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Understanding the role of post-materialism in the trade-off between economic growth and the environment in BRICS countries

Jorich Johann Loubser

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About the author:

Jorich Loubser is an economics honours student

and a researcher in iCWild and the CSSR.

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Abstract

This article uses the World Values Survey to explore, in the BRICS countries and in the 'West' (a pool of observations from Germany, the Netherlands and Sweden), the role of values (materialist and post-materialist) in shaping whether respondents prioritise the environment even at the cost of growth, or growth even if the environment suffers. Inglehart's theory of post-materialism suggests that materialists will support economic growth at the cost of environmental degradation, while post-materialists will favour environmental protection. However, the article finds that at relatively low levels of GDP per capita, post-materialists support economic growth at the expense of the environment, perhaps in an attempt to alleviate poverty. In countries with relatively high GDP per capita, post-materialists are more likely to favour environmental protection over economic growth. Post-materialist theory suggests that individuals personal economic environments shape their values; this article shows that the economic conditions of the community/country shape the way that these values are lived out.

1. Introduction

This article uses the 6th Wave of the World Value Survey (WVS) to explore the role of values (materialist and post-materialist) in shaping whether respondents believe that 'protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs' or that 'economic growth and creating jobs should be the top priority, even if the environment suffers to some extent'. We focus on the BRICS countries (Brazil, Russia, India, China and South Africa) – paying specific attention to South Africa and the 'West' (pooled observations from Germany, the Netherlands and Sweden).

Ronald Inglehart's theory of post-materialism describes the value-shift in societies from material concerns (held by 'materialists'), such as physical needs and economic security, towards non-material concerns, such as self-expression, environmental concern and quality of life (Inglehart, 1981). Inglehart (1995)

argued that those who are 'post-materialist' are more likely to support the environment than those who are materialists. This issue remains topical. Although the discussion on climate change and the environment has become more important globally, many developing countries understandably view economic development as of primary importance. Thus, this article seeks to increase our understanding of the relationship between the two issues.

The WVS is the largest non-commercial, cross-national, time series investigation of beliefs and values globally and Inglehart, as the founding president, was central to its formation. This article will investigate if the role of post-materialism (in shaping attitudes towards growth versus the environment) is the same in each of the BRICS countries and in the 'West'. It will also report on the extent to which countries are divided between those who support economic growth even if it sacrifices the environment (a materialist belief) and those who support environmental protection even if hinders economic growth (a predominantly post-materialist value).

Firstly, the article will consider the issue of value divergence (advanced capitalist countries becoming more post-materialist and developing countries remaining predominantly materialist) and what this means for the international development agenda as discussed by Lant Pritchett in 2015. The article will provide a deeper analysis of South Africa than the other countries, to explore the role of race and class in shaping attitudes. Thus, the article includes a brief discussion of South Africa's current socio-economic context and need for growth and then describes the role of the environment on growth to show why this study is of importance. This will be followed by an account of factors which influence whether individuals prioritise the environment. Lastly, before results are shown, both the composition of support for environmental protection and economic growth and post-materialism for each country will be showcased.

2. Post-materialism

As early as the 1970s Inglehart (who pioneered work on the WVS) found that there had been a large shift in Western priorities during the post-war period from what he called a materialist emphasis to a post-materialist one (Inglehart, 1981).

Inglehart argued that Western citizens were placing less emphasis on material goals, such as physical sustenance and safety, and more emphasis on non-material (post-material) goals, such as self-expression and quality of life. These post-material goals were, in accordance with Maslow's hierarchy of needs, classified as higher order goals. Inglehart (1981) suggested that this shift was a product of unprecedented levels of economic and physical security in the post-

war era. His argument suggested a linear progression from a state of pure materialism to one of pure post-materialism because of 'the fundamental difference between growing up with an awareness that one's survival is precarious and growing up with the feeling that one's survival can be taken for granted' (Inglehart, 1997:31). Inglehart argued that the unprecedented higher living standards of many individuals in the late 20th and early 21st century changed their fundamental outlook on the world and their place within it.

3. Post-materialism, income and divergence

Lant Pritchett (2015) highlights the role of post-materialist values (which he attributes to rising living standards) in his exploration of changing priorities in donor countries regarding foreign aid. Using data from the WVS from 1995 to 2014, he argues that the median voter in most developed countries has shifted from holding materialist (concerned about growth and possessions) values to post-materialist (concerned about beauty and the environment) values, whereas the median voter in developing countries has remained materialist (Pritchett, 2015). He predicts that Organisation for Economic Cooperation and Development (OECD) donors will become increasingly irrelevant to economic growth in developing countries as they 'talk development down' by shifting attention away from large scale development interventions, focusing instead on measuring absolute poverty (presumably to guide attempts to ameliorate it) and on small scale renewable energy projects (Pritchett, 2015:208). He is particularly scathing about this, observing that the poor do not need surveys to tell them what they already know – that they are poor – or which promote projects that appeal to developed country voters rather than building the power stations, dams and ports that they need to drive growth. He accepts that development aid has been affected by slower global growth since 2008 but attributes the increasing 'unreliability' of the advanced capitalist countries as sources of growth-oriented development finance to the political ramifications of changing values.

Pritchett extends this argument to make the claim that differences in level of development (per capita income) shape the composition of those with materialist or post-materialist values within a country, which in turn changes the nature and role of development as understood by Western donors. This results in a clash over development priorities, with developed countries more willing to give aid to projects/initiatives which are founded on post-materialist values, while developing countries have a preference for aid that supports projects/initiatives which are founded on material values. Citing data from Afrobarometer surveys (of citizen preferences and attitudes to democracy) Pritchett estimates that 60% of American assistance to Africa is placed into areas that Africans view as distinctly lower-tier priorities (Pritchett, 2015:212).

In Figure 1 below, Pritchett (2015) plots GDP per capita against the percentage of WVS respondents in each country that said that economic growth was the top priority for the country. It shows a negative relationship. In the prosperous Western countries (Australia, Finland, France, Japan, the Netherlands, Norway, Sweden and the United Kingdom) most respondents disagreed, indicating that the median voter in those countries did not prioritise growth.

Data from the WVS thus supports the proposition that dominant social values evolve with GDP per capita from more materialist concerns (growth, jobs, consumption, capital accumulation) to post-materialist values more strongly oriented towards the environment. Yet there is clearly substantial variation around the regression line reported in Figure 1. This may well reflect particular historical and social circumstances, perhaps also distributional factors (inequality), regional location, environmental degradation etc.

Inglehart has shown that post-materialism increases support for the environment. This paper uses the WVS to explore the extent to which environmental values are favoured over material values in South Africa, and then to compare the results with the other BRICS countries (Brazil, Russia, India and China) and the 'West'.

