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Chapter 1 : Climate change and the true cost of economic growth | Letters | Environment | The Guardian

The conflict between economic growth and environment is sharper today than ever before, particularly in developing countries like India with fast growing population and mass poverty.

Share via Email People form a barricade as they protest against the destruction of the Hambacher forest. This has the unintended consequence of rewarding destruction. Hence the German situation in Hambacher: And, in an infinite world, there are always more 12,year-old forests. This form of thinking might have been a useful simplification when human population and activities were at the levels of the Enlightenment, when much of the philosophy that still drives the economy was developed. Indeed, for any one individual the world is still a remarkably big place and it is difficult to imagine it running out of anything. And that is without considering increased rates of consumption. Maybe the better question is: I remember the rationing of food, clothing and fuel in the s. It was tiresome but necessary and it ensured that no one in UK starved. Rather than destroy our environment, we need to introduce a system of mileage rationing for people using modes of transport which run, directly or indirectly, on fossil fuels. It takes a peculiar form of obstinacy for news channels such as the BBC to consistently not mention climate change. Last week, for example, Jeremy Corbyn committed the Labour party to a huge investment in green technology coupled, to zero carbon emissions by This was ignored in favour of yet more pointless debates about Brexit. But is there any chance he could get together with, say, Owen Jones, Caroline Lucas and Justin Welby, to tell us how, practically, to get from where we are to where we should be, without catastrophic unemployment, poverty and civil unrest? Stop driving fossil-fuel cars. Do not follow fashion. Do not upgrade phones with every new model. Buy products, including clothes, furniture and household items to last. At an individual level, we all need to forget what everyone else might be doing, and tailor our activities and consumption to much reduced totals. This has to mean a much simplified lifestyle: It means a fundamental change of attitude to everyone else. At a political level, we need to replace competitive politics with cooperative politics. Left and right politics is redundant, as are most of our politicians. But why will he not take his argument to its logical conclusion? There is one overarching problem which is behind all the others: It is the population problem: Someone, I forget who, has suggested that if everyone on earth had a European standard of living we would need about three planets to sustain us five for a North American standard. Some people get very exercised over the thought that there might be 9 or even 10 billion of us by That is the wrong concern: I believe that it is not enough to slow or stop population growth; we need to reverse it â€” drastically, and fast â€” but this obviously raises some unpleasant decisions. The time to start thinking is now.

Chapter 2 : Economic Growth & Environmental Problems | Bizfluent

NBER Program(s):Economic Fluctuations and Growth, Environment and Energy Economics This paper reviews both theory and empirical work on economic growth and the environment. We develop four simple growth models to help us identify key features generating sustainable growth.

