

## Post-(Sustainable) Development?

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**Abstract**

This paper critically reviews the application of a post-development analysis to sustainable development by employing a defined target for post-development analysis - the Environmental Kuznets Curve (EKC). The 'quadratic' EKC predicts an increase in environmental degradation with national wealth before reaching a point of inflection. Data from the 2005 Environmental Sustainability Index (ESI) for 146 countries are used to generate statistically significant EKC models, and the approach is deconstructed by employing post-development theory. While an ESI derived EKC is clearly an easy target for post-development critique, there are foundations upon which both rest which are not easily dismissed. Neither is the typical post-development 'alternative' of encouraging 'endogenous discourse' and grassroots movements at odds with sustainable development. As a result the paper argues that sustainable development theory already incorporates much of the critique and alternatives raised by post-developmentalists, and the problems rest more with how theory is translated to practice. Indeed what is more disconcerting is that sustainable development readily encompasses such apparently divergent ideas represented by the ESI, EKC and post-developmental critique and solutions. Building on the work of Fyodor Dostoevsky the paper questions whether what we embrace as sustainable development can ever be practically realised given the imperfections of human beings?

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**Keywords:** Post-development; Sustainable Development; Environmental Kuznets Curve; Environmental Sustainability Index; Africa; Latin America; Europe

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## **Introduction**

Development as it is known today is generally regarded as born in the early post-second World War period. Rightly or wrongly its birth is often taken to be President Truman's program for peace and freedom (1949) which stresses four major course of action that his presidency will pursue during his tenure. The fourth one of these states:

*“Fourth, we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas.*

*More than half the people of the world are living in conditions approaching misery. Their food is inadequate. They are victims of disease. Their economic life is primitive and stagnant. Their poverty is a handicap and a threat both to them and to more prosperous areas.*

*For the first time in history, humanity possesses the knowledge and skill to relieve the suffering of these people.*

*The United States is pre-eminent among nations in the development of industrial and scientific techniques. The material resources which we can afford to use for assistance of other peoples are limited. But our imponderable resources in technical knowledge are constantly growing and are inexhaustible.*

*I believe that we should make available to peace-loving peoples the benefits of our store of technical knowledge in order to help them realize their aspirations for a better life. And, in cooperation with other nations, we should foster capital investment in areas needing development.”*

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Here there is a strong sense of a Western-led trusteeship – “*help them realize their aspirations*” – as well as a clear emphasis on the application of technical knowledge and capital investment (modernization) coming from the west as means of meeting peoples aspirations “*for a better life*”. However, in the nearly 60 years that have elapsed since 1949 this sense of trusteeship for the ‘developed’ to help the ‘developing’, as well as the emphasis on modernization and capitalization has been questioned. Perhaps the latest manifestation is sustainable development where what is done now “*for a better life*” (development) should not damage future generations (sustainability).

But others have also sought to question the post-2<sup>nd</sup> WW push for development in what they regard as a far more fundamental and radical sense than simply what they perceive as tinkering around the edges (Pieterse, 2000). Proponents of ‘post-development’ see what has been promoted as development since the 2<sup>nd</sup> World War (what Mathews, 2004, abbreviates as PWWII) as a Northern-driven and ‘top down’ modernizing agenda which in large part has failed to deliver (Rahnema and Bawtree, 1997; Pieterse, 1998; Hart, 2001). The poor are still very much with us, they argue, and a drive for modernization and industrialization has generated much environmental damage and failed to address gaps between rich and poor. Indeed, they argue, matters may have worsened rather than improved. Africa is put forward as the classic example of this failure of PWWII development (Mathews, 2004). Sustainable development is seen by them as nothing more than a re-hashing of the PWWII agenda in such a way as to negate (or hide?) the damage to the environment which has arisen.

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Post-developmentalists argue that they are not against ‘improvement’ or a ‘better life’ but the key rests with what these mean and how they are to be facilitated. They argue that the PWWII development project has created a tautology – that those who are ‘developed’ (as defined by themselves) know what has to be done to help the developing world. They set the goal and while the instrumentation (the tactics) for achieving these targets can evolve and be flexible (practitioners may see some of this change in tactics as groundbreaking and revolutionary), it doesn’t hide the fact that at a strategic level development is based on a set of assumptions over which those being ‘developed’ have no influence. Thus it’s not just a matter of failure – it’s the world-view and mindset of PWWII development that is at fault (Pieterse, 2000). Sustainable development is just another variant of this same flawed theme (“*different constellation of the same elements*”; Nustad, 2001; page 481) and a mere ‘siren song’ – an attempt to repackage a failed approach with enticing language of care for the environment and a respect for the rights of future generations. There is also an implied arrogance here. Sustainable development is seen as an answer to a developed world set of problems, and hence its ‘imposition’ by a developed world elite with all of the accompanying rhetoric over the rest of the globe cannot be morally acceptable.

But although they have been highly articulate in pointing out the deficiencies of PWWII development they have not been as forthcoming as to what should replace it (Blaikie, 2000). Indeed Pieterse (2000; page 183) in his criticism of post-development states that “*at times one has the impression that post-development turns on a language game rather than analysis*” and that “*post-development is caught in rhetorical gridlock*”. The language of ‘alternatives’ tends to be far more ambiguous than identification of the failings of PWWII development (Blaikie, 2000). Some claim

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that it is not the job of post-developmentalists to put forward alternatives; their contribution need only be to provide an analysis of failure. Unsurprisingly therefore we have quotations such as:

*“Post-development theory has failed, in a direct sense, to put food in the mouths of the hungry, to put roofs above the homeless or to put money in the pockets of the penniless.”*

Siemiatycki (2005; page 60)

Indeed there are explicit undercurrents of disengagement and withdrawal from the PWWII strategy as the only desired ‘action’ of post-development. Thus with sustainable development there should be a disengagement from a sense of trusteeship of the ‘now’ as well as a disengagement of trusteeship for future generations (Roe, 1995). Pieterse (2000; page 187) makes the interesting point that *“post-development arrives at development agnosticism by a different route but shares the abdication of development with neoliberalism”*. For those who do put forward more tangible suggestions as to what should replace the PWWII strategy rather than stop at disengagement there is a broad call for more local (‘bottom up’) initiatives, ‘endogenous discourse’ (Escobar, 1992), a global nexus with grassroots movements (Siemiatycki, 2005) or what Ziai (2004) refers to as ‘radical democracy’. But even here the language can be vague, although somewhat reminiscent of ‘Dependency Theory’ (Pieterse, 2000). For example, with regard to Africa Mathews (2004; page 379) states that:

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*“I will argue that the way in which Africa is different from the West and Westernised world in terms of the values, world-views and lifestyles of its people (from now on referred to as Africa’s difference); as well as the way in which Africa is home to diverse people groups who experience the world in diverse ways (from now on referred to as Africa’s diversity) can provide some pointers for those who are trying to conceive alternatives.”*

Expressed in this way there may be little to disagree with, but how are grassroots movements in Africa or elsewhere to engage in an alternative form of sustainable development given that they themselves may often lack sufficient resources and are often devoid of political and economic power? After all, if such grassroots movements are so effective why does Africa remain so poor and why is there so much concern over environmental problems in rapidly emerging countries such as China? Mathews (2004) herself quotes statistics from the UNDP to support this contention as an argument for the failure of PWWII development. If such movements are to pass through a process of selection and support then isn’t that the very trusteeship that post-modernists decry (Grischow and McKnight, 2003)?

