innovation, technology and growth. Thus the secret to growth is not capital accumulation, but a shift to the families' preferences that is closely associated with egalitarianism and democracy.

This new thinking ended up in the birth of new growth theory that essentially uses the concept of human creativity and endeavor into a rigorous structure. Thus the growth theory was saved from its rather mechanistic interpretation by Solow (1957) to a more creative arena.

Though the modern theory incorporates human creativity, it still neglects the huge socio-economic and cultural changes that are accompanied by and often foster modern economic growth. This neglect is quite significant since the Nobel Prize to Simon Kuznets (1966) is precisely because of the rich caricature of growth. In a sense, we can treat the modern growth theory, in spite of its mathematical brilliance, as a vagabond who is roaming in a big mansion that is called economic growth.

Last year Nobel winners – Daron Acemoglu, Simon Johnson and James Robinson – have turned their gaze to this factor. They argued and analyzed a host of institutional factors that sponsored modern economic growth. Without these institutional factors no human endeavor can lead to growth as we see today. Numerous instances in History proved it. Harari (2014) argued in his magnum opus Sapiens: A brief history of humankind that most of the development emerged from industrial revolution. Various things such gun powder, rocket, compass, salt came from China. Unfortunately, China could not herself utilize these resources. Similarly, the Indians created the decimal system but could not reap its advantages to

the fullest extent. It transpired to Europe via Arabia where it flourished into a new Mathematics that structure our life today. Coming to the more Western frontier, Hero of Alexendria has discovered the use of steam power around 60 AD. He used it as a play tool and opening and closing of temple doors. He never thought that it could be used for running machines and carrying passengers as George Stephenson or James Watt thought centuries later in Europe. Some say that chap availability of slave labour prevented Hero from a mass use of this machine. Thus institutional factors are important as argued by Daron Acemoglu, Simon Johnson and James Robinson (2001, 2004). Without that the growth theory becomes a mere theory of curiosity of quantitative gymnastics with little relevance in analyzing the problem of poor countries and providing a prescription.

3. This Year's Nobel: The Nobel in Technology & Creative Destruction

This year's Nobel is bestowed to the trios Joel Mokyr (1990, 2009), Philippe Aghion and Peter Howitt (1992, 1994). The emphasis of this year's Nobel is on the process on which technology is created and adopted by the society and is transmitted to growth. Their main endeavor is to deepen the analysis of new growth theories (Romer, 1986; Lucas 1990).

Aghion and Howitt (1992, 1994) have attempted to answer these questions. For this they have used the Schumpeterian (1934/1911) concept of creative destruction. This concept argues that when a new technology comes, old technology dies. Printing brought a death to calligraphy and handwriting art. Email brought a death of old tradition of letter writing. Automobile removed the horse carriages, gunpowder removed the past weapons. Examples can be plenty. When a new technology arrives, gradually and often swiftly the demand shifts to the new technology. So the old technology receives no or less users and consequently it dies down. We see the death of many traditional occupations due to industrial revolution. In medieval England, many traditional occupations like mouse trapper, code musicians died as the new industrial revolution raised on.

This idea of creative destruction gives a twist to the story of Romer (1986). In Romer (1986), all the past knowledge remains and the new knowledge is added up. This creates mathematically a sum on an integration over an ever-expanding set of knowledge that is indexed by 'A'. Capital may be defined as sum total of these qualitatively varied newer and newer goods. To make the analysis simple Romer (1986) used the Chamberlin's (1933) heroic assumption of a constant cost of production for the new products. This enables their adding up by creating a notion of capital. The idea of capital rejuvenated is a mocking figure of old idea of capital. It is like the atheists' acceptance of God as an epitome of supreme power as has been done by Stephen Hawking (2018). His God has no personal existence nor could it distribute the fruits of prayer according to devotion. In the same way, this capital has no market price, nor can it be visualized in any term of physical reality.

Aghion and Howitt (1992, 1994) removed the Romer's (1986) concept of integration to a single value parameter, to a newly endowed knowledge engraved in new intermediate goods. This is because the old is non-existent as soon as the new comes. They devised a very complex mathematical structure for the evolution of the new knowledge via stochastic process. Barring the mathematical complexities, the Aghion and Howitt (1992, 1994) model is an extension of the Romer's (1986) model incorporating the Schumpeterian (1934/1911) logic.

