The validity of the environmental kuznets curve

Environment, Ecology

The proper use of theenvironmenthas become a controversial topic in economics. In both of James Beseecher's lectures during the module, he outlined a critique of mainstream economics currently governing all our policies, and presented several key thinkers In environmental economics. The huge potential for economic growth through the exploitation of the environment has been undeniable. Vital resources have forever been and continue to be a necessary component of economic growth.

But the environment also performs the essential function of supporting life. Needless to say, if humans impair the earth's ability to sustain life the consequences would be dire. And unfortunately, the very same exploitation that provides us with crucial economic Inputs can also be the Instrument by which we impair the earth's ability to support life. Beechen Insisted the world would have to shift Its focus too more sustainable branch of economics. One policy proposed by economists is to allow countries to economically grow out of environmentally damaging activity.

Looking at countries with already large economies, we see signs of environmental regulation such as emissions standards, extensive recycling programs, and limited timber harvesting. The economists supporting a policy that Initially allows for environmental degradation assert that If a country can achieve sufficient economic growth In a short period of time then perhaps environmental damage should be tolerated. A well-known hypothesis providing support for a policy that emphasizes economic growth at the expense of environmental protection is the environmental Sunset curve (EKE) hypothesis.

It posits that countries in the development process will see their levels of environmental degradation increase until some Income threshold Is met and then afterwards decrease. If true, economic polices should allow extensive, although not necessarily absolute, use of the environment for growth purposes. But carrying out such policies involves inherent dangers. If developing countries decide to overlook environmental protection by counting on rising incomes to abate environmental damage the consequences could be devastating.

The most pressing danger is that additional environmental degradation could cause some irreversible and significant harm. This could occur before the predicted Income threshold Is met. The other concern with counting on Incomes to reduce environmental damage Is that the EKE hypothesis could easily be incorrect and relying on its predictions would lead to consistently insufficient protection. This paper evaluates the validity of the EKE hypothesis and argues that it is not a sound basis for policy formation and Justification with so much at stake.

The plan of the paper is as follows. Section II examines the basis for the EKE hypothesis and conditions under which It may accurately predict a country's future environmental at the findings of these studies. Section IV identifies the inherent dangers in determining environmental policy based upon the EKE hypothesis. Some concerns are relevant if the hypothesis does not hold and others are present even if it does prove a correct forecaster of environmental quality. Section V provides a conclusion.

Section II: The Concept of the Environmental Sunset Curve The EKE hypothesis asserts that countries will naturally move from relatively low environmentally degrading activity to highly degrading activity and then, once a certain income threshold is achieved, will proceed to less degrading activity once again. This assertion allows one to predict the relative level of environmental damage Ewing caused by a country by looking at GAP per capita. However, this prediction is relative to individual countries. In other words, each country has its own EKE, based upon resource endowment, social customs, etc. From which it progresses along relative to its GAP. A graphical model of the hypothesis helps illustrate the inverted " U" shape of the relationship: It is important to note that the theoretical EKE graph does not explicitly express time as a dimension and for this reason the use of the EKE hypothesis to Justify policy decision - an action that by definition incorporates time - would appear inadequate. Only by comparing two different countries can the inverted " U" shaped curve be derived as seen above. However each country possesses its own unique EKE and therefore each country's policies should be organized accordingly.

In order for the graph to show an EKE, and thereby be valid as policy Justification, we must incorporate a time dimension. We find a time dimension along the x-axis. The EKE hypothesis assumes that changes in income per capita only occur over time. By including this supposition of changes in income inherently signifying time, the graph can now show an EKE for a specific country. The identification of a country's particular EKE provides a basis for using it to influence policy. Possessing the theoretical

model by which the EKE hypothesis is used for economic policy we turn our focus to explaining why the inverted " U" shape exists.

There are two primary explanations for the proposed shape of the EKE. The first examines the history of developed countries and the paths they took to achieve development. The second reflects the changing preference for environmental quality as incomes rise. Historically, all developed countries' economies were originally based upon agriculture, a state that produced little environmental damage. Their economies later switched to a much more environmentally damaging state that focused on industry and manufacturing. Two main factors lead to environmental damage that occurs during industrialization.

First, the harmful by-products of production damage the environment. High levels ofpollutionand water contamination accompany the expansion of industry. The second factor is the increased consumption of natural resources. The extensive over-use of land, deforestationand mining of mountains is a form of environmental damage in and of itself. A common conclusion of this placement pattern is that Olds must pass through the same phases in order to regulations, Olds will be at an economic disadvantage compared to the already developed countries.

Many Olds point to this competitive disadvantage when rejecting global environmental standards. The next stage of development saw industrial nations switching to service-based economies, a trend that all global GAP leaders tend towards. During this phase the income threshold of the Ekes for certain polluting substances appear to have been reached. According to the

hypothesis, service-based economies are said to be able to avoid many of the most environmentally damaging economic activities. In theory, environmental impacts also fall as a result of improvedtechnologydiscovered in developed countries.

In some cases technology leads to a more efficient use of inputs. Other technological advancements make it possible to restrict the harmful effects that economic activity have on the environment. The second reason that a high-income level can reduce environmental damage is by altering the demand for environmental quality. Known as the " income effect", sufficiently high GAP per capita often leads individuals to place environmental quality above additional economic growth. The aggregation of these individual preferences plays an integral role in determining the income threshold.