Valuation[edit] Assessing the economic value of the environment is a major topic within the field. Use and indirect use are tangible benefits accruing from natural resources or ecosystem services see the nature section of ecological economics. Non-use values include existence, option, and bequest values. For example, some people may value the existence of a diverse set of species, regardless of the effect of the loss of a species on ecosystem services. The existence of these species may have an option value, as there may be the possibility of using it for some human purpose. For example, certain plants may be researched for drugs. Individuals may value the ability to leave a pristine environment to their children. Use and indirect use values can often be inferred from revealed behavior, such as the cost of taking recreational trips or using hedonic methods in which values are estimated based on observed prices. Non-use values are usually estimated using stated preference methods such as contingent valuation or choice modelling. Contingent valuation typically takes the form of surveys in which people are asked how much they would pay to observe and recreate in the environment willingness to pay or their willingness to accept WTA compensation for the destruction of the environmental good. Hedonic pricing examines the effect the environment has on economic decisions through housing prices, traveling expenses, and payments to visit parks. Under this plan, the economic impact has to be estimated by the regulator. Usually this is done using cost-benefit analysis. There is a growing realization that regulations also known as "command and control" instruments are not so distinct from economic instruments as is commonly asserted by proponents of environmental economics. The main difference an environmental economist would argue exists between the two methods, however, is the total cost of the regulation. Some firms, in this system, can abate inexpensively, while others can only abate at high cost. Because of this, the total abatement has some expensive and some inexpensive efforts to abate. Consequently, modern "Command and control" regulations are oftentimes designed in a way, which addresses these issues by incorporating utility parameters. For instance, CO2 emission standards for specific manufacturers in the automotive industry are either linked to the average vehicle footprint US system or average vehicle weight EU system of their entire vehicle fleet. Environmental economic regulations find the cheapest emission abatement efforts first, then the more expensive methods second. This leads to a lower cost for the total abatement effort as a whole. Often it is advocated that pollution reductions should be achieved by way of tradeable emissions permits , which if freely traded may ensure that reductions in pollution are achieved at least cost. In theory, if such tradeable quotas are allowed, then a firm would reduce its own pollution load only if doing so would cost less than paying someone else to make the same reduction. In practice, tradeable permits approaches have had some success, such as the U. Taxes and tariffs on pollution. Increasing the costs of polluting will discourage polluting, and will provide a "dynamic incentive," that is, the disincentive continues to operate even as pollution levels fall. A pollution tax that reduces pollution to the socially "optimal" level would be set at such a level that pollution occurs only if the benefits to society for example, in form of greater production exceeds the costs. Some advocate a major shift from taxation from income and sales taxes to tax on pollution - the so-called " green tax shift. The Coase Theorem states that assigning property rights will lead to an optimal solution, regardless of who receives them, if transaction costs are trivial and the number of parties negotiating is limited. For example, if people living near a factory had a right to clean air and water, or the factory had the right to pollute, then either the factory could pay those affected by the pollution or the people could pay the factory not to pollute. Or, citizens could take action themselves as they would if other property rights were violated. The US River Keepers Law of the s was an early example, giving citizens downstream the right to end pollution upstream themselves if government itself did not act an early example of bioregional democracy. Many markets for "pollution rights" have been created in the late twentieth centuryâ€”see emissions trading. According to the Coase Theorem, the involved parties will bargain with each other, which results in an

efficient solution. However, modern economic theory has shown that the presence of asymmetric information may lead to inefficient bargaining outcomes. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. August Learn how and when to remove this template message Environmental economics is related to ecological economics but there are differences. Most environmental economists have been trained as economists. They apply the tools of economics to address environmental problems, many of which are related to so-called market failuresâ€”circumstances wherein the " invisible hand " of economics is unreliable. Most ecological economists have been trained as ecologists, but have expanded the scope of their work to consider the impacts of humans and their economic activity on ecological systems and services, and vice versa. This field takes as its premise that economics is a strict subfield of ecology. Ecological economics is sometimes described as taking a more pluralistic approach to environmental problems and focuses more explicitly on long-term environmental sustainability and issues of scale. Environmental economics is viewed as more pragmatic in a price system ; ecological economics as more idealistic in its attempts not to use money as a primary arbiter of decisions. These two groups of specialists sometimes have conflicting views which may be traced to the different philosophical underpinnings. Another context in which externalities apply is when globalization permits one player in a market who is unconcerned with biodiversity to undercut prices of another who is - creating a race to the bottom in regulations and conservation. This, in turn, may cause loss of natural capital with consequent erosion, water purity problems, diseases, desertification, and other outcomes which are not efficient in an economic sense. This concern is related to the subfield of sustainable development and its political relation, the anti-globalization movement. The three pillars of sustainability clickable Environmental economics was once distinct from resource economics. Natural resource economics as a subfield began when the main concern of researchers was the optimal commercial exploitation of natural resource stocks. But resource managers and policy-makers eventually began to pay attention to the broader importance of natural resources e. It is now difficult to distinguish "environmental" and "natural resource" economics as separate fields as the two became associated with sustainability. Many of the more radical green economists split off to work on an alternate political economy. Environmental economics was a major influence on the theories of natural capitalism and environmental finance , which could be said to be two sub-branches of environmental economics concerned with resource conservation in production, and the value of biodiversity to humans, respectively. The theory of natural capitalism Hawken, Lovins, Lovins goes further than traditional environmental economics by envisioning a world where natural services are considered on par with physical capital. The more radical Green economists reject neoclassical economics in favour of a new political economy beyond capitalism or communism that gives a greater emphasis to the interaction of the human economy and the natural environment, acknowledging that "economy is three-fifths of ecology" - Mike Nickerson. These more radical approaches would imply changes to money supply and likely also a bioregional democracy so that political, economic, and ecological "environmental limits" were all aligned, and not subject to the arbitrage normally possible under capitalism. An emerging sub-field of environmental economics studies its intersection with development economics. Dubbed "envirodevonomics" by Michael Greenstone and B. Kelsey Jack in their paper "Envirodevonomics: A Research Agenda for a Young Field," the sub-field is primarily interested in studying "why environmental quality [is] so poor in developing countries.