In this paper I will explore the validity of the post-development assumption that sustainable development is nothing more than an extension of PWII development without anything new to add other than being a ‘siren song’. This is admittedly a complex topic impossible to deal with in its entirety in a paper as necessarily short as this, but I intend to handle it by focusing the analysis upon what should be a relatively easy target for post-development, but a target that has some theoretical validity nonetheless in the sustainable development discourse; the Environmental Kuznets

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Curve (EKC; Stern et al., 1996; Khanna and Plassmann, 2004; Hartman and Kwon, 2005; Nahman and Antrobus, 2005). Even worse, from a post-development standpoint, the paper will derive a specific example of an EKC based upon the increasingly popular Environmental Sustainability Index (ESI) advocated by the World Economic Forum (WEF) and others. Both the EKC and ESI have received much criticism. The combination of an ESI derived EKC should provide an easy target for post-development critique. So what can we learn from this?

### **First straw man? The Environmental Kuznets Curve**

The EKC is named after Simon Kuznets (1901-1985), a Russian-born economist and Nobel Prize winner famous for his work on estimating national income. Kuznets also worked on the assumed linkage between national wealth and inequality of the distribution of that wealth (Kuznets and Simon, 1955). His conclusion was that inequality increases with wealth but at a point of inflection inequality declines as social support systems such as a minimum wage, better education etc. are take effect (the Inequality Kuznets Curve, IKC). The EKC borrows from this idea by claiming that as a country (or for that matter any geographical region) passes through a process of industrialisation to generate wealth, so the environment becomes degraded. But as with the IKC it is theorised that at some point the curve turns down – further wealth leads to a lessening of environmental degradation. Maybe this is because the population of the region begins to value the environment and pressure is placed (legal, moral or otherwise) on the polluters to reduce the damage which they are inflicting or

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to stop altogether (Ekins, 1997; Stern, 2004; Dinda, 2005). The assumed model is presented as Figure 1, with two versions of the EKC based on whether the vertical axis is presented as:

(a) pressure on the environment (rate of release of pollutants, rate of deforestation etc.)

(b) state of the environment (concentration of pollutants in the environment etc.)

<Figure 1 near here>

In essence the lines in Figure 1 would pass through a two-dimensional space of ‘dots’ (not shown in the graphs) representing the wealth and environmental quality of individual spatial units (countries or otherwise) in the dataset.

The EKC was first put forward in 1991, 6 years after Kuznets death, but both the EKC and the IKC carry the implied message that economic growth is ultimately good news. While there may be pain along the way – a worsening environment or greater inequality – the endpoint is a ‘better life’ for this and future generations. There is something that we can do about these problems, provided we have the resources and the will.

In this paper it is not possible to explore the substantial literature on the EKC, and it need only be stressed that the underlying theory and evidence have been hotly debated. As the meaning of ‘degradation’ and ‘quality’ are themselves contentious, and given that environmental data can be messy’, then it is perhaps inevitable that

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conclusive evidence which all agree upon for a quadratic form of EKC has been elusive (Stern et al., 1996; Ekins, 1997; Torras and Boyce, 1998; Perman and Stern, 2003; Cole, 2003; Stern, 2004; Galeotti and Lanza, 2005; Nahman and Antrobus, 2005). Some point out that any attempt to generate a simple relationship between complex sets of empirical data with all the problems of time delay and trans-boundary effects will inevitably involve a reduction of complexity. Much obviously depends on how environmental degradation and hence quality are measured, the quality of the data, what countries and years are included etc. (Harbaugh et al., 2002). The result is that all sorts of arbitrary 'EKC' type curves may be fitted to such data (Harbaugh et al. 2002), and the quadratic type EKC and economic theory upon which it is based may be deceptive (Galeotti and Lanza, 2005). Sobhee (2004) suggests a logistic type model where there is a flattening of degradation at some level of income but not an eventual decline, and there is also the possibility that the relationship is logarithmic where degradation continues to increase with income, albeit at a slower rate. Thus while the logistic and logarithmic models share the 'getting better with increasing wealth' assumption as the quadratic EKC it doesn't get that much better! However, there are also suggestions such as a 'two-hump' (cubic) polynomial curve which implies that while degradation improves in the short term with wealth it eventually worsens (Rupasingha et al., 2004; Bousquet and Favard, 2005).

While acknowledging the critical discourse, even within the sustainable development literature, surrounding the quadratic EKC it is clear that this 'message' would be at the very heart of what post-developmentalists would probably regard with disdain; an assumption that an emphasis on economic growth is the way forward and that ultimately technology will save us from ourselves. Hence the North-driven value set

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for environmental degradation and quality, economic development and associated technological ‘fixes’ for damage that the North has largely been responsible for creating in the first place.

### **Second straw man? The Environmental Sustainability Index**

If the quadratic (good news) form of the EKC has proven to be contested then here I will compound the problem by deriving such a curve from the ESI. The ESI is an aggregated index of environmental sustainability calculated with a standardized methodology across nations. It has been created by the World Economic Forum (WEF), a powerful grouping of the world’s richest countries, in conjunction with Yale and Colombia Universities in the USA (the self-styled ‘*Global Leaders of Tomorrow*’). The pilot was released in 1999, and values of the ESI have been published for 2001, 2002 and 2005. The ethos behind the ESI is straightforward and indeed familiar given the widespread quotation of the Human Development Index (HDI) and its three components (GDP/capita, longevity and enrolment in education) in the literature, including by post-developmentalists as partial evidence for failure of the PWWII development project (for example, see Mathews, 2004; page 378). Basically the ESI aims to condense complex data sets into a single value for each country that allows for easy interpretation and ranking. Hence there is an element of ‘name and shame’.