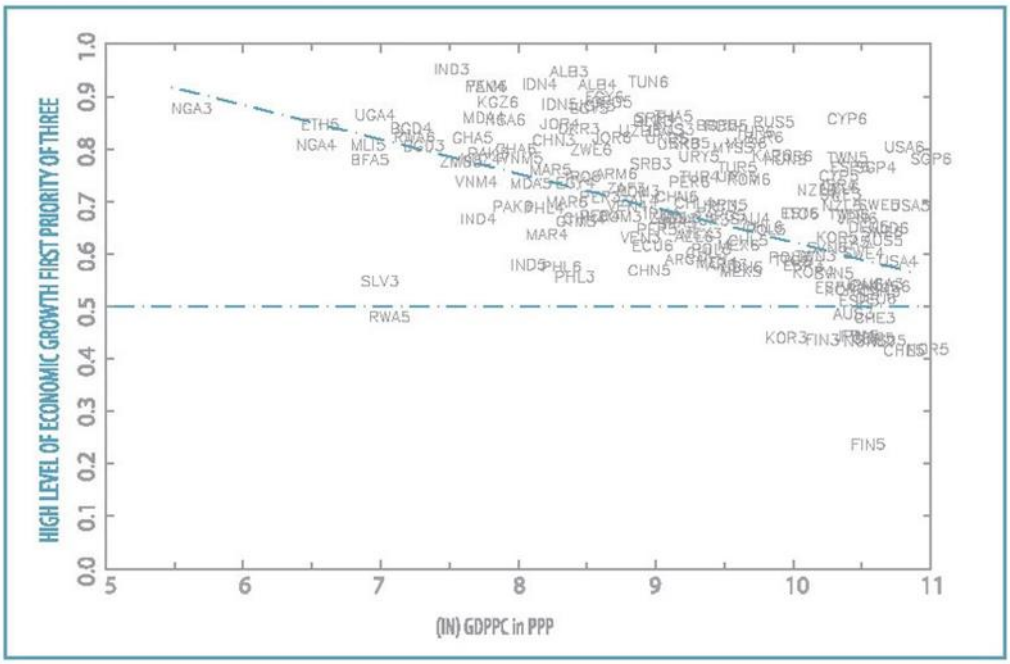


Figure 1: Economic growth as a first priority and per capita income (Pritchett, 2015):

4. South Africa's socio-economic context

South Africa is one of the world's most unequal countries, an outcome driven by high unemployment and wage inequality (Leibbrandt et al, 2012). Social welfare (especially grants such as old age pensions) have helped alleviate poverty and inequality but slowing growth since 2011 has placed pressure on the capacity of the fiscus do more (Inchauste et al. 2015). South Africa not only has a high unemployment rate, but it also has incredibly high levels of youth unemployment (Dessus et al., 2018). Racial inequality has declined in post-apartheid South Africa, the top income quintile is now half black and half white, as class differences have become more pertinent (Seekings & Nattrass, 2016). Yet the legacy of Apartheid means that the socio-economic hierarchy continues to be shaped by race with white people having the highest average income followed by Indian, coloured and black South Africans (Kotzé & Garcia-Rivero, 2018). Inclusive growth in these circumstances requires that unemployment, wage inequality and racial inequality be reduced. How to do this is a complex economic and political issue and is beyond the scope of this paper.

We explore the extent to which materialist (or post-materialist) values – as well as factors such as race, class, pollution levels, and the state of the national economy – affect the trade-off decision between the environment and economic growth (that is, whether respondents prioritise growth even at the cost of the environment or vice versa). As discussed above, Pritchett looked at differences in dominant values between countries, arguing that the rise of post-materialism was associated with higher per capita income. This paper explores whether income shapes values *within* a country – and we use South Africa (and other countries) as a lens for doing so. The extent to which income, class and/or race affects the relationship between value-orientation and how respondents deal with any potential trade-off between maximizing growth and protecting the environment, may have political/policy implications.

If, as suggested by Pritchett, income is the reason for the divergence between countries with predominantly materialist or post-materialist values, then there exists the possibility that, especially in highly unequal countries, this divergence will be manifest, also within countries and drawn along class (income) lines. Could it be that in South Africa, the relatively poor have materialist priorities, whereas better off (especially white) South Africans have post-materialist priorities? Does race and class also affect the extent to which respondents support economically costly environmental protection?

Pritchett emphasizes the political importance of the median voter, but the values of the elite are also important (Inglehart, 1997). According to elite theory of democracies, public policy is not exclusively determined by the masses, but also

largely reflects the values of the elite because elite opinion makers have a greater input into and influence on problem definition and agenda-setting in public policy making (Anderson, 2015). South African president, Cyril Ramaphosa, has responded to the need for inclusive growth in his State of the Nation address in 2018: 'This year, we will be initiating measures to set the country on a new path of growth, employment and transformation' (Ramaphosa, 2018). However, the extent to which economic growth will be sustainable or environmentally friendly remains a contested area.

5. Development and the environment

The great rise in economic growth during the 18th and 19th centuries was based on the coal-fired industrial revolution with adverse consequences for air quality. Attempts by developing countries to catch up, have similarly been plagued by environmental costs, although improvements in technology offer some hope for greener growth. Analysis of data from 1980-2007 for Brazil, China and India, and data from 1992-2007 for Russia, indicates that CO_2 emissions increased with real output, stabilised, and then declined (Pao & Tsai, 2011). Yet Pao and Tsai (ibid) found, by analysing the effects of Foreign Direct Investment, that there is evidence that certain developing countries are pollution havens for large multinational companies. It thus appears likely that the relationship between growth and the environment is shaped by development context and strategy. It is also likely that where large numbers of people are exposed to pollution (as in urban areas) there will be political and social pressure to improve the environment.

Neoclassical economists had previously viewed environmental amenities as 'luxury goods' premised on the fact that poorer nations and individuals had to prioritise material goods such as food, clothing and housing and that protecting the environment would benefit primarily the rich at the cost of the poor (Baumol & Oates, 1979:175). This is consistent with the explanation of increasing support for environmental protection in the West as driven by post-materialist values associated with rising living standards (Inglehart, 1995). Post-materialist theory reinforced the notion that environmental protection was a luxury good, achievable only once a certain (relatively high) level of development had been attained (discussed in Dunlap & York, 2008).

This view was strongly challenged by Dunlap et al. (1993) who through their analysis of the results of the 1992 Health of the Planet Survey, found that contrary to conventional thought and neoclassical theory, the environmental agenda had entered the public agenda in many developed and developing countries. The study also found that environmental issues were not only perceived as a threat to quality

of life, but were in fact also viewed as health threats, a consequence of high levels of pollution. The study was ground-breaking in illustrating that the widespread assumption that citizens of poorer countries were universally more willing to accept environmental degradation in return for economic growth was in fact empirically untrue.

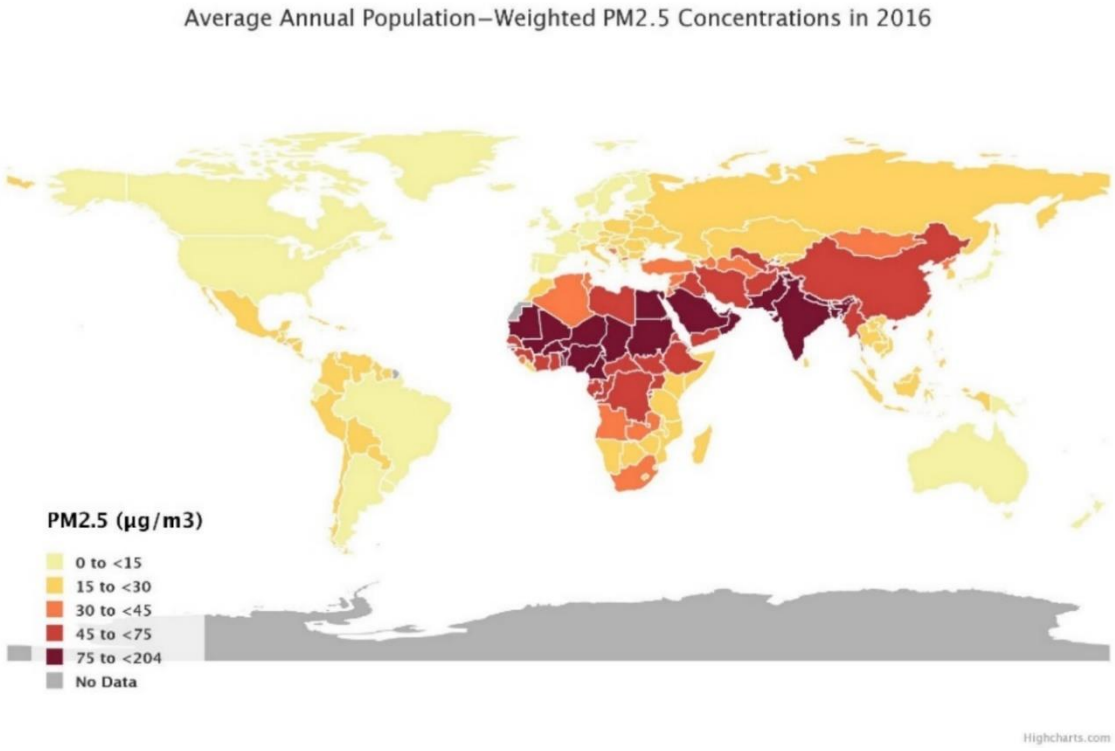
These ground-breaking findings of Dunlap et al. (1993) have been confirmed in subsequent analysis using the WVS, Dunlap & York (2008) found that concern over the environment was not exclusively post-materialist but had become a global phenomenon. Inglehart, considering Dunlap et al.'s (1993) earlier work, suggested that support for the environment should be considered through the lens of an 'objective problem and subjective values' model (Inglehart, 1995). He noted that some of countries with the highest levels of support for environmental protection also faced severe levels of pollution. This, he argued, supported a 'challenge-response' model, concluding that much of the support for environmental policy in the developing countries was a product of the objective reality of citizens in highly polluted countries.