Chapter 3 : Relationship Between Environment and Economic Growth

The relationship between economic growth and the environment is, and will always remain, controversial. Some see the emergence of new pollution problems, the lack of success in dealing with global warming and the still rising population in the Third World as proof positive that humans are a short.

The environmental degradation has three damaging effects. It harms human health, reduces economic productivity and leads to the loss of amenities. The following factors are responsible for the costs of economic growth and environmental degradation: The strategy of heavy industrialization is the main cause of environmental degradation in different countries. The establishment of such industries as fertilizers, iron and steel, chemicals, refineries etc. The use of fossil fuel, minerals and timber as sources of industrial energy is depleting these natural resources and degrading the natural ecosystem. Agricultural development has been a major factor in environmental degradation. Intensive farming and excessive use of fertilizers and pesticides has led to over exploitation of land and water resources. These have led to land degradation in the form of soil erosion, water-logging and salination. Urbanization which is the concomitant result of economic growth and industrial growth has led to atmospheric pollution. Rapid and unplanned urbanisation has led to degradation of urban environment. Slums and shanty towns pollute air and water, and generation of solid and hazardous wastes have contributed to environmental degradation on a vast scale. Deforestation also causes environmental problems. Deforestation leads to felling of trees and of natural plants growth for setting up industries, and building towns, roads, highways and dams etc. It destroys flora and fauna. It leads to localised flooding in hilly and adjoining areas. There is loss of human and animal life. The green landscape changes into factories, residential and commercial buildings. They produce more heat, noise and pollution which bring environmental degradation and ultimately, result in death of humans and cause of birth defects and genetic mutations. Environmental degradation is also due to transport development in the different parts of the world. Road, air and sea transportation lead to air pollution, noise pollution and sea pollution. The development of port and harbours have led to oil spills from ships and adversely affected fisheries, coral reefs, mangroves and landscapes. Solid and Hazardous Waste: Solid wastes also create air and water pollution in urban and semi-urban areas. Unregulated urban growth without such facilities as collection, transportation treatment and disposal of solid wastes pollutes the atmosphere and water resources. Rotting garbage and blocked drains spread communicable diseases and pollute ground water resources. An important cause of environmental degradation is market failure. It reflects failure of government policy in removing market distortions created by price controls and subsidies. Market failure also called externalities, are caused by lack of individual property rights and jointness in either production or consumption. For instance, individual farmers living in hilly areas cause soil degradation through deforestation and overgrazing of land that flood areas of people living in lower areas. Negative externalities costs and adverse effects on people in lower areas are not considered by the inhabitants of hilly areas. The effects of such environmental degradation are not controlled by market forces.

Chapter 4 : Environmental economics - Wikipedia

Growth and the Environment: The Sustainability of Economic Growth. Growth may lead to a rapid destruction of rain forests, the over-exploitation of fish stocks and loss of natural habitat created through the construction of new roads, hotels, retail malls and industrial estates.