The ESI methodology to arrive at a value for a country is somewhat complex and does not need to be repeated here. For details please see the various ESI reports available at

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[www.ciesin.columbia.edu/indicators/ESI/](http://www.ciesin.columbia.edu/indicators/ESI/)). For the purposes of this paper it need only be summarized as a set of steps (based on the 2005 ES covering 146 countries):

Step 1. Collection of raw data sets for 76 variables, some of which are shown in Table 1, which are then aggregated into 22 ‘indicators’. The ESI is based on data sets covering a diverse range of variables such as ambient pollution and emissions of pollutants to impacts on human health and being a signatory to international agreements. The ESI variables are loosely grouped into the pressure-state-impact-response (PSIR) framework often used for sustainability indicators. Nonetheless, the choice is very much that of the ESI creators and hence has a strong degree of subjectivity although no doubt a good case can be made for each variable.

Step 2. The variables are checked for their distribution across all the nations included in the sample. If the data have a highly skewed distribution then the skewness is lessened by taking logarithms. Also extreme values (high and low) are capped by using percentiles. This step is objective in the sense that set rules are applied across all variables, but it’s the creators of the ESI that make those rules.

Step 3. As the variables all have different units of measurement they are standardised by subtracting the mean or subtracting from the mean (depending upon whether high values of the variable are regarded as ‘good’ or ‘bad’ for sustainability) and dividing by the standard deviation. If higher values (e.g. biodiversity) are deemed to be good:

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country value - mean

z-value = -----

standard deviation

If high values are deemed to be bad for sustainability (e.g. emissions of pollutants):

mean – country value

z-value = -----

standard deviation

Step 4. The average z-value for an indicator (a group of related variables) is then calculated for each country. Grouping of variables into indicators is another subjective decision.

Step 5. The average z values of each indicator are converted to a more intuitively meaningful statistic ranging from 0 to 100 by calculating the ‘standardised normal percentile’ (SNP).

Step 6. The SNPs are averaged over all the indicators to provide the ESI for each country and these are then presented in a league table format. The higher a country appears in the league table then the more environmentally sustainable it is deemed to be.

As with the EKC the ESI has received a great deal of criticism, even from those who would be sympathetic with the PWWII development project. There is no need to go

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into these in depth here (see Morse 2004 for an outline), but suffice it to say that these encompass issues of data quality and trans-boundary effects raised earlier, as well as the more fundamental concern regarding just whose vision of environmental sustainability does the ESI represent (The Ecologist, 2001)? After all it is a device created by a powerful group of primarily Northern-interests and applied on a global scale. Where is the voice of the poor here? Therefore even many supporters of sustainable development would accept that the ESI data set is not an unimpeachable source of ‘truth’ with regard to environmental quality.

With regard to the post-development case it is clear from the forgoing that the ESI represents precisely the sort of tool that post-developmentalists would decry. Whatever one’s thoughts about the desirability of the ESI, it is deigned to be a part of ‘sustainable development’ and hence ameliorate the negative effects of the PWWII development project. It is entirely a top-down and northern-driven agenda with absolutely no scope for local perspective or even discourse. It represents what the WEF feel is important for environmental sustainability and is applied to all countries for which data exists. Complexity is reduced to simple numbers and the whole exercise has a feel of being positivist and mechanical. For post-developmentalists the ESI must surely sum up all that is wrong with the underlying assumptions, values, worldview and mindset of the PWWII movement.

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### **Straw on straw? Using the ESI to create an EKC for post-development critique**

The ESI dataset can be used to test the quadratic EKC hypothesis. It first has to be said that the creators of the ESI have not shied away from linking the index to wealth. On page 26 of the 2005 ESI report (Esty et al. 2005) we have the following text under a section entitled “*ESI versus Per Capita Gross Domestic Product (GDP)*”:

*“In statistical terms, about 23% of the variance in the ESI is accounted for by per capita GDP. This result suggests that richer countries can – and do – invest in pollution control and other environmental amenities.”*

The graph upon which this confident conclusion is reached can be found on page 26 of the report and basically shows the ESI for 2005 as the dependent variable and GDP/capita (presumably also for 2005) as the independent. A linear least squares regression fit to the data generates a positive slope (ESI increases with GDP/capita) and an  $R^2$  of 23%. The text goes on to draw conclusions with regard to individual (outlier) countries:

*“As indicated by their position above the regression line, the Nordic countries have high GDP per capita but even higher ESI scores than their wealth might forecast. The United Kingdom, Belgium, and the United States fall well below the regression line – indicating sub-par performance given their level of wealth. Likewise, Trinidad and Tobago falls below Argentina and Brazil among medium-income level countries. And Tajikistan and Uzbekistan lag behind Guyana among low-income countries.”*

Interestingly the authors do not attempt to fit a quadratic line as suggested by EKC

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theory (Morse, in press). Instead they imply that environmental sustainability will continue to increase with wealth – there is no worsening before improvement. But given that they provide all of the raw data and z-values in each of the ESI reports it is possible to attempt to derive a quadratic form of the EKC.

For the horizontal axis of the EKC it was decided to employ the GDP/capita (adjusted for purchasing power parity, PPP) published in the 2002 Human Development Report (UNDP, 2002). The real GDP/capita values are for 2000 (base year is 1996). I assumed that environmental performance as measured with the datasets in the ESI 2005 would be subject to a cause-effect delay, hence they may be more reflective of economic performance some years earlier rather than GDP/capita in 2003/2004 (the years that most of the data in ESI 2005 were collected). For the vertical axis it was decided to use the z-values of the ESI (rather than the raw data) but rather than pass through the process of aggregation within the ESI it was decided to employ principal component analysis to extract out a first principal component from variables that can be described as ‘pressure’ and ‘state’. My selection of pressure and state variables from the ESI is shown as Table 1. Analysis was via regression.

<Table 1 near here>

The results of the PCA are shown as Table 2. For the pressure variables the first principal component accounted for some 70% of the variation while for the state variables the respective figure was 40%. The pressure 1<sup>st</sup> PC is significantly related to the state 1<sup>st</sup> PC as shown in Figure 2. As pressure on the environment increases so the state of the environment (its quality) decreases.

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My versions of the EKC based on pressure and state first principal components are shown in Figure 3. The quadratic models are statistically significant and the plots do indeed have a visual sense of a curve. Thus there is some evidence here for the quadratic form of the EKC, although I do admit that it is far from conclusive given that other equally valid models (e.g. logistic; Sobhee, 2004) can be fitted to these data and could generate different interpretations of the relationship between national wealth and environmental quality.

<Table 2 near here>

<Figures 2 and 3 near here>

Nonetheless the quadratic ('good news') EKC does emerge as one statistically valid model.