People have asked the relevance of Aghion and Howitt (1992, 1994) model to today's world. Some have said Aghion and Howitt (1992, 1994) expressed the idea of creative destruction as a source of creation of

new knowledge, investment and innovation. They argued that just the accumulation of capital cannot lead to growth. New growth requires creation of new knowledge simultaneously deleting the old knowledge. It is here that the government should give enough sponsorship.

Mokyr (1990, 2009) tried to understand the rise of the new economy, science and technology to empirical exercise. He argued that the new revolution that started in the eighteenth century was a culmination of strength of discovery coming one after another. There was however no dearth of knowledge before that. Ancient Greece and Rome had much scientific knowledge. The ancient world of Egypt, Mesopotamia and Indus Valley had flourished in the development of many technologies and science such as geometry, engineering, physician skills and so on. In the classical China and India, a lot of development was seen such as plastic surgery, compass, paper, decimal system, gunpowder, rocket, salt and so on. In the Mesoamerican civilization also, a lot of development took place (purification of water, prediction of astronomical events and so on). In spite of all these brilliant achievements, this part of the world could not ensure a sustained long-run growth. This was possible in the modern Europe because of the culmination of many factors. Mokyr (1990, 2009) tried to identify these factors such as 'a joint evolution of science and technology', 'mechanical competence', and 'a society open to change'. It is a combination of these factors and the societal structure which is required to endure growth that has led to the modern economic growth. His contribution thus helped to clearly identify the factors that are required to foster growth. In a way his work is complementary to the study of Aghion and Howitt (1992, 1994).

4. The Long History of Sapiens

The views of these three economists, while important, would not bring out the entire socio-cultural effect of growth because of its very limited mathematical nature. These ideas were condensed by Harari (2014). Harari points out several factors for this. None of them seem prominent in the analysis of this year's Nobel. The first point that Harari (2014) states, is the acceptance of ignorance. Modern science and all the endeavors of the West accept the ignorance. It accepts that there are many things which are unknown and strives to know. This feeling is sadly absent in the pre-modern world and in the orient. In spite of the development of science and technology the philosophical tradition of India seems to differentiate between Para Vidya and Apara Vidya. The Apara Vidya includes all the science, technology and other branches of art and artifacts. The Para Vidya includes the knowledge of Brahman or supreme being, or nirvana or enunciation as understood by the so-called Indian atheists schools. It is argued that if one attains the supreme knowledge, the other knowledge becomes irrelevant. In the theist scheme, this knowledge is supreme being or Brahman. In the non-atheist scheme, this is a type of structure that is different from the day to day world. It is like a shunya which does not mean void but something that is not describable in the common day to day language. It is this belief that gave predominance to the Para Vidya and the people who pursued it. The word 'Buddha' itself means 'the enlightened one' and so is Mahavira. The atheists believed them not to be personified in a supreme consciousness but something beyond our cognition. Without arguing the truthiness or falsity of such a belief, it is clear that it is inimical to the development of scientific and other types of knowledge. If Para Vidya is so important and leads to supreme happiness, why should people go for Apara Vidya. It is in the acceptance of the ignorance that the Western science goes on experimentation and furthering its knowledge which the East misses.

The argument is to accept ignorance is a fundamental pathway of truth. Without this the urge for new knowledge becomes non-important. A similar problem arose in the Arab world where it is argued that knowledge is important but to enlighten the world of Allah. It seems as if the final goal of knowledge is set to allow people to gesture like that in a well-orchestrated drama. In West, science grew in clash of church and a de-church struggle for secularism. We know the plight of Galileo but he was not the one or the first. The same happened to Abelard and also to Giordano Bruno and to some others. It is this struggle with the acceptance of ignorance and removing all knowledge including the so-called spiritual or supreme knowledge in front of the human endeavor to prove.