This may well be due to the obvious health-related effects of environmental degradation when expressed in the form of air pollution. Pollution in various forms can pose severe health risks, however fine particle air pollution, measured as PM2.5, which are particles less than or equal to 2.5 micrometers in diameter, is the 6th-highest risk factor for early death. Worldwide exposure to PM2.5 has contributed to 4.1 million deaths (Health Effects Institute, 2018). India and China are the worst-off BRICS nations. Table 1 reports data from the World Bank's World Development Indicators to provide estimates for the BRICS countries as well as the global average and averages for high-, low- and middle-income countries. Figure 2 indicates the seriousness of this problem globally, with Africa and Asia being the worst-off.

China and India have grown rapidly during the 21st century, with adverse effects on air quality. In 2014 China's Premier Li Keqiang, declared 'war against pollution', and China has since seen remarkable improvements in in air quality, ranging from 21% to 42% decreases in PM2.5 concentrations between 2013 and 2017 (Greenhouse & Schwarz, 2018). Even so, the World Bank estimates that all people in China remain at risk of adverse health effects from air pollution (Table 1). India's exposure to air pollution is also high and appears to have worsened since 2010 (Health Effects Institute, 2018).

Inglehart (1995) however, also warns that it would be naive to ignore subjective values. Certain cultural regions, where there has traditionally been a close and highly valued connection to the land, may have much higher support for environmental protection than would be predicated by income alone. A recent

South African example of cultural efforts to protect the environment as part of a broader effort to protect a traditional way of life can be seen in the opposition to an attempt by an Australian mining company to acquire the rights to mine Titanium on rural tribal lands on the Wild Coast of the Eastern Cape. Speaking to the World Alliance for Religion and Peace against the mining and the duty of the community to protect the land both as a source of income for peasant farmers and for cultural purposes, Crown Princess of the AmaPondo, Princess Wezizwe Sigcau, said 'It is a duty that is implicit in our sense of accountability to our ancestors, who are identified within the Earth. The strong attachment to the land which traditional communities have is a source of indigenous knowledge and properly understood, it is a progressive, inclusive cosmology' (Clark, 2015).



Source: Health Effects Institute, 2018

Figure 2: Annual air pollution concentrations

Table 1: Exposure to air pollution

	Percent of population exposed to ambient concentrations of PM2.5 that exceed the WHO guideline value of 10 micrograms per cubic meter (the lower end of the range of concentrations over which adverse health effects due to PM2.5 exposure have been observed). (2016)	Population-weighted exposure to ambient PM2.5 pollution is defined as the average level of exposure of a nation's population to concentrations of suspended particles measuring less than 2.5 microns in aerodynamic diameter, which are capable of penetrating deep into the respiratory tract and causing severe health damage. Exposure is calculated by weighting mean annual concentrations of PM2.5 by population in both urban and rural areas.
Brazil	71.9%	12.6%
Russia	91.5%	15.5%
India	99.9%	75.8%
China	100%	56.3%
South Africa	100%	35.9%
Low income	100%	56.9%
Middle income	98.6%	55.5%
High income	76.4%	19.5%
World	95.1%	49.7%

Source: World Development Indicators (World Bank, 2018a)

6. Post-materialism and environmental support

Although post-materialism is positively correlated with support for environmental protection in high-income Western countries, the effect of post-materialism in the developing world has remained unclear for two reasons: firstly because, post-materialists make up a smaller portion of the population in the developing world and secondly the material motivations for concern about the quality of their surrounding environment are more prominent, for example life-threatening pollution (Inglehart, 1995).

Inglehart (1995) accepted that values in favour of environmental protection had become salient in both developed and developing countries but pointed out that people are far more hesitant to support environmental protection when questions are raised about willingness to pay. Dunlap & York's (2008) analysis also found that people in developing nations were less likely to support environmental protection when framed explicitly as being at the expense of economic growth. Although it is possible in certain circumstances to provide environmental protection without incurring any costs, Inglehart reminds us that when considering environmental protection: 'The crunch comes when a difficult choice is needed between roads and trees, dams or endangered species, to burn fossil fuels that may lead to global warming or to remain non-industrialised. It is when a society is forced to make difficult choices like these, that environmental protection becomes a political issue' (1995:57). This is a critical question in many countries in the Global South, and the factors that influence the trade-off decision must be fully understood.

Inglehart (1995) theorized that an individual's support for the environment over growth will be a function of either their post-materialist values or, in certain cases, if they experience high levels of pollution. A multilevel analysis of 50 countries showed that those who held post-materialist values were more supportive of environmental issues (Gelissen, 2007). The positive effect of post-materialism is supported by Franzen (2003) and Kemmelmeier et al. (2002). Kemmelmeier et al. (2002) created an index of willingness to make economic sacrifices for the sake of the environment composing of willingness to pay higher taxes, pay higher prices and accept cuts in standard of living to protect the environment. It must be noted that all of these sacrifices are personal sacrifices. Analysing 20 countries, mostly European, using the 1993 International Social Survey Programme, he showed that on a societal level (that is, using cross-country analysis) once controlling for income, post-materialism only has a positively statistically significant effect on the environmental sacrifice index in 9 of the 20 countries. However, on an individual level (i.e. analysing the data within countries) post-materialism has a highly statistically significant positive effect in 17 of the 20 countries. Kemmermeier et al. (ibid) also found that controlling for income does not produce statistically significant differences in the effect of post-materialism at an individual level. They conclude that economic circumstances are more critical to environmental sacrifices than subjective values. Following these findings, it is hypothesised that within a country those who are stronger holders of post-materialist values will support economically costly environmental protection.

7. Socio-demographic variables & environmental protection

Franzen (2003) shows through his analysis of data from the 1993 and 2000 International Social Survey Program (ISSP) in 26 countries, that a higher proportion of citizens in high-income countries support environmental protection at the cost of economic growth. This is in line with Inglehart's 'objective problems-subjective values' hypothesis. But Franzen is careful to state that an increase in environmentalism is not necessarily a result of post-materialist values but can alternatively be explained by the 'affluence hypothesis'. This hypothesis states that income affects pro-environmental values through two channels (Franzen, 2003). Firstly, an increase in income increases the demand for a clean environment. Secondly, although lower-income countries are also concerned with the environment, the higher per capita GDP enjoyed by high-income countries eases the reallocation of economic resources from the market economy to the environment. Thus, it is hypothesised that within all countries, those who are wealthier will be more likely to support the environment over the economy.