Relationship Between Environment and Economic Growth! In recent years there has been growing concern about degradation and pollution of environment and climate change as they impact on future development of both the developing and developed countries. In , representatives of over countries met at Rio in Brazil to discuss the environmental issues and their implications for future development of the world. This has produced greater awareness about environmental issues and facilitated the cooperation between different countries to reduce environmental degradation, particularly to reduce emission of greenhouse gasses GHG such as carbon dioxide to prevent adverse climate change, that is, global warning in future which if not prevented will have disastrous consequences for the welfare and development of the population, both in developing and developed countries. The conflict between economic growth and environment is sharper today than ever before, particularly in developing countries like India with fast growing population and mass poverty. The developing countries are making strenuous efforts to balance their need for rapid economic growth with the environmental concerns for keeping their natural base intact. In India, as in other developing countries, the adoption of development strategy based primarily on large-scale industrialisation, energy-intensive technologies and biochemical-based agricultural technology, ignoring indigenous development paradigm based on locally self-sufficient technologies, has led to environmental degradation. In this article, we shall explain various environmental issues and the adverse impact of climate change and explain the need for sustainable development. He urged upon the State governments to control environment pollution, clean rivers and fight climate change. This shows that we have not been taking adequate efforts to ensure sustainable development. To stop further decline in our natural resources and protect environment from pollution stringent regulations and incentives are needed. But, as the PM has said, due to rampant corruption prevailing in the bureaucracy the rules regarding the use of our natural resources and protection of environment have been flouted with impunity. There are numerous instances when the Ministry of Environment and Forests has flouted all norms to give clearance to dubious projects at the cost of environment and communities that depend on it. This is because increasing population causes environmental degradation. Increases in population cause over-exploitation of natural resources such as forests, water, fisheries and minerals at a rate far greater than their capacity to regenerate. Besides, population pressure on land compels us to cultivate arable land more intensively by using chemical inputs such as fertilizers, pesticides which cause soil degradation. Further, increase in population through its effect on deforestation by the rural and urban population for timber and fuel leads to the increase in carbon dioxide in the atmosphere and therefore causes air pollution. Thus the population impacts on environment primarily through the use and depletion of natural resources and is associated with environmental problems such as air and water pollution and loss of biodiversity and increased pressure on arable land. As an example of estimate of loss, Tata Energy Research Institute TERI estimates that economic losses due to soil degradation, diseases caused by pollution and forest degradation is between Rs. Populations increases cause over-exploitation of land and water resources and loss of biodiversity and forests and will therefore endanger sustainability of agriculture and food security in the country. According to Prof MS. It is manifest from above that rapidly increasing population in developing countries will lead to the over-exploitation and degradation of land and depletion of fisheries which will threaten the achievement of food security in the developing countries. Besides, the growth of urban population in the absence of adequate infrastructure facilities has caused the lack of clean water to drink and given rise to slums with the poor sanitation which has increased the vulnerability of the people to several diseases. It follows from above that to meet the expanding needs of the developing countries, environment degradation must be halted. For that purpose, reduction in population growth will greatly help in easing the intensification of many environmental problems. Poverty in developing countries is also said to be responsible for