### **Destroying the straw men: The post-development case**

Figure 3 and the basis for its construction from the ESI variables would appear to be the very PWWII development construct that post-developmentalists bemoan. The combination of a classically 'top down' PWWII tool (ESI) to explore a PWWII vision (quadratic EKC) nested within a PWWII 'siren song' (sustainable development) must surely be amongst the ultimate post-development heresy. Every step in the analysis, starting with the use of the ESI dataset and EKC theory applied by an 'outsider' (i.e. myself residing in the UK), would provide a basis for post-development analysis and

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swift rejection. Whether the quadratic EKC regressions are statistically significant or not, or indeed where the point of inflection of the curves rest, would be irrelevant for a post-development argument because here we have very much a sense of “*the imposition of science as power*” (Pieterse, 2000; page 175) and modernity, as well as a mirage which lures us with a promise that improving wealth, through more industrialisation and consumption, will inevitably lead to a better environment. The implication is of a continuous progress along the horizontal axis of the EKC which leads to industrialisation and modernisation. The emphasis is very much on the national scale (each point in Figure 3 is for an individual country) with no room for local perspectives as to what comprises ‘environmental quality’. Where are the people and the room to include local values and worldviews? There is an assumption that all must head in the same direction and that differences are in essence differences of economic development (Ferguson, 1997).

The tactical goal for which the EKC provides a starting point (and indeed the underlying rationale of the ESI itself) is to achieve a better environment, and this is intertwined within the overarching strategic goal of development represented here by national wealth estimated as GDP/capita. But it can be argued that the real goal of sustainable development is economic growth with a ‘better environment’ as a secondary concern (Escobar, 1995). All of this has been set by individuals, including myself, far removed, spatially as well as in terms of “*values, world-views and lifestyle’s*” (Mathews, 2004; page 379) from the local, especially in the developing South. Indeed the whole process, from constructing of the ESI by the ‘World Leaders of Tomorrow’ through to the ‘good news’ vision of the EKC is imbued with ‘Western bias’ (Adams, 1995).

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Even a more localised re-analysis of the data in Figure 3 does not help address these fundamental criticisms. It is easy enough to take the data from Figure 3 and separate out the values for regions such as Africa, Latin America and Europe (based upon ‘definitions’ of those regions as set out in Wikipedia). The results of separate regressions for the three regions are shown as Figure 4 (Africa), Figure 5 (Latin America) and Figure 6 (Europe). For both Africa and Latin America the quadratic models had squared terms which were not significant. For these data the linear models were more statistically valid, and this is logical given that within EKC theory these regions were still on the rising component of the curve; increasing industrialisation leading to greater pressure on the environment. For the Europe data set regression can fit a significant quadratic curve (squared GDP/capita term is significant) and this can be explained using EKC theory by there being a greater span of points along the horizontal axis thereby allowing the point of inflection to be exceeded. Beyond the point of inflection increased wealth leads to a reduction in pressure on the environment. But given that the premise upon which this analytical edifice for the three regions has been built is fundamentally flawed as far as post-development is concerned then these conclusions are meaningless. Even worse, validity of statistical analysis withstanding, we have both a Western vision of ‘environmental pressure’ (derived from the ESI) and ‘progress’ (GDP/capita) dominating in all three of these regions. Why should the ‘World Leaders’, and through them the WEF, vision of environmental pressure apply to Africa and Latin America? After all, the WEF website ([www.weforum.org](http://www.weforum.org)) claims that its members “*comprise in principle the foremost 1,000 global enterprises. Characteristics of Members include:*

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- *Their rank among the top companies within their industry and/or country*
- *The global dimension of their activities*
- *A leading role in shaping the future of their industry and/or region”*

One can't help wondering what proportion of this 1,000 membership comprises companies indigenous to Africa and Latin America rather than simply having a subsidiary located there? Arturo Escobar (1996; page 329), one of the key figures within post-development analysis, stresses this point more broadly as follows:

*“The question in this [sustainable development] discourse is what new manipulations can we invent to make the most out of nature and ‘resources’. But who is this ‘we’ who knows what is best for the world as a whole?”*

In fairness it should be emphasised that post-developmentalists would not be against an improvement in the environment *per se*, it is in the dominance of perspective from one direction (and an absence of discourse) presented, in essence, as a counter to the prevailing PWWII strategic assumption that movement along the horizontal axis of Figures 3 to 6 from left to right is the desired course. After all, initiatives such as Structural Adjustment promoted by the IMF and World Bank were designed to encourage such a ‘progression’ along the horizontal axis, and with it, so the EKC says, comes ultimately an improvement in the environment even if within the short term the result is degradation.

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<Figure 4, 5 and 6 near here>

### **Post-(sustainable) development?**

Post-development has been useful in highlighting reasons for the failure of some of the PWWII development project. Indeed some post-developmentalists would say that this is all they need do – that explaining why interventions do not work is a valid end in itself without necessarily putting forward an alternative (Nustad, 2001). As we have seen both the EKC and ESI provide excellent focal points for these criticism, but while the EKC-ESI represents easy ‘straw men’ targets for critique there are also problems with such a neat position. In a sense the ESI-EKC analysis presented in this paper illustrates the limits of critique.

For all its faults, the quadratic EKC as presented here encompasses a number of important assumptions in sustainable development:

1. environment change is inevitably linked to economic and social change (interconnectivity)
2. economic and social change within one group should not be to the detriment of others (equity)
3. it is important to include a consideration for future generations (futuraity)

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Putting aside for the moment that in practice these ideals are often not realised, when expressed in these more general terms it is doubtful whether these assumptions as a form of strategic guidance would be contested by post-developmentalists, even if taken to local scales. Would a locally instigated and controlled discourse, or indeed one mediated internationally by grassroots organisations, opt for a desired change which disadvantaged others (the weakest?) in their community or harm the opportunities for their children and grand children? If they did then surely one could question whether the local grassroots movement is right. Thus even in the apparent ‘straw man’ of the EKC there are fundamentals which arguably transcend “*difference*” and “*diversity*” (to use terms from Mathews, 2004). To begin with there is the immediate distinction that sustainable development is meant for both the developed and developing worlds; we really are all in it together. The environmental problems we see today may indeed have been spawned by the developed world, but does that make them any less of a problem? The EKC curves do embrace this notion as Figure 3 includes the entire ESI 2005 global subset of 146 countries. Post-development assumes exogenous as an ‘ill’ to which endogenous is the ‘cure’ and within Figure 3 some of the data points can be labelled in these terms, but there is no exogenous to Figure 3 taken as a whole.

Allied to this principal of a shared journey are some fundamental points as to what would likely constitute a collapse of sustainability. An example is provided by the ‘Natural Step’ founded in Sweden in 1989 by Karl-Henrick Robert (Hardi et al., 1997).