Franzen (2003) shows that results tend to favour the post-materialist hypothesis over the affluence model as the post-materialist theory incorporates value changes over the long-term, a theory that closer aligns to the data, while the 'affluence theory' assumes that an individual's demand for environmental quality increases directly proportionally to increases in income. However, particularly following the 'affluence theory' and the research that has shown a positive relationship between income and environmental support (Kemmelmeier et al., 2002; Gelissen, 2007; Shen & Saijo, 2008), it is hypothesised that those who are wealthier within a country will be more likely to support economically costly environmental growth.

Higher levels of education are also likely to foster support for environmental protection as it is likely to be associated with the diffusion of environmental information and better skills to understand this information. Xiao & Dunlap (2007) found a positive relationship between education and environmental support in the United States of America and Canada using the 1992 Health of the Planet Survey. This positive relationship was also found in 14 of 21 countries analysed by Kemmelmeier et al. (2002). Shen & Saijo (2008), in their analysis of urban Shanghai through a field survey, found that higher levels of education and household income were positively correlated with concern for the environment. A multilevel analysis of 50 countries found that higher levels of educational attainment are positively related to environmental protection (Gelissen, 2007). It is hypothesised that education, in particular tertiary education, will have positive effect on environmental support.

Shen and Saio (2008) showed that in Shanghai older people were more likely to prioritise the environment. They suggest that this was because many of the older generation experienced the worst of the Shanghai pollution in the 1980s and 1990s. However, work using the Washington State Survey (Dunlap et al., 2000) and multilevel analysis across 50 countries (Gelissen, 2007) showed that there was a negative relationship between age and environmental support. Analysis that has focused specifically on the role of age and environmental support in the United States has shown that the relationship is not as simple. Depending on the indicator used to proxy for environmental support, the young may be the most pro-environmental or the least (Dietz et al., 1998).

The role of gender regarding environmental issues is mixed, for example Koninsky et al. (2008) in their analysis of U.S. adults in the Cooperative Congressional Election Study found that there are no gender differences between males and females with respect to environmental resources issues, but that females are greater supporters of government intervention regarding pollution issues. However, Zelezny, Chau & Aldrich (2000) when surveying university undergraduates across 14 countries, found that women are generally more supportive of environmentalism but Kemmelmeier et al. (2002) found no clear relationship. While Shen and Saijo (2008) found that men in Shanghai were more likely to prioritise the environment as in Shanghai males had been socialised to adopt a more altruistic socially concerned role. The role of gender and age are not clear, and thus probably need to be investigated on a case by case basis.

8. Using the World Value Survey (WVS) to explore support for environmental protection over economic growth

The WVS (Inglehart, 2014) is the largest non-commercial, cross-national, time series investigation of beliefs and values globally. The surveys are completed in different years in different countries, but within a certain range, for example all countries in Wave 6 were surveyed between 2010 and 2014. This study uses data from Wave 6 (2014). Germany, the Netherlands and Sweden have been pooled and will represent the relatively high income ‘West’. Regressions will be run on this pooled data and presented in a comparative context with regressions for each of the BRICS nations.

The specific WVS question used in the study reads as follows:

> 'Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view?: 1) Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs' or 2) Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent'.

The first option can be taken as an indicator of support for environmental protection over the more materialist valuing of economic growth and the second option represents support for the environment over growth (perhaps indicating support for post-materialist values but possibly reflecting the reality of air pollution as discussed in the preceding sections).[1] A binary was created, those who chose the first option were classified as supporters of the environment at the cost of economic growth, and given a score of 1. While those who chose the second option were classified as supporters of economic growth even if it caused environmental degradation and given a score of 0.

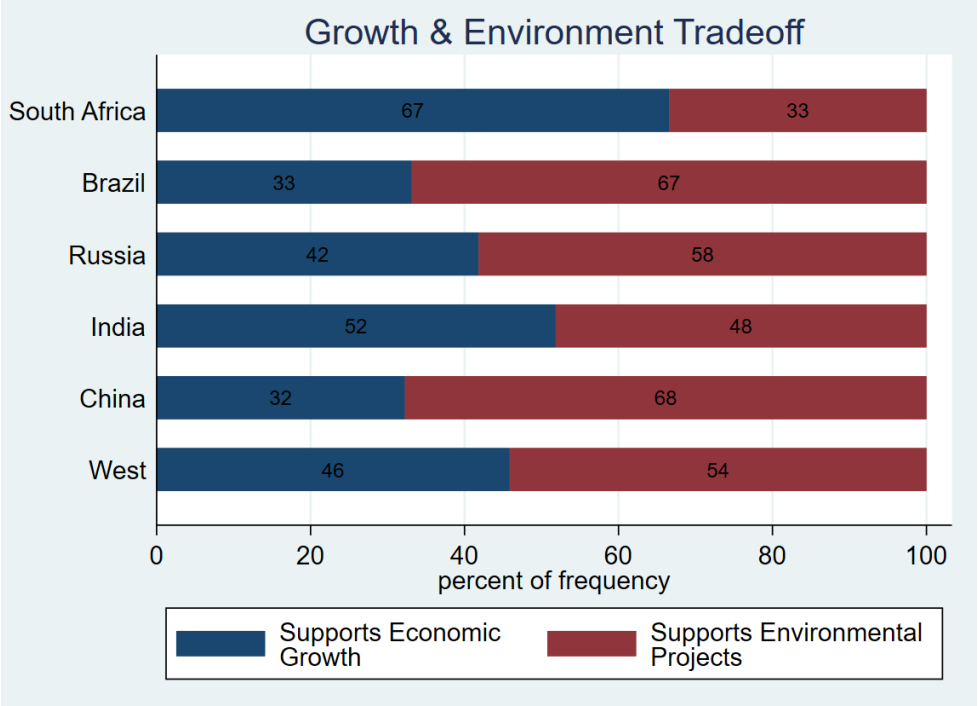
9. Growth and the Environment's Trade-off

Figure 3 reports the percentage of respondents who support economic growth over the environment (in blue) and the percentage who support the environment over economic growth (in red). Over half of respondents in the countries representing the West favoured the environment over economic growth whereas in India, the only low-income country in the sample, most favoured economic growth over the environment, if only marginally. Only a third of South African respondents favoured the environment over growth, but in the other middle-income countries, a higher proportion than in the West opted to protect the environment over growth. China reported the largest share of support for the environment over growth (68% of respondents supported this option). High levels of pollution (Table 1 and Figure 1) may well be driving the support for the environment over economic growth in China and elsewhere. However, India which also suffers from high levels of pollution does not have as high support. It is a limitation of both the WVS and data on pollution that data are presented at national level only, and hence regional variation cannot be explored. Thus, it cannot be established whether there is or is not a direct correlation between pollution levels and relative support for the

[1] The survey makes space for other answers if volunteered independently. These remarks will be ignored. This amounts to 0.85% of South African respondents, 1.8% of Brazilian respondents, 4.5% of Russian respondents, 12.3% of Indian respondents, 2.8% of respondents of China and 4.8% of respondents in the 'West'.

environment. This relationship is also likely to be mediated by national income, personal characteristics of respondents and perhaps also regional differentiation with respect to culture and income within countries.