environmental degradation. Poor people rely on natural resources more than the rich. For survival the rural poor are forced to cut forests for timber and fuel as well as graze animals on pasture lands more than the reproductive capacity of these natural resources. Besides, when the cultivable land becomes short relative to population, the poor are forced to make their subsistence by cultivating fragile land on hills and mountains resulting in soil erosion on a large scale. It is in such environment that poverty becomes a vicious circle. Poverty leads to land degradation and land degradation accelerates the process of impoverishment because the poor people depend directly on exploitation of natural resources on which property rights are not properly assigned. Thus, though a large number of poor people earn a good deal of their livelihood from the un-marketed natural resources such as common grazing lands, forests from where food, fuel and building materials are gathered by them, the degradation and loss of such resources may harm the poor and result in perpetuation of their poverty. Thus, as mentioned above, in the use of natural resources by the poor, the vicious circle of poverty operates. It is important to note that the poorest in our society will suffer most if we use our resources unsustainably as their lives and livelihood depend very directly on water, land, seas and forests. This requires sound environment policies which attempt to conserve the natural resources and help the poor to use them properly so that forest cover is not destroyed, land is not degraded through soil erosion and its fertility is maintained. With growing population the poor encroach upon large remote areas of forests and grasslands to make their livelihood. If there are strict regulations to prevent such encroachment, it is opposed with stiff resistance by the poor, especially in the tribal areas. The solution to the poverty problem of these teeming millions lies in land reforms, generation of more employment opportunities and improvement in productivity of arable land already in use, for example, shifting the poor from poor resource-based to modern science-based agriculture. This is what has been sought to be achieved through green revolution technology. However, the green revolution has also been criticised for environmental reasons, especially the use of fertilizers and pesticides that increase soil salinity. Besides, ample use of irrigation in green revolution technology without adequate drainage facilities results in soil degradation through salinity and water logging. Adequate and appropriate steps should be taken to make the green revolution technology clean and environment-friendly. There can be no two opinions that major efforts must be made to overcome these defects through development of less poisonous chemicals, pest and insect control with reduced chemical application and improved drainage facilities. However, if the efforts to develop modern technology were abandoned because of these defects, employment and income-earning opportunities for marginal farmers and agricultural labourer would continue to be reduced under population pressure. As a result, many would be forced to push cultivation frontiers into ecologically fragile lands resulting in increased incidence of food and soil erosion. It is important to note that the environment representing forests, mines, sources of water, land that provides employment and livelihood to the poor people, especially those living in the tribal regions and it is they who in India are opposing the various development projects, even those cleared by the government. Sunita Narain, a noted environmentalist, rightly writes. It is people, often the poorest, saying these projects will devastate their environment, their forests, which is their source of water, land and livelihood. They are saying, we are poor, but your development will make us poorer. The environmental movement of the country is being led from the bottom today. It is not in the hands of middle-class environmentalists like me. How are business firms concerned with this environmental issue? The business firms are related to the natural environment in two ways. First, they require natural resources such as land for setting up industries , energy sources coal, petroleum, gasâ€”the natural products , wood and water for their production work. In the present state of technological development, the modern industries do not depend on the natural resources to the extent the industries depended on them in the early stages of industrial development in the nineteenth century. Nevertheless, they require land for setting up industrial plants and consume energy from fossil fuels-the natural sources. On the other hand, production in industries leads to degradation and pollution of environment. It is now well-known that industries and vehicular traffic in the urban areas are great polluter of air and water which cause heavy damage to the health of the people which represents social cost imposed on the society. Because of these adverse effects, the industries which pollute air and water need to be regulated to prevent them from causing heavy damage to the health of the people. Bhopal gas tragedy is prime example of

polluting industries in the urban areas which pose threat to the life and health of the people. In Bhopal thousands of people died and thousands others suffered severe damage to their health as a result of leakage of gas from pesticides producing industrial unit owned by an MNC Union Carbide Ltd. Again, in Delhi, the capital of India, where thousands of small industrial units were located in the congested residential areas against Master Plan and environment law. It was due to tough stand taken by High Court and Supreme Court that a good number of them have been relocated at the periphery of Delhi where proper infrastructure for prevention of pollution has been created. However, thousands of industrial units are still operating in the residential areas due to political pressure and vote-bank politics and government has authorised them declaring those areas as fully commercial areas. Delhi is not an isolated case of industries being set up in residential areas and causing air and water pollution. Similar situation prevails in other big Indian cities such as Mumbai, Kolkata. Due to rampant corruption in the bureaucracy these unauthorised polluting industrial units even get environment clearance from the Government. In India, for setting up big industrial projects, the companies both in the private and public sectors are required to get clearance from the Ministry of Environment and Forests which is given on the condition that they put in place and implement a concrete corporate environment policy for protection of environment. Thus while giving clearance to the industrial projects in states and the centre their impact on natural environment is considered. To ensure a green economy need has been felt in India to integrate environmental concerns into the main stream of corporate policies. Concrete guidelines are being framed on how to go ahead with the projects, both in the private and public sector. Land acquisition and environment are two major challenges that the projects are facing today in India. The policy of the government is not to have development at the high cost of environment. The policy is to seek a balance between the two. The Centre has suggested an organizational structure to oversee the implementation of the corporate environment policy. According to the suggested module, a compliance committee, under the leadership of chief executive, board of directors and country heads, would oversee the environmental performance status of the companies. The companies have been told to prepare an annual environmental performance report and include it in its annual report. The Ministry of Environment and Forests guidelines have also suggested incentives for employees of the firms for achieving corporate environmental targets and disincentives for failure to achieve this.