The next factor that Harari (2014) points out is the mentality of conquest. Science has been expanding with imperialism. Both have an unknown land to conquer. This leads either to the conquest of the natural world or human world. Whether it is the first anthropologist or archaeologist, there main aim is to conquer the world. In order to conquer the world for the betterment of the human society, even the so called rival idea of socialism is not free from it. It is in this context, the pre-western civilization may be differentiated. There is a harmony or peace with nature for attaining a cosmic equilibrium. Without this spirit of conquest, the spirit of creative destruction loses its sense. It is in the use of science for capturing nature for human benefit that has sponsored the process of creative destruction.

Thirdly Harari (2014) has argued on the growth and expansion of capitalism at the world system. Harari (2014) defined capitalism as a system that can generate more money out of money and the process goes on unending. Capitalism has pervaded all facets of live. People are run by profit-making and saving motive. Harari (2014) argues that capitalism seems to be invincible because it provided the only practical solution to the human problems as of today. Without this, capital is dry. The creative destruction loses its force. Here Harari (2014) takes the cues from Marx (1867). In Capital: A Critique of Political Economy, Marx says that dynamism is the basis of capitalism. Under competition, capitalist's profit soon goes to zero. In order to prevent that, the society has to constantly innovate or create.
Unlike other commentators, Harari (2014) accepted the huge human pains and losses under capitalism. These mainly arose out of imperialism, ruthless exploitation, racialism, that are closely linked with the marriage of capital and empire. However Harari supports capitalism for three reasons. Firstly, until now only capitalism provided a viable and sustainable society in spite of its fissures. Secondly, capitalism has changed the world outlook in such a way that it is impossible to think beyond it. Thirdly, it is believed that such wrongs will not be done in the future.

Unfortunately however we could not buy these reasons given by Harari (2014). The world is dynamic and the views and attitudes are also so. Also there is no guarantee that the old pains will not be repeated in the future. That can be more disastrous bringing ecological and human losses that are irreparable. The way-out we think comes out of lessons of the great Buddhist preacher Nagarjuna Nagarjuna (1969/2nd–3rd century CE). He expounded the concept of Mahayana or Greater Vehicle. Here he argues that the master or gurus of yoga should have Karuna. The word Karuna does not mean sympathy but empathy. The master has the role to lift up all to his level. So the vehicle should be larger. We need a similar concept in economics that corroborates this broader vision of humanity.

5. Conclusion

Thus the contribution of Aghion and Howitt (1992, 1994) points out to a historical process through which the development of the modern world has taken place. It has taken cues from history and postulated them in the form of a neat theory. In its way the Marxian concept of creative destruction has been used.

The idea is very well suited to understand the growth of the new world through chains of invention or innovation, each replacing the old and in the process radically transforming the society. There are however crucial points that these three Nobel winning economists miss. This is linking growth to a broader framework of social and institutional network that was done by many thinkers such as Daron Acemoglu, Simon Johnson and James Robinson (the 2024 Nobel laureates), Harari, Kuznets and others. Without this broader framework the simple mathematics of creative destruction, however sophisticated, cannot capture the entire truth.

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[1] The tenancy inefficiency debate percolated by Ricardo (1817) and Marshall (1890) and was also taken up by the modern development economists (Bardhan 1984). They all are of the views that the agriculture tenancy system breeds inefficiency and stifles growth and innovation. Because of these, they

denied the crucial role that is given by the physiocrats to the agriculture and stresses instead on industry which to their views is progressive having no such inefficiency appendages.

[2] Many later critics argued that it an over-simplistic assumption of Smith.

[3] In Ricardo, land includes all the natural resources that come from nature to the service of man. He has shown that with capital accumulation, the share of rent will rise and the share of profit will fall. Though there are some technical difficulties, it can be shown that the total economic surplus (rent +profit) is bound to decline in the Ricardian world as formulated by Barkai (1967).

[4] This debate about the policies regarding under-development and growth has arisen during the Great Debate of Soviet Union (Hobsbawm, 2011).

[5] If human capital is treated as a potential element of growth, then the present Nobel Prize in growth can be deemed fifth in the line.

[6] This has been stated by Lucas (2018) himself.

[7] Recently, in Bihar an ancient nun hostel has been found. In Baishali, ruins have been found of a nun hostel.

24-JAN-2026 @ https://mainstreamweekly.net/article16517.html