- 1 Materials from the Earth’s crust must not be systematically increased

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in the ecosphere

- 2 Materials produced by society must not be systematically increased in the ecosphere
- 3 The physical basis for the productivity and diversity of nature must not be systematically diminished
- 4 There must be fair and efficient use of resources with respect to meeting human needs

Superficially these four steps are very ‘top down’ and ‘Western’ in origin, representing as they do a consensus among that country’s top scientists as to what conditions are required for a sustainable society. Of these the fourth is perhaps the one most open to contention as to the meaning of words such as “fair” and “needs” and indeed the achievement to date has much to be desired (Fernando 2003), but the first three are more fundamental. Even ‘deep ecologists’, with whom post-developmentalists are sometimes compared (Pieterse, 2000; page 176), would find little, if anything, to disagree with here. Pollution is generally bad and resources do need to be utilised in ways which do not diminish them.

The ESI which has been employed here to generate quadratic EKC is admittedly only one representation of ‘Natural Steps’ 1 to 3, and as with any reduction of complexity the ESI does have its faults which makes it an easy target for post-development analysis. While it is difficult to defend the ESI as the definitive global measure of environmental sustainability we can at least acknowledge that the fundamental intention is there even if the picture has been painted by one group of powerful interests (The Ecologist, 2001). While there are several environmental narratives

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based on Northern images and ideologies about local degradation (e.g. deforestation) in say Africa (Roe, 1995) we are still left with a planet undergoing rapid environmental change which is at least hinted at by some of the variables of the ESI.

Post-development critique has emphasised the importance of the local while also acknowledging the role that trans-national solidarities and social movements can play in reinforcing this emphasis. The ESI is a nation-state scale index and from it was derived in this paper the national wealth-environmental quality EKC. But an overriding focus on either of these scales has its problems. We have already discussed those of the EKC, but the local construction of meaning with regard to sustainable development does have a fundamental dilemma in that it may not take into account impact at higher scales (e.g. global impact as a results of human-induced emissions of CO<sub>2</sub>) or indeed trans-local effects where pressures at one site can have an influence perhaps many miles away at another (e.g. acid rain or pollution from nuclear power). These may not be seen as important at one site but highly important at another. Having said that, it is already well established that there are many levels within which sustainable development can take place, and the local is perhaps the key scale for most of us in our everyday lives. Hence the oft-quoted refrain of ‘act local – think global’. At the level of our planet we are all endogenous, and thus we are left with the conclusion that action is required at all scales – local, regional, national and international.

Examples abound of community-scale sustainable development initiatives with both the meaning of ‘development’ and ‘sustainable’ open to precisely the sort of debate and construction avowed by post-developmentalists. Indeed some argue that

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sustainable development has discourse as a central element (Bell and Morse, 2003). The literature on such community-based sustainable development projects and the role of discourse is an extensive one and in this paper I cannot do it full justice. The following quotation is but an example:

*“Sustainability describes a state that is in transition continually:*

- 1) The objective of sustainability is not to win or lose and the intention is not to arrive at a particular point.*
- 2) planning for sustainability requires explicit accounting of perspective (world view or mindset) and must be involving of broadly representative stakeholder participation (through dialogue)*
- 3) Success is determined retrospectively, so the emphasis in planning should be on process and collectively considered, context-related progress rather than on achieving remote targets. A key measure of progress is the maintenance of a creative learning framework for planning.*
- 4) Institutional arrangements should be free to evolve in line with community learning.*
- 5) The new role for policy makers is to facilitate learning and seek leverage points with which to direct progress towards integrated economic, ecological and sociocultural approaches for all human activity.*

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*This describes a move away from a culturally inappropriate, exclusive epistemology of positive and normative definitions to a process that facilitates reflective insight and the genuine sharing of ideas.”*

Meppam and Gill (1998)

When expressed as an ideal a process of “*reflexive insight and the genuine sharing of ideas*” between all involved does not seem a long way away from ‘endogenous discourse’ (Escobar, 1992), a nexus with grassroots movements (Siemiatycki, 2005) or even ‘radical democracy’ (Zai, 2004) although no doubt there are issues over what these mean in practice.

So is it the ‘straw men’ of the EKC and ESI that are at fault or is it post-development? The answer is probably both neither and all. The EKC is in some ways an easy target but it also embodies important principles not easily dismissed. The ESI for all of its faults is at least an attempt to raise the profile of environmental sustainability at a decision-making level. Flawed it may be but at least it is a step in the right direction. On the other hand post-developmental critique does raise valid concerns with sustainable development as generally practised, particularly in terms of who is controlling the definition and practice, and this is a valuable reminder to those who perhaps see public participation as nothing more than a gesture towards ticking a project blueprint box for accountability. In her ‘postist’ critique of sustainable development Hove (2004; page 53) does come to the conclusion that:

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*“Most fundamentally, the future of sustainable development as a method of overcoming the impasse must more meaningfully attempt to change world production processes in order to render a more equitable, just, and sustainable world order into which the rights and interests of all are incorporated.”*

A statement which readily maps onto the ‘Natural Step’ statements of principle given earlier and would not be all that far away from most definitions of sustainable development such as that of the World Commission for Environment and Development (WCED).

*“Development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations”*

WCED (1987)

Thus it would appear that post-developmental critique of sustainable development is primarily focussed on the practice rather than principle. Indeed it is perhaps ironical that ideas represented by the EKC, ESI and post-developmentalism can be happily bundled within sustainable development. This ability to happily embrace as I have done *“ships of very varied allegiance”* (Adams, 1995: 98) is at first somewhat disconcerting and highlights a central dilemma with sustainable development that is if anything one of its few common denominators – its complexity. It does make one wonder whether we are perhaps trying to embrace too much. Is it all just appealing theory that spans many ideas, covers many approaches (quantitative and qualitative)

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and scales (social, spatial or otherwise) and readily absorbs an unlimited deconstruction? If so will sustainable development inevitably be flawed when put into practice? Is the translation from theory to practice impossible given the imperfections of human beings?

## **Conclusion**

This paper explored the application of a post-development analysis to sustainable development by first creating an easy target ('straw man') for post-development analysis - an EKC derived from the ESI. However for all of their undoubted faults there are nonetheless foundations upon which the EKC and ESI rest which are not easily dismissed. Neither is the typical post-development 'alternative' of encouraging 'endogenous discourse' and grassroots movements necessarily at odds with sustainable development; far from it. As a result it can be argued that sustainable development theory already incorporates much of the critique and alternatives raised by post-developmentalists – post-sustainable development already exists and is what many argue we should be trying to do - and the problems rest more with how such rich theory is being translated into practice. Public participation in sustainable development projects is often seen as nothing more than a mechanical nod in the direction of accountability rather than a genuine attempt to help provide local people with a voice and a space to encourage learning (Bell and Morse, 2003). Despite the participatory rhetoric the voice of the project funder and its demands for measurable

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impact can often be the dominant one, and post-development at least reminds us of the need to question whether this is right.