Chapter 5 : Economic Growth and the Environment: A Review of Theory and Empirics

The Under Secretary of State for Economic Growth, Energy, and the Environment, Manisha Singh (Acting), leads the State Department's efforts to develop and implement international policies related to economic growth, energy, agriculture, the ocean, the environment, and science and technology. The.

The rate of growth of GDP per capita is calculated from data on GDP and people for the initial and final periods included in the analysis of the analyst. Determinants of per capita GDP growth[edit] In national income accounting, per capita output can be calculated using the following factors: Productivity improving technologies economic history Economic growth has traditionally been attributed to the accumulation of human and physical capital and the increase in productivity and creation of new goods arising from technological innovation. Increases in productivity are the major factor responsible for per capita economic growth â€" this has been especially evident since the midth century. Most of the economic growth in the 20th century was due to increased output per unit of labor, materials, energy, and land less input per widget. The balance of the growth in output has come from using more inputs. Both of these changes increase output. The increased output included more of the same goods produced previously and new goods and services. During the Second Industrial Revolution , a major factor of productivity growth was the substitution of inanimate power for human and animal labor. Also there was a great increase in power as steam powered electricity generation and internal combustion supplanted limited wind and water power. Other productivity improvements included mechanized agriculture and scientific agriculture including chemical fertilizers and livestock and poultry management, and the Green Revolution. Interchangeable parts made with machine tools powered by electric motors evolved into mass production , which is universally used today. Real food prices fell due to improvements in transportation and trade, mechanized agriculture , fertilizers , scientific farming and the Green Revolution. Great sources of productivity improvement in the late 19th century were railroads, steam ships, horse-pulled reapers and combine harvesters , and steam -powered factories. By the late 19th century both prices and weekly work hours fell because less labor, materials, and energy were required to produce and transport goods. However, real wages rose, allowing workers to improve their diet, buy consumer goods and afford better housing. New goods and services included television, air conditioning and commercial aviation after , creating enough new demand to stabilize the work week. Productivity in the United States grew at an increasing rate throughout the 19th century and was most rapid in the early to middle decades of the 20th century. Demographic changes[edit] Demographic factors may influence growth by changing the employment to population ratio and the labor force participation rate. Women with fewer children and better access to market employment tend to join the labor force in higher percentages. There is a reduced demand for child labor and children spend more years in school. The increase in the percentage of women in the labor force in the U. Spending wave Other factors affecting growth[edit] Political institutions, property rights, and rule of law[edit] See also: These included new laws favorable to the establishment of business, including contract law and laws providing for the protection of private property, and the abolishment of anti-usury laws. Enforcement of contractual rights is necessary for economic development because it determines the rate and direction of investments. When the rule of law is absent or weak, the enforcement of property rights depends on threats of violence, which causes bias against new firms because they can not demonstrate reliability to their customers. Thanks to the underlying homogeneity of its land and people, England was able to achieve a unified legal and fiscal system since the Middle Ages that enabled it to substantially increase the taxes it raised after Many of these intermediate level institutions relied on informal private-order arrangements that combined with public-order institutions associated with states, to lay the foundations of modern rule of law states. In many urban areas the poor "invade" private or government land to build their houses, so they do not hold title to these properties. Much unregistered property is held in informal form through various property associations and other arrangements. Reasons for extra-legal ownership include excessive bureaucratic red tape in buying property and building. In some countries it can take over steps and up to 14 years to build on government land. Other causes of extra-legal property are failures to notarize transaction documents or having