There is no one-to-one relationship between GDP per capita and the percentage of respondents supporting the environment over economic growth. As illustrated in Figure 4, the Western countries had a significantly higher income per capita level than the other countries in our sample but did not have the highest level of support for the environment over growth. While South Africa has a substantially higher per capita income and a lower level of pollution than India, it has less support for prioritizing the environment over economic growth, showing the complexity/context-driven nature of the trade-off decision between the environment and economic growth.

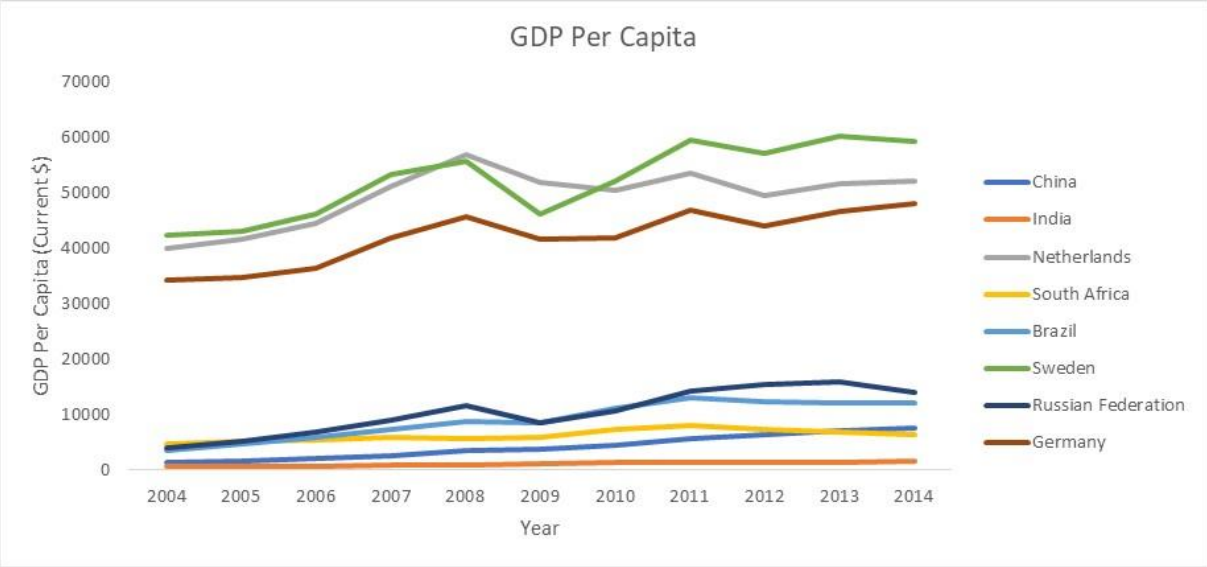


Source: Inglehart et al., 2014

Figure 3: Trade-off decision between the environment and economic growth

South Africa is the only country that has overwhelming support for economic growth at the cost of environmental degradation. India and the 'West' are both only marginally away from an equal division of support. Russia has higher support for the environment than growth. In Brazil and Russia the support is overwhelmingly in favour of environmental protection. In other words, there is not a clear bright line between the BRICS countries and the West on this issue, rather it is the BRICS countries that are divided with South Africa as the outlier in its relatively large support for environmentally damaging growth.

Brazil and China have similar levels of per capita income and a similar level of support for the environment over economic growth. Yet as shown in Table 1, they have very different levels of pollution (Brazil having much lower measures of air pollution). In short, support for environmental protection over economic growth cannot be boiled down simply to being the product of the objective realities of income and pollution. Other, country-level factors are clearly relevant. The rest of this paper explores potential individual-level determinants of support for environmental protection over economic growth at country level.



Source: World Development Indicators (World Bank, 2018b)

Figure 4: GDP per Capita

10. Measuring post-materialism

This article will use the 12-item post-materialist index generated by the WVS (Roser, 2018). The 12-item post-materialist Index for the United States, Britain, France, and former West Germany and East Germany, has been used to show that a shift towards post-materialism is associated with increased demand for work environment flexibility, a decline in deference towards authority, less restrictive attitudes towards sex-related issues, increased support for environmentalism and gender equality and the stimulation of direct political participation in decision making (Dalton, 2014, Abrahamson, 2010). This index is included in the WVS dataset and is based on how the respondent answers the following sets of questions:

> 'People sometimes talk about what the aims of this country should be for the next ten years. On this card are listed some of the goals which different people would give top priority. Would you please say which one of these you, yourself, consider the most important? (Code one answer only under 'first choice') And which would be the next most important? (Code one answer only under 'second choice')'

1. A high level of economic growth
2. Making sure this country has strong defence forces
3. Seeing that people have more say about how things are done at their jobs and in their communities
4. Trying to make our cities and countryside more beautiful

If you had to choose, which one of the things on this card would you say is most important? And which would be the next most important? (Code one answer only under 'second choice'):

5. Maintaining order in the nation
6. Giving people more say in important government decisions
7. Fighting rising prices
8. Protecting freedom of speech

Here is another list. In your opinion, which one of these is most important? (Code one answer only under 'first choice'). And what would be the next most important? (Code one answer only under 'second choice')

9. A stable economy
10. Progress toward a less impersonal and more humane society
11. Progress toward a society in which ideas count more than money
12. The fight against crime.'

Inglehart (1997) classified options 1, 3, 5, 6, 9 and 12 as materialist values, and options 2, 4, 7, 8, 10 and 11 as post-materialist values. This 12-item Index was a more comprehensive modification of the original 4-item Index, which only focused on questions 1-4 and, and as Inglehart himself admitted, was 'excessively sensitive to short-term forces' (Inglehart, 1990:131). In constructing the post-materialist index, the WVS allocates a score of 0 for all the materialist answers and 1 for options 2, 7, 8, 10 and 11. It also allocates a value of 0 for option 4, 'Trying to make our cities and countryside more beautiful' (Held et al., 2009). The post-materialist index simply sums the answers provided by respondents and has a range from 0 to 5. The index does not account for whether the given answer was the first or second choice. The index thus acts as a sum of how many post-materialist values you hold.

It has been posited by critics that in the first set of questions the respondents' first and second choices are randomly related (Davis & Davenport, 1999). Inglehart (1999), however, subsequently showed that Davis & Davenport made unwarranted assumptions and showed that this was not the case. Clarke et al. (1999) state that the observed trend towards post-materialism was a result of declining inflation and rising unemployment, however Inglehart (1999) shows that once controlling for inflation there is still a large shift towards post-materialism.

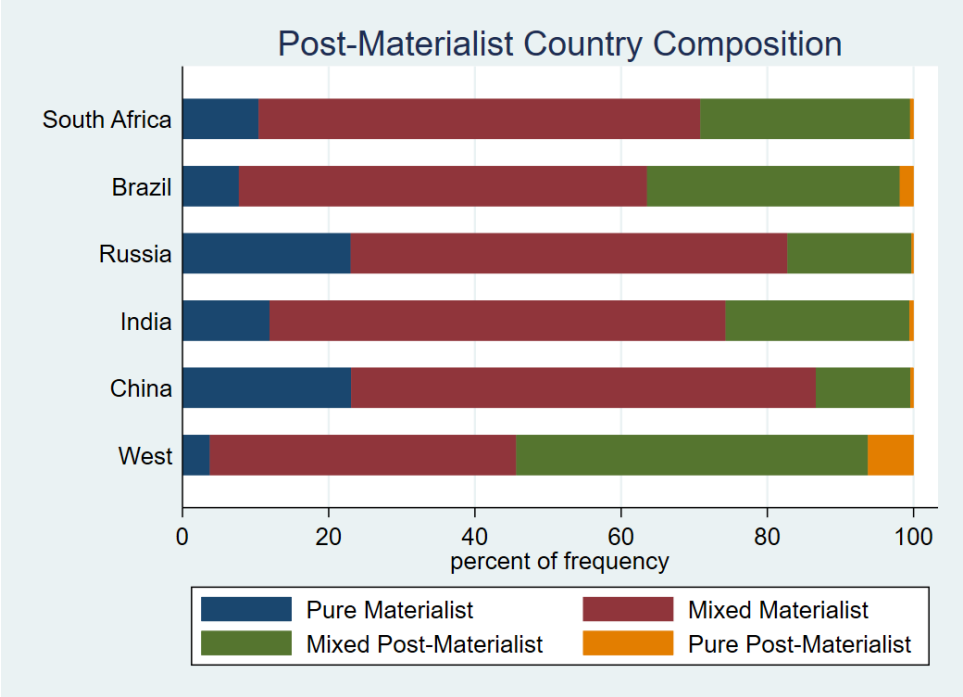
The strict typology classification of pure materialists and pure post-materialists has been developed further by Inglehart who also introduced mixed classifications of mixed materialists and mixed post-materialists. Mixed materialists display both materialist and post-materialist values with a preference for materialist values. Mixed post-materialists also display both materialist and post-materialist values but with a preference for post-materialist values (Held et al., 2009).