Is sustainable development doomed to failure because of implementation by imperfect human beings? There are worrying echoes here of Fyodor Dostoevsky's book '*Notes from the Underground*' (first published in 1864) interpreted by a contemporary (Vasily Rozanov) as encompassing:

- 1) impossibility, by means of reason, to create a perfect society and to abolish suffering.
- 2) human imperfection is a law of nature and the cause of human suffering.
- 3) humans are essentially irrational and incomprehensible beings.

Placing the theory of sustainable development into practice requires the opposite of all three of these points; at least for most of the time.

Ironically Dostoevsky regarded the 'Crystal Palace built on London's Hyde Park in 1851 for the Great Exhibition as the greatest example of reason, science and logic the world had seen at that time. It was the World's first modern building, made entirely of glass and iron, and was moved to South London once the Great Exhibition has ended.

*It burnt down in 1936 – just 85 years later.*

### **Acknowledgement**

The author would like to thank the contributions made by the two anonymous referees for the improvement of this paper. The views expressed are entirely those of the author.

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Table 1. Indicators and variables included in the Environmental Sustainability Index (ESI) of 2005.

(a) State variables

Variable Code	Variable
NO2	Urban population weighted NO2 concentration
SO2	Urban population weighted SO2 concentration
TSP	Urban population weighted TSP concentration
INDOOR	Indoor air pollution from solid fuel use
ECORISK	Percentage of country's territory in threatened eco-regions
PRT_BRD	Threatened bird species as percentage of known breeding bird species in each country
PRT_MAM	Threatened mammal species as percentage of known mammal species in each country
PRTAMPH	Threatened amphibian species as percentage of known amphibian species in each country
NBI	National Biodiversity Index
ANTH10	Percentage of total land area (including inland waters) having very low anthropogenic impact
ANTH40	Percentage of total land area (including inland waters) having very high anthropogenic impact
WQ_DO	Dissolved oxygen concentration
WQ_EC	Electrical conductivity
WQ_PH	Phosphorus concentration
WATAVL	Freshwater availability per capita
GRDAVL	Internal groundwater availability per capita
FOREST	Annual average forest cover change rate from 1990 to 2000
WATSTR	Percentage of country under severe water stress

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### (b) Pressure variables

Variable Code	Variable
NOXKM	Anthropogenic NOX emissions per populated land area
SO2KM	Anthropogenic SO2 emissions per populated land area
VOCKM	Anthropogenic VOC emissions per populated land area
COALKM	Coal consumption per populated land area
CARSKM	Vehicles in use per populated land area
ACEXE	Acidification exceedance from anthropogenic sulfur deposition
GR2050	Percentage change in projected population (2000 to 2050)
TFR	Total Fertility Rate
EFPC	Ecological Footprint per capita
HAZWST	Generation of hazardous waste
BODWAT	Industrial organic water pollutant (BOD) emissions per available freshwater
FERTHA	Fertilizer consumption per hectare of arable land
PESTHA	Pesticide consumption per hectare of arable land
OVRFSH	Productivity over-fishing
CO2GDP	Carbon emissions per million US dollars GDP
CO2PC	Carbon emissions per capita
POLEXP	Import of polluting goods and raw materials as percentage of total imports of goods and services

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Table 2. Results of a principal component analysis on the z-values of the pressure and state variables of the ESI 2005.

	Pressure 1 <sup>st</sup> PC		State 1 <sup>st</sup> PC
Eigenvalue	11.81	Eigenvalue	7.2
Proportion	69.5	Proportion	40.0
NOXKM	-0.266	NO2	-0.036
SO2KM	-0.275	SO2	-0.234
VOCKM	-0.219	TSP	-0.316
COALKM	-0.276	INDOOR	-0.316
CARSKM	-0.288	ECORISK	0.035
ACEXC	-0.235	PRTBRD	0.044
GR2050	0.283	PRTMAM	0.14
TFR	0.285	PRTAMPH	-0.178
EFPC	-0.263	NBI	0.317
HAZWST	-0.166	ANTH10	0.099
BODWAT	-0.243	ANTH40	0.293
FERTHA	-0.269	WQ_DO	-0.236
PESTHA	-0.27	WQ_EC	0.262
OVRFSH	-0.116	WQ_PH	0.015
CO2GDP	-0.05	WATAVL	0.294
CO2PC	-0.28	GRDAVL	0.3
POLEXP	-0.187	FOREST	-0.323
		WATSTR	0.299

All countries reported in the ESI 2005 were included in the analysis.

**Figure legends**

Figure 1. The assumed relationship between national wealth and environmental degradation in the Environmental Kuznets Curve (EKC).

Figure 2. State 1<sup>st</sup> Principle Component as a function of pressure 1<sup>st</sup> Principle Component.

Figure 3. The 1<sup>st</sup> principal components of pressure and state as a function of log GDP/capita: the EKC model.

Figure 4. 1<sup>st</sup> Principle Component for pressure as a function of GDP/capita. Data from African countries.

Figure 5. . 1<sup>st</sup> Principle Component for pressure as a function of GDP/capita. Data from Latin American countries.

Figure 6. . 1<sup>st</sup> Principle Component for pressure as a function of GDP/capita. Data from European countries.