The EKE income threshold aggregates all environmentally damaging agents into a single numerical value. However, taken individually economists can place dollar values on the turning points of damaging agents. For example, in a 1997 paper by Cole, Earner and Bates, the authors found the turning point of CO and NON emissions to be around $9, 900 and $14, 700, respectively. Using environmental quality preference as an explanation, the income threshold represents the income level per pita at which the preference for environmental quality outweighs the preference for additional income.

This change in preference occurs on a public level, rather than a private one. Microeconomic decisions to support more environmentally friendly goods

and services cannot account for the income effect. The issue is instead a matter of public policy. The changes in environmental standards reflect political pressure on governments. According to the EKE hypothesis, changes to evolving economies and the individual preference for environmental quality combine to determine the income threshold. However, whether or not an inverted " U" shaped curve exists at all is still up for debate.

Section Ill: Evidence For and Against the EKE Hypothesis Evidence regarding the EKE hypothesis is circumstantial and inconclusive. Most early studies that supported the hypothesis focused on a single damaging agent, such as a pollutant. Identifying key characteristics associated with agents that have been studied we find that only certain types of agents exhibit an EKE. Evidence supporting the EKE first began in 1994 when Selene and Song derived an EKE for SIS. A later test in 1995 by economists Grossman also found SIS emissions to follow n EKE. They found a turning point between $4, 000 and $6, 000.

Another early documentation of EKE support came from Theodore Pantaloon who found the turning point of deforestation to be $823. After the initial studies, other economists began to investigate the validity of the EKE hypothesis and found refuting evidence. In the 1997 paper by Cole, Earner and Bates, they found no EKE for traffic, nitrates or EKE; rather, energy use per capita rose steadily with increased income. Evidence appears to support the EKE hypothesis only for a limited type of damaging agents. The emission of SIS is found in urban waste areas and is thereby hardhearted by its locality.

Deforestation also reflects a situation involving a specific location. Damaging agents that affect only a particular site tend to show Ekes. However, a damaging agent such as traffic is plain to see and also affects certain areas heavily. In this case the agent is dominated by a scale effect - increased activity leads to increased environmental impact. While traffic-related pollution is generally iterated by population size, damaging agents such as energy production by-products increase with GAP per capita. Section lb. Dangers of the EKE Hypothesis ininternational development

There exist many dangers in allowing an economy to simply grow out of environmentally damaging activity. Some of these dangers arise because the EKE hypothesis does not hold true in all cases. Others exist even if we assume the hypothesis as an accurate predictor of environmental conditions. The following is a list of concerns regarding the EKE hypothesis: l. It remains inconclusive if most damaging agents follow the EKE. II. The threshold income may be irrelevantly high or the temporary period of increasing environmental damage too long. Ill.

Any decrease in environmental damage seen in developed countries may reflect the exportation of production abroad and subsequent importation. IV. The " absorptive capacity' of our earth is unknown. V. Ekes may only exist in certain political atmospheres. A detailed examination of the above concerns illustrates the inherent dangers in accepting the EKE hypothesis and afterwards using it to Justify policy making. As discussed above, only local and regional damaging agents show signs of Ekes. Other " difficult to detect" agents seem to increase with GAP per capita.

This discovery leaves open to question whether more agents than not respond to income increases. If there exist more agents that do not respond then attempting to grow past these impacts would be impossible. Many damaging agents may respond to income levels, but not until GAP per capita approaches out-of-reach levels. If in a developed country, the turning point for a damaging agent is above, say, $50, 000 then neglecting to react will create damage for a considerable amount of time. Over the time it takes to achieve the turning point, the environmental damage may become irreversible .

Obviously, in a OLD the turning point value needs only to be considerably lower and still have the same adverse effects. Using solely the EKE hypothesis to Justify unsustainable growth is unwise, as the outcome still remains unknown. Another consideration that challenges the EKE evidence is that wealthy countries are massively importing products manufactured in Olds, thereby contributing to environmental degradation; the only difference is that the degradation is not domestic. The first hypothesis to bring up this possibility was the Pollution Haven hypothesis.

It states that developed countries export their high polluting industries to Olds whose governments have more lax environmental standards. Many economists follow environmental regulations. However, this does not exclude the possibility of heavy industries existing in Olds and coincidently exporting their products to wealthy countries. In this case, wealthy countries only started along the downward slope on the EKE by domestically reducing

environmental damage. When taken globally their increased consumption due to income may without doubt still be increasingly damaging.

Another danger is that leaving the quality of our environment subject to economic activity, even for only a short period, may well prove to be disastrous. The ability of the earth to absorb the damaging agents produced by economic activity, called " absorptive capacity," is not yet known. A final concern is that even if countries can achieve high levels of income per capita they may not possess a political atmosphere conducive to environmental protection. Assuming that the aggregate turning point in a country is reached, that country is not necessarily going to enact environmental protection.

The most successful avenues for obtaining environmental quality, it seems, are lobbyists. Without a government that responds to political pressure by these public groups here is no reason to believe that its policies will reflect the demand for a cleaner environment, if such demand exists at all. Indeed, it also remains to be seen if all cultures place similar values on environmental quality. Section V: Conclusion The questions and concerns about the EKE hypothesis examined in this paper raise significant doubt as to the wisdom of adopting environmental policy based upon the EKE hypothesis.

Even assuming its validity, the EKE hypothesis generates considerable doubt as to its effectiveness at balancing economic growth with environmental protection. In order to effectively produce a critique of the EKE, the present paper assumes growth is still regarded as the sole goal of economic

development. The hypothesis indeed uses rising incomes as a factor of time.
Calls however have been growing stronger for a shift of focus from economic
growth towards well-being, equalityand sustainability.