documents notarized but failing to have them recorded with the official agency. Unregistered businesses and lack of accepted accounting methods are other factors that limit potential capital. Specifically, "democracy increases future GDP by encouraging investment, increasing schooling, inducing economic reforms, improving public goods provision, and reducing social unrest. This is due to endogeneity - forces that drive economic growth also drive entrepreneurship. In other words, the empirical analysis of the impact of entrepreneurship on growth is difficult because of the joint determination of entrepreneurship and economic growth. A few papers use quasi-experimental designs, and have found that entrepreneurship and the density of small businesses indeed have a causal impact on regional growth. Capital is subject to diminishing returns because of the amount that can be effectively invested and because of the growing burden of depreciation. In the development of economic theory the distribution of income was considered to be between labor and the owners of land and capital. New products create demand, which is necessary to offset the decline in employment that occurs through labor saving technology and to a lesser extent employment declines due to savings in energy and materials. Also, the creation of new services has been more important than invention of new goods. The transition from an agricultural economy to manufacturing increased the size of the sector with high output per hour the high-productivity manufacturing sector , while reducing the size of the sector with lower output per hour the lower productivity agricultural sector. Eventually high productivity growth in manufacturing reduced the sector size, as prices fell and employment shrank relative to other sectors. Theories and models [edit] Classical growth theory[edit] In classical Ricardian economics, the theory of production and the theory of growth are based on the theory or law of variable proportions, whereby increasing either of the factors of production labor or capital , while holding the other constant and assuming no technological change, will increase output, but at a diminishing rate that eventually will approach zero. Criticisms of classical growth theory are that technology, an important factor in economic growth, is held constant and that economies of scale are ignored. In fact, the natural growth rate is the highest attainable growth rate which would bring about the fullest possible employment of the resources existing in the economy. Solowâ€”Swan model[edit] This section is about a neoclassical growth model. It is not to be confused with Steady-state economy Main article: Solowâ€”Swan model Robert Solow and Trevor Swan developed what eventually became the main model used in growth economics in the s. Capital accumulates through investment, but its level or stock continually decreases due to depreciation. As a consequence, growth in the model can occur either by increasing the share of GDP invested or through technological progress. As a consequence, with world technology available to all and progressing at a constant rate, all countries have the same steady state rate of growth. Implicitly in this model rich countries are those that have invested a high share of GDP for a long time. Poor countries can become rich by increasing the share of GDP they invest. One important prediction of the model, mostly borne out by the data, is that of conditional convergence; the idea that poor countries will grow faster and catch up with rich countries as long as they have similar investment and saving rates and access to the same technology. The Solowâ€”Swan model is considered an "exogenous" growth model because it does not explain why countries invest different shares of GDP in capital nor why technology improves over time. Instead the rate of investment and the rate of technological progress are exogenous. The value of the model is that it predicts the pattern of economic growth once these two rates are specified. Its failure to explain the determinants of these rates is one of its limitations. Although the rate of investment in the model is exogenous, under certain conditions the model implicitly predicts convergence in the rates of investment across countries. In a global economy with a global financial capital market, financial capital flows to the countries with the highest return on investment. Endogenous growth theory[edit] Main article: Endogenous growth theory Unsatisfied with the assumption of exogenous technological progress in the Solowâ€”Swan model, economists worked to " endogenize " i. Unlike physical capital , human capital has increasing rates of return. Research done in this area has focused on what increases human capital e. Endogenous growth theory was satisfied with accounting for empirical regularities in the growth process of developed economies over the last hundred years. As a consequence, it was not able to explain the qualitatively different empirical regularities that characterized the growth process over longer time horizons in both developed and less developed economies. Unified growth theories are endogenous growth theories that