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Fig. 1

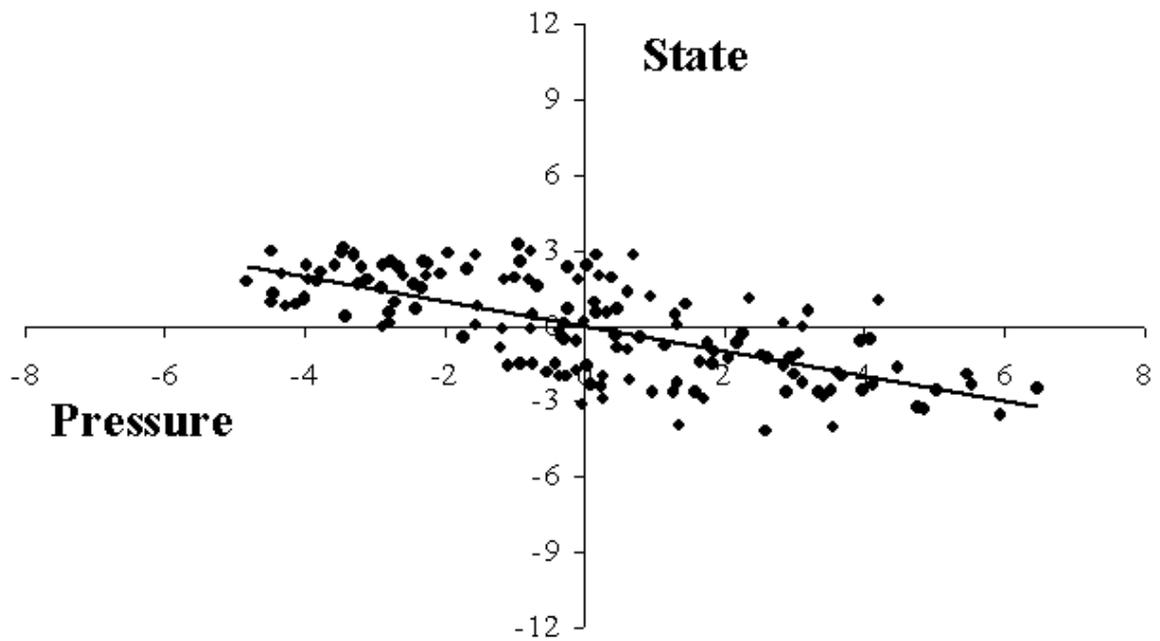
(a) Expressed in terms of environmental degradation (or pressure)



(b) Expressed in terms of environmental quality (or state)



Fig. 2



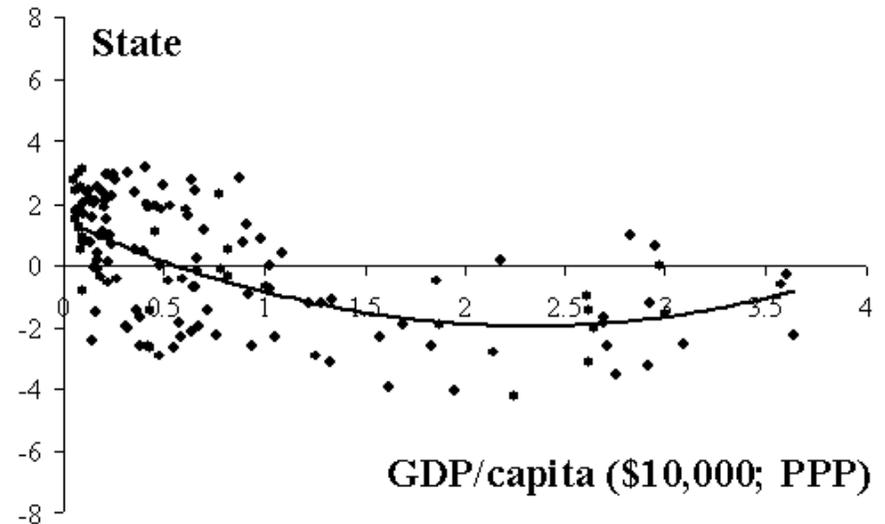
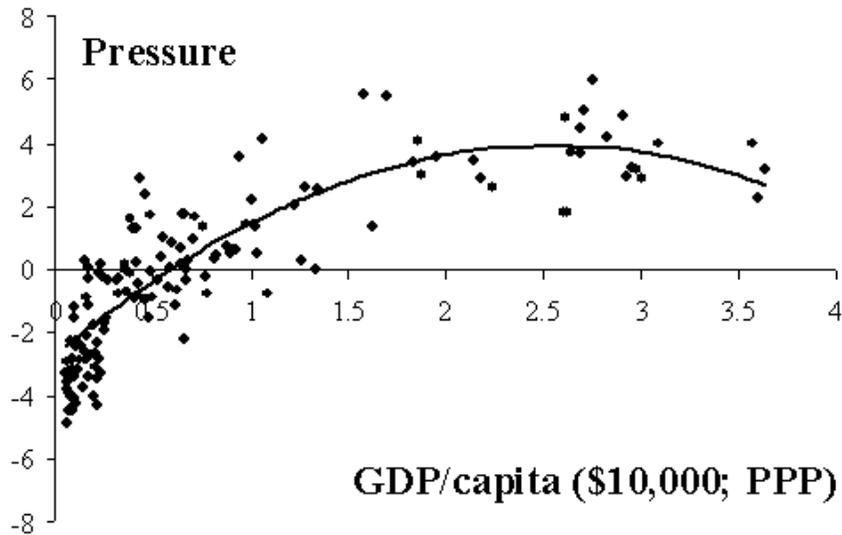
	Coefficient (SE)	t-value/significance
Intercept	0.00 (0.115)	0.00 ns
Pressure 1 <sup>st</sup> PC	-0.501 (0.043)	-11.56 ***

F = 133.52 (P < 0.001) df = 1, 144

R<sup>2</sup> = 48%

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Fig. 3



	Coefficient (SE)	t-value/significance
Intercept	-3.114 (0.199)	-15.62 ***
GDP	5.842 (0.428)	13.86 ***
GDP <sup>2</sup>	-1.193 (0.135)	-8.85 ***

F = 219.85 \*\*\* df = 2, 138

R<sup>2</sup> (adjusted) = 75.8%

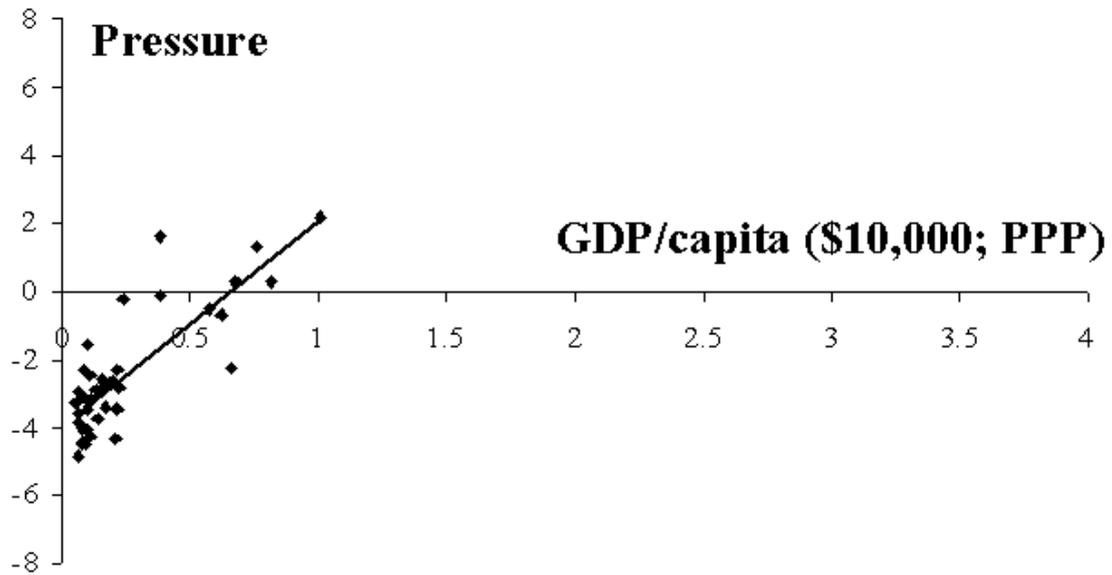
Note: GDP regression coefficients are in \$10,000