We classify those who scored a 0 as pure materialists, those who scored a 1 or a 2 as mixed materialists, those who scored a 3 or 4 as mixed post-materialists and those who scored a 5 as pure post-materialists.

Inglehart's (1995) theory states that stronger holders of post-materialist values will be more likely to support economically costly environmental protection, thus it is hypothesised that mixed post-materialists will be more likely to support economically costly environmental protection than mixed and pure materialists and that pure post-materialists will be the most likely to support economically costly environmental protection.

The largest component of BRICS country respondents was 'mixed materialists'. As expected, the Western high-income countries had the highest contingent of mixed post-materialists and post-materialists. China had the lowest portion of

their population classified as either mixed post-materialist or pure post-materialist.



Source: Inglehart et al., 2014

Figure 5: Post-materialist country composition

As illustrated by Figure 3, respondents in Brazil were more likely to support environmental protection over economic growth than in the West – this despite Brazil having a lower per capita income (as shown in figure 4) and a smaller contingent of mixed post-materialists and pure post-materialists (figure 5). This suggests that there more factors involved in the decision-making process than income and post-materialist values alone.

11. Model and hypotheses

A logistic regression will be used to test the hypotheses below. The dependant variable will be the binary variable, where the success outcome (=1) is attributed to those who selected the 'Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs' option in the WVS. Those who selected 'Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent', were assigned the failure outcome (=0).

The base group for the materialist-post-materialist analysis will be the mixed materialists as they represent the largest group in all the countries as can be seen in figure 5. Although theory has indicated a link between income and post-materialism, we explore the impact of income class and values separately and together in the same model. The regressions presented in Appendix A show that these variables have distinct impacts (their coefficients do not change significantly when both are included as determinants). Drawing on the literature discussed above, these are the following hypotheses:

Hypothesis 1: The higher the score of an individual on the post-materialist index, the greater the likelihood that they support environmental protection at the cost of growth.
Hypothesis 2: The higher an individual's income, the greater the likelihood that they support environmental protection at the cost of growth.
Hypothesis 3: The more formal education an individual has undergone, the greater the likelihood that they support environmental protection at the cost of growth.
Hypothesis 4: The younger an individual, the greater the likelihood that they support environmental protection at the cost of growth.
Hypothesis 5: There will be no gender effect.

12. Results

Table 2 presents regression results (reporting average marginal effects) for all the BRICS nations and the 'West' (Germany, the Netherlands and Sweden) controlling for basic demographics (age, gender, education), relative income status and values. The results support the hypothesis that in the West, holding all else constant, those who are mixed post-materialists are more likely to support economically costly environmental protection than those who are mixed materialists. In the West, pure post-materialists are the most likely to support economically costly environmental protection holding all else constant. Holding all else constant, being a mixed post-materialist or pure post-materialist relative to a mixed materialist, increased the average marginal probability of supporting economically costly environmental protection by 19.2and 49.0 percentage points respectfully. This provides evidence to support Inglehart's (1995) theory that those who hold post-materialist values are more likely to support the environment and are more likely to make economic sacrifices for environmental protection in the West.

In China and Brazil, mixed post-materialists are more likely than mixed-materialists to support economically costly environmental policy, holding all else constant. Keeping all else constant, being a mixed post-materialist increased the average marginal probability of supporting economically costly environmental

protection relative to a mixed materialist by 8.7 percentage points in Brazil and 11.8 percentage points in China. The pure post-materialist group have been omitted from the regression as they comprise of too few observations. The country in which post-materialism has the largest effect is the 'West', which is also the wealthiest 'country'.

However, in South Africa and Russia being a mixed materialist has no statistically significant impact on support for economically costly environmental protection. In India (and contrary to theory), mixed post-materialists are statistically less likely to support economically costly environmental support than mixed materialists, holding all else constant. In India being a mixed post-materialist decreased the average marginal probability of supporting economically costly environmental protection by 15.8 percentage points.

The results do not necessarily discredit the existence of the post-materialist hypothesis in India and South Africa. Research suggests (Kemmelmeier et al., 2002) that in those countries in which post-materialism has a positive effect on economically costly environmental protection, it may be because the individual is altruistically prioritising the needs of the environment over their own personal individual needs. Kemmelmeier et al. (2002) showed many post-materialists are willing to make personal sacrifices for the environment, this shows that what is fundamental about this decision to sacrifice is that the individual does not place sole importance on themselves. Following a similar line of thinking, it might be possible that in South Africa and India, those with post-materialists values record a preference for sacrificing the environment (a good they prefer) as an altruistic act to assist the poor and/or reduce inequality in their society.

Scheepers and Te Grotenhuis (2005) showed that post-materialists are more likely to donate money to alleviate poverty than non-post-materialists in 15 European countries. This may mean that in South Africa, Russia and India, a portion of mixed post-materialists and pure post-materialists (which the theory of post-materialism would suggest are likely to be the wealthier citizens), may be sacrificing the environment not for their own sake, but in the hopes that the poor in their country will benefit from economic growth.

Table 2: Exploring determinants of prioritising the environment even if this is economically costly

VARIABLES	South Africa	Brazil	Russia	India	China	West
Pure Materialist	-0.0539 (0.0387)	-0.0162 (0.0561)	-0.0557* (0.0322)	0.2199* (0.1205)	0.0124 (0.0331)	-0.0121 (0.0506)
Mixed Post-Materialist	-0.0105 (0.0213)	0.0870*** (0.0294)	0.0112 (0.0311)	-0.1581*** (0.0470)	0.1175*** (0.0338)	0.1917*** (0.0202)
Pure Post-Materialist	-0.0561 (0.1305)	-	0.2612* (0.1382)	0.2549 (0.1871)	-	0.4903*** (0.0247)
Middle Income Group (Decile 7-8)	0.0768*** (0.0239)	0.0436 (0.0396)	-0.0026 (0.0415)	-0.0904 (0.0630)	-0.0042 (0.0380)	-0.0087 (0.0251)
High Income Group (Decile 7-8)	0.0979** (0.0442)	-0.1453 (0.1001)	0.2371* (0.1293)	-0.0810 (0.1047)	-0.0221 (0.1674)	-0.0431 (0.0464)
High School Education	-0.0084 (0.0211)	0.0244 (0.0318)	-0.0217 (0.0314)	0.0896 (0.0732)	0.0535* (0.0308)	0.0759*** (0.0217)
Tertiary Education	0.0155 (0.0487)	0.0813* (0.0457)	0.0093 (0.0285)	-0.0431 (0.0857)	0.1240*** (0.0323)	0.1209*** (0.0250)
Age	-0.0018 (0.0037)	-0.0081* (0.0046)	-0.0003 (0.0039)	-0.0015 (0.0067)	-0.0092* (0.0054)	0.0017 (0.0030)
Age^2	0.0000 (0.0000)	0.0001 (0.0000)	0.0000 (0.0000)	0.0000 (0.0001)	0.0001* (0.0001)	-0.0000 (0.0000)
Female	0.0071 (0.0198)	0.0356 (0.0282)	0.0555** (0.0239)	-0.0162 (0.0465)	0.0010 (0.0256)	0.0414** (0.0185)
Observations	3,367	1,185	1,981	1,054	1,611	4,161
k-fold cross-validation (Average of 5 Crossfold Mean Squared Error (MSE) estimates (known as the Brier score for binary outcomes)	0.2805	0.2677	0.2735	0.2736	0.2733	0.2563