are consistent with the entire process of development, and in particular the transition from the epoch of Malthusian stagnation that had characterized most of the process of development to the contemporary era of sustained economic growth. In doing so, they make old technologies or products obsolete. This can be seen as an annulment of previous technologies, which makes them obsolete, and "destroys the rents generated by previous innovations. Europeans adopted very different colonization policies in different colonies, with different associated institutions. In places where these colonizers faced high mortality rates e. Thus, although other economists focus on the identity or type of legal system of the colonizers to explain institutions, these authors look at the environmental conditions in the colonies to explain institutions. For instance, former colonies have inherited corrupt governments and geo-political boundaries set by the colonizers that are not properly placed regarding the geographical locations of different ethnic groups, creating internal disputes and conflicts that hinder development. In another example, societies that emerged in colonies without solid native populations established better property rights and incentives for long-term investment than those where native populations were large. Human capital has been included in both neoclassical and endogenous growth models. The most commonly-used measure of human capital is the level average years of school attainment in a country, building upon the data development of Robert Barro and Jong-Wha Lee. One problem with the schooling attainment measure is that the amount of human capital acquired in a year of schooling is not the same at all levels of schooling and is not the same in all countries. This measure also presumes that human capital is only developed in formal schooling, contrary to the extensive evidence that families, neighborhoods, peers, and health also contribute to the development of human capital. He shows that economic growth is not correlated with average scores in more educated countries. Econodynamics Further information on Energy efficiency: A fixed relationship between historical rates of global energy consumption and the historical accumulation of global economic wealth has been observed. These include the great improvements in efficiency of conversion of heat to work, the reuse of heat, the reduction in friction and the transmission of power, especially through electrification. For example, the United Kingdom experienced a 1. It grew to 1,, million pounds by A growth rate that averaged 1. The large impact of a relatively small growth rate over a long period of time is due to the power of exponential growth. For example, a growth rate of 2. Thus, a small difference in economic growth rates between countries can result in very different standards of living for their populations if this small difference continues for many years. Quality of life[edit] One theory that relates economic growth with quality of life is the "Threshold Hypothesis", which states that economic growth up to a point brings with it an increase in quality of life. But at that point â€" called the threshold point â€" further economic growth can bring with it a deterioration in quality of life. Business cycle Economists distinguish between short-run economic changes in production and long-run economic growth. Short-run variation in economic growth is termed the business cycle. Generally, economists attribute the ups and downs in the business cycle to fluctuations in aggregate demand. In contrast, economic growth is concerned with the long-run trend in production due to structural causes such as technological growth and factor accumulation. The neutrality of this section is disputed. Relevant discussion may be found on the talk page. Please do not remove this message until conditions to do so are met.

Chapter 6 : Economic growth vs. environmental protection | Globalization | DW |

To balance economic growth with environmental protection and natural resource conservation, some economists and environmentalists propose an approach to economic growth that emphasizes not only meeting current societal needs, but considering the effect of present growth on future generations.

Chapter 7 : Economic growth - Wikipedia

Rather, for most indicators, economic growth brings an initial phase of deterioration followed by a subsequent phase of improvement. The turning points for the different pollutants vary, but in most cases they come before a country reaches a per capita income of $8,

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Chapter 8 : Global Forum on Environment and Economic Growth - OECD

_____ 45 CHAPTER 2 ECONOMIC GROWTH AND THE ENVIRONMENT Theodore Panayotou Introduction Will the world be able to sustain economic growth indefinitely without running into resource.

Chapter 9 : The Costs of Economic Growth and Environmental Degradation

When it comes to economic growth these days, people often point out that it must be sustainable or "green growth." To what extent is a combination of economic growth and sustainability really.