	Coefficient (SE)	t-value/significance
Intercept	1.669 (0.24)	6.96 ***
GDP	-3.293 (0.514)	-6.41 ***
GDP <sup>2</sup>	0.728 (0.162)	4.49 ***

F = 39.8 \*\*\* df = 2, 138

R<sup>2</sup> (adjusted) = 35.7%

Fig. 4



Quadratic model

	Coefficient (SE)	t-value/significance
Intercept	-4.289 (0.363)	-11.8 ***
GDP	9.211 (2.69)	3.42 ***
GDP <sup>2</sup>	-3.598 (2.955)	-1.22 ns

F = 42.04 \*\*\* df = 2, 38

R<sup>2</sup> (adjusted) = 67%

Linear model

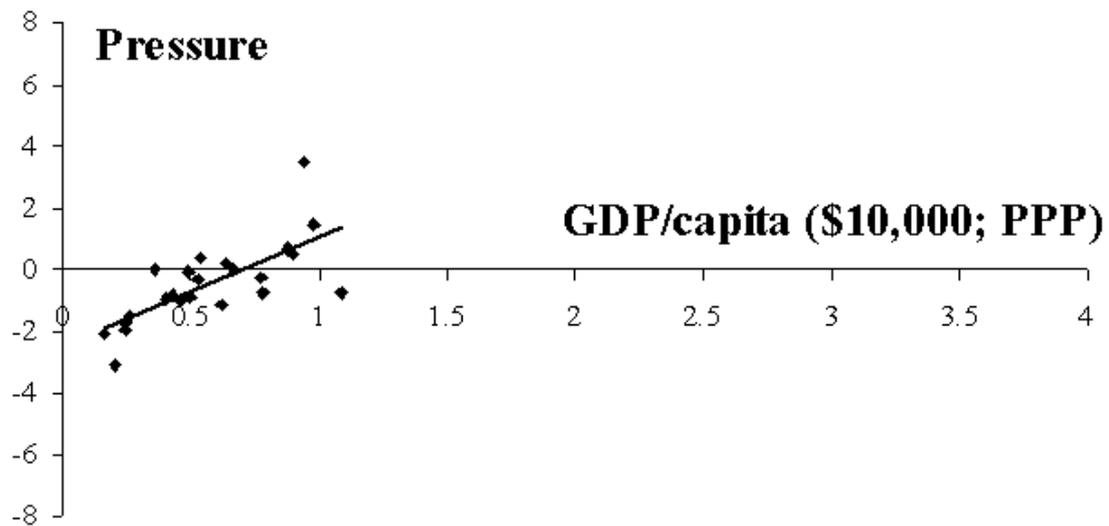
	Coefficient (SE)	t-value/significance
Intercept	-3.942 (0.227)	-17.34 ***
GDP	6.037 (0.669)	9.03 ***

F = 81.57 \*\*\* df = 1, 39

R<sup>2</sup> (adjusted) = 67%

Note: GDP regression coefficients are in \$10,000

Fig. 5



Quadratic model

	Coefficient (SE)	t-value/significance
Intercept	-3.613 (0.974)	-3.71 ***
GDP	8.192 (3.589)	2.28 ***
GDP <sup>2</sup>	-3.832 (2.901)	-1.32 ns

F = 12.41 \*\*\* df = 2, 20

R<sup>2</sup> (adjusted) = 51%

Linear model

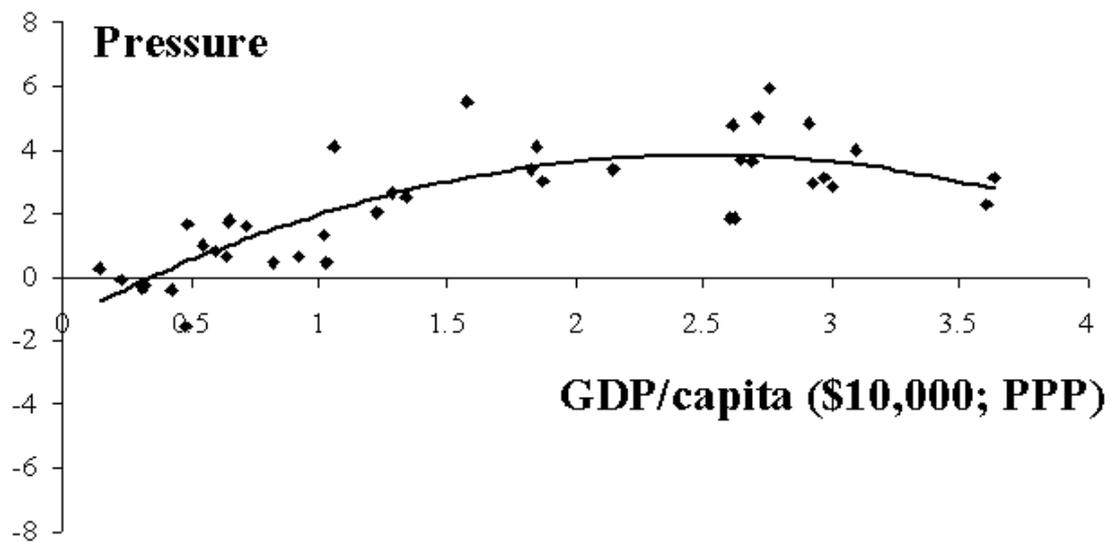
	Coefficient (SE)	t-value/significance
Intercept	-2.482 (0.473)	-5.25 ***
GDP	3.552 (0.752)	4.72 ***

F = 22.28 \*\*\* df = 1, 21

R<sup>2</sup> (adjusted) = 52%

Note: GDP regression coefficients are in \$10,000

Fig. 6



Quadratic model

	Coefficient (SE)	t-value/significance
Intercept	-1.334 (0.514)	-2.6 *
GDP	4.128 (0.739)	5.58 ***
GDP <sup>2</sup>	-0.827 (0.203)	-4.08 ***

F = 35.41\*\*\* df = 2, 37

R<sup>2</sup> (adjusted) = 64%

Note: GDP regression coefficients are in \$10,000