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 3 shows the percentage of each country that is living below national poverty lines. These estimates are based on population-weighted subgroup estimates from household surveys (World Bank, 2018(b)). As can be seen in Table 1, the coefficient on mixed post-materialism and pure post-materialism is positive, but not statistically significant, and Table 2 illustrates that Russia has a higher level of poverty than Brazil and China. While the coefficients in South Africa and India are negative, they are statistically significant in India but not in South Africa (in later models, it will become significant), and these two countries have much higher levels of poverty relative to the other three.

Table 3: Poverty Headcount at National Poverty Lines

Country	**Year of Survey**	**Poverty headcount ratio at national poverty lines (% of population)**	**Year of Poverty Headcount**
South Africa	2013	55.5%	2014
Brazil	2014	7.4%	2014
Russia	2011	12.7%	2011
India	2012	21.9%	2011
China	2013	8.5%	2013

Source: World Development Indicators (World Bank, 2018c)

Holding all else constant, age has a negative effect (on the marginal probability of supporting economically costly environmental protection) at the 10% level of statistical significance in Brazil and China. However, age has no significant effect in South Africa, Russia, India and the 'West'. Gender is only statistically significant in Russia and the 'West'. Holding all else constant being a female in Russia increases the average marginal probability of supporting economically costly environmental protection by 5.6 percentage points. The corresponding figure for the West is 4.1 percentage points.

South Africa is the only country in which income decile has a statistically significant effect: Table 2 shows that controlling for values, education, age and gender, middle- and upper-income respondents were more likely to support economically costly environmental protection than low-income respondents.

Table 4 provides results for South Africa exclusively. For the sake of convenience, Model 1 reproduces the same model that was used in Table 2. As

can be seen, the only statistically significant variables are related to relative income (or class) in that richer people are more likely to support economically costly environmental protection than the poor. This is consistent with the 'affluence hypothesis' discussed earlier, which states that increases in income increase the demand for environmental amenities and that higher income eases the reallocation of economic resources to the environment (Franzen, 2003).
Holding all else constant, Model 1 suggests that being in the middle-income group increased the marginal probability of supporting economically costly environmental protection by 7.7 percentage points relative to being in a low-income group (and the corresponding figure for being in a high-income group was 9.8 percentage points).

The introduction of race in Model 2 sees surprising results. Holding all else constant, whites, coloureds and Indians are all less likely to support economically costly environmental protection relative to black respondents. Model 3 excluded the income categories to see whether this finding with regard to race was conditional on controlling for income. It shows that the findings for whites and coloureds remained robust, with only a slight decline in the size effects. The effect of being Indian (which was statistically significant only at the 10 percent level in Model 2, lost statistical significance in this model and in all the other models reported in Table 4. Models 3 to 5 include a dummy variable for people who believe that people living in poverty is the most serious problem 'for the world as a whole', against those who believe that the most serious problem is gender discrimination, poor sanitation and infectious diseases, inadequate education or environmental pollution. The coefficient is negative, substantial and statistically significant in all three models. Post-materialist theory suggests that those who believe that poverty is the most serious problem facing the world, would be more materialist in outlook and thus more likely to support growth. The results in Table 4 are consistent with this in that models 3 to 5 show that controlling for the other variables in the model, believing that poverty is the most important problem reduces the average marginal probability of supporting environmentally costly environmental protection by about 13 percentage points. In these models the coefficient on mixed post-materialist remains negative and small but becomes statistically significant at the 10 percent level. This is perhaps some indicative support for the hypothesis suggested earlier, that mixed post-materialists and pure post-materialists may be sacrificing the environment in the (altruistic) hope that economic growth may alleviate the dire national economic need within South Africa. This theory is illustrated in Figure 6 below.

Table 4: Exploring the effect of race and class in South Africa on preference for economically costly environmental protection

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Pure Materialist	-0.0539 (0.0387)	-0.0526 (0.0387)	-0.0425 (0.0387)	-0.0460 (0.0392)	-0.0487 (0.0391)
Mixed Post-Materialist	-0.0105 (0.0213)	-0.0150 (0.0213)	-0.0356* (0.0210)	-0.0367* (0.0213)	-0.0402* (0.0213)
Pure Post-Materialist	-0.0561 (0.1305)	-0.0678 (0.1275)	-0.1063 (0.1400)	-0.1103 (0.1306)	-0.1172 (0.1305)
Middle Income Group (Decile 7-8)	0.0768*** (0.0239)	0.0811*** (0.0242)	- 	0.0794*** (0.0241)	0.0761*** (0.0245)
High Income Group (Decile 9-10)	0.0979** (0.0442)	0.1020** (0.0445)	- 	0.0828* (0.0436)	0.0849* (0.0442)
Matric Education	-0.0084 (0.0211)	0.0019 (0.0214)	0.0095 (0.0208)	0.0055 (0.0211)	0.0062 (0.0211)
Tertiary Education	0.0155 (0.0487)	0.0358 (0.0500)	0.0464 (0.0499)	0.0332 (0.0497)	0.0409 (0.0502)
Age	-0.0018 (0.0037)	-0.0014 (0.0038)	-0.0020 (0.0036)	-0.0016 (0.0037)	-0.0017 (0.0037)
Age^2	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Female	0.0071 (0.0198)	0.0062 (0.0197)	-0.0015 (0.0193)	-0.0002 (0.0195)	-0.0006 (0.0195)
White		-0.0650* (0.0364)	-0.0588* (0.0349)	-0.0772** (0.0357)	-0.0797** (0.0355)
Coloured		-0.0635** (0.0309)	-0.0576* (0.0299)	-0.0563* (0.0310)	-0.0574* (0.0311)
Indian		-0.0854* (0.0474)	-0.0600 (0.0473)	-0.0733 (0.0475)	-0.0738 (0.0475)
Believe people living in poverty and need is the most serious problem in the world			-0.138*** (0.0201)	-0.134*** (0.0204)	-0.135*** (0.0204)
Degree of acceptance of inequality: 4-6					0.077*** (0.0275)
Degree of acceptance of inequality: 7-10					0.0525** (0.0268)
Observations	3,366	3,366	3,366	3,366	3,366

k-fold cross-validation (Average of 5 Crossfold Mean Squared Error (MSE) estimates)	0.2805	0.2761	0.28	0.2813	0.2836

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Below a certain amount of development (this is proxied for by national income per capita), the post-materialist, who are most likely the wealthier within society, may be displaying solidaristic values by sacrificing the environment for growth, in the hope that this growth will lead to the bettering of the economic conditions of the poor within the country. When the country reaches a certain point of development, then the individual who is a post-materialist shifts to supporting economically costly environmental protection as the level of national economic need is now sufficiently low (poverty levels are low) for the post-materialist to justify their decision, taking into account both personal and social need. The wealthier the country is, the more likely post-materialists in that country are to support economically costly environmental protection. For example, post-materialists in the West, which is the wealthiest 'country', are the most likely to support economically costly environmental growth.

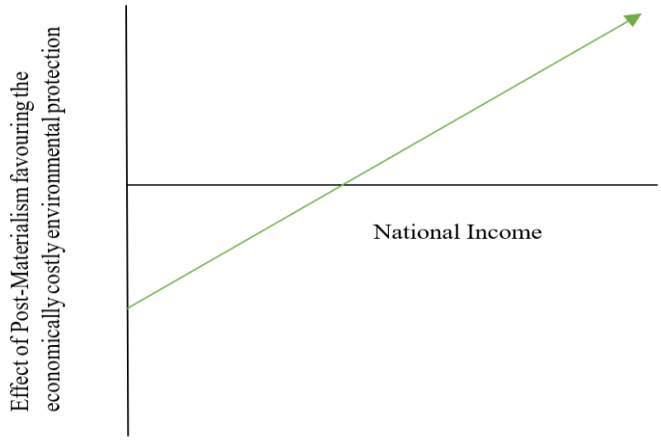


Figure 6: Theoretical illustration of the role of post-materialism

South Africa has the highest level of measurable inequality than any other country for which comparable data exists (Dessus et al., 2018). Model 5 includes control variables for how comfortable the respondent is with inequality. It was found that on a scale of 1-10 (with 1 being 'Incomes should be made more equal', and 10 being 'We need larger income differences as incentives for individual effort') that those who were more comfortable with income inequality were more supportive of economically costly environmental protection.

In all four models, level of education, age and gender have no statistically significant effect on the trade-off decision between the environment and economic growth. While it has been the case in other countries that the youth are more supportive of environmental protection, the chronically high levels of youth unemployment which exist (Dessus et al., 2018), this pattern is not evident in South Africa.

As with many other countries there do not appear to be statistically significant gender differences in environmental support in South Africa.

13. Conclusions

This paper has shown, that the only country that does not have high levels of support for economically costly environmental protection is South Africa. Such findings suggest that the country is potentially vulnerable to attempts by countries such as China and India to export their domestic pollution to South Africa.

The paper supports previous research suggesting that post-materialists express their prioritisation of the environment differently depending on the circumstances of their country. The article has augmented Inglehart's 'Objective problem and Subjective values', which states that pollution may cause materialists, who would otherwise not have been strong supporters for economically costly environmental protection to become strong supporters of the environment because of the negative impact that pollution has on their overall wellbeing. Similarly, low levels of national development, and the ensuing poverty, might encourage those who would otherwise have been strong supporters of economically costly environmental protection, to support economic growth at the expense of environmental degradation in the hopes of alleviating the poverty of their fellow citizens.

Inglehart has shown that individual's personal economic environment shape their values; this paper contributes to an emerging literature showing that the economic conditions of the community/country shape the way that these values are *lived out.*

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Appendix A: Logistic regressions on preference for environmental protection over growth

	South Africa	Brazil	Russia	India	China	West
Pure Materialist	-0.0530 (0.0389)	-0.0243 (0.0570)	-0.0504 (0.0321)	0.2240* (0.1181)	0.0101 (0.0331)	-0.0059 (0.0509)
Mixed Post-Materialist	-0.0092 (0.0212)	0.1003* (0.0293)	0.0121 (0.0311)	-0.1658*** (0.0463)	0.1256*** (0.0334)	0.2010*** (0.0201)
Pure Post-Materialist	-0.0548 (0.1399)	-	0.2601* (0.1431)	0.2614 (0.1835)		0.5025*** (0.0235)
Observations	3399	1190	1989	1077	1611	4183
Average of 5 Crossfold (MSE) estimates	0.2791	0.2632	0.2488	0.2721	0.2718	0.2544

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

	South Africa	Brazil	Russia	India	China	West
Middle Income Group (Decile 7-8)	0.0761*** (0.0234)	0.0566 (0.0368)	-0.0111 (0.0400)	-0.1074* (0.0519)	0.0086 (0.0353)	0.0144 (0.0244)
High Income Group (Decile 7-8)	0.0962** (0.0443)	-0.0643 (0.0937)	0.2415* (0.1252)	0.0322 (0.0957)	0.0168 (0.1438)	-0.0125 (0.0472)
Observations	3399	1328	2098	1342	1724	4311
Average of 5 Crossfold (MSE) estimates	0.2791	0.2656	0.2504	0.2629	0.2661	0.2482

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

VARIABLES	South Africa	Brazil	Russia	India	China	West
Pure Materialist	-0.0573 (0.0386)	-0.0248 (0.0570)	-0.0527 (0.0320)	0.2182* (0.1197)	0.0108 (0.0333)	-0.0067 (0.0509)
Mixed Post-Materialist	-0.0112 (0.0211)	0.1002*** (0.0292)	0.0120 (0.0311)	-0.1603*** (0.0466)	0.1260*** (0.0334)	0.2008*** (0.0201)
Pure Post-Materialist	-0.0580 (0.1311)	-	0.2612* (0.1425)	0.2485 (0.1901)	-	0.5024*** (0.0235)
Middle Income Group (Decile 7-8)	0.0772*** (0.0234)	0.0595 (0.0386)	-0.0118 (0.0411)	-0.0918 (0.0616)	0.0203 (0.0358)	0.0117 (0.0238)
High Income Group (Decile 7-8)	0.0974** (0.0440)	-0.1248 (0.1006)	0.2302* (0.1359)	-0.0804 (0.1033)	-0.0207 (0.1623)	0.0024 (0.0446)
Observations	3399	1190	1989	1077	1611	4183
Average of 5 Crossfold (MSE) estimates	.2815	0.2644	0.2505	0.2726	0.2721	0.2548

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

The effect that values have on trade-off decision between choosing economically costly environmental protection, is not significantly affected by controlling for income as can be seen and vice-versa.

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The CSSR is an umbrella organisation comprising four research units:

The **AIDS and Society Research Unit** (ASRU) supports innovative research into the social dimensions of AIDS in South Africa. Special emphasis is placed on exploring the interface between qualitative and quantitative research. Focus areas include: AIDS policy in South Africa, AIDS-stigma, sexual relationships in the age of AIDS, the social and economic factors influencing disclosure (of HIV-status to others), the interface between traditional medicine and biomedicine, the international treatment rollout, global health citizenship, and the impact of providing antiretroviral treatment on individuals and households.

The **Safety and Violence Initiative** (SaVI) facilitates debate, research and interventions across the university with a focus on understanding and responding to violence and promoting safety. The initiative aims to establish research collaborations that will contribute to promoting safety, reducing violence and to raising awareness about these issues within South Africa and other African countries. As university-based research collaboration a key feature of SaVI's role will be to develop theory and to translate this into practice.

The **Families and Societies Research Unit** (FaSRU) examines households, families and kinship from an inter-disciplinary perspective. The 'family' in South and Southern Africa is an institution undergoing rapid change, with implications for the distribution of income and access to livelihoods, care-giving, child-raising and health, intimacy and well-being, and social and political attitudes and behaviour. The unit promotes research that links economic and social aspects of families and households and employs mixed methods combining qualitative and quantitative research.

The **Sustainable Societies Unit**'s (SSU) mission is to explore the social and institutional dimensions of economic development and the interaction between human society and the natural world. Focus areas include: winners and losers in South African economic growth and the interplay between ecological and economic concerns. The SSU was previously known as the Social Surveys Unit and still works on a number of survey projects, including the Cape Area Panel Study.