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1 Environmental versus Social Externalities and Life Satisfaction: A Cross-Country Investigation

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Abstract

Using recent cross-country data for 135 nations, this paper examines the determinants of life satisfaction. The main contribution lies in examining the sensitivity of satisfaction to externalities, both social and environmental. Besides contributing to the literature, the findings also have some implications for public policy. The results show that some factors consistently affect life satisfaction whether or not externalities are considered, while others are sensitive to such considerations. Even under each category of spillovers, the influence on satisfaction varies. Further, other things being the same, satisfaction was lower in transition nations, perhaps signifying that these countries were somehow failing to meet the expectations of their citizens.

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1   Introduction[1]

Individuals' perceptions about their quality of life have important political and economic implications and the issue has intrigued policymakers and researchers for quite some time. Policymakers can tailor policies appropriately once the key determinants of happiness or life satisfaction are identified. For instance, more satisfied individuals are likely not to engage in anti-social activities and to demand radical changes in the political regimes. The economics of happiness has developed rather recently as the scope of the research shifted from sociology and psychology to economic science. The question of life satisfaction is intriguing, yet hard to grasp. Self-reported indicators of satisfaction are a semi-formal way to analyze the issue because they reflect many subjective components (Kaliterna Lipovčan and Prizmić-Larsen, 2006). Empirical investigations of the determinants of happiness or satisfaction have become possible in recent years due to the availability of consistent data across countries.[2] Economists' interest in aspects of happiness is nicely articulated by Frey and Stutzer (2002b), while Layard (2006) provides a framework for linking public policy and happiness.[3] Furthermore, scholars have used numerous determinants of life satisfaction at the micro and macro levels (Di Tella et al., 2003; Frey and Stutzer, 2002a).[4]

This body of research, however, has ignored the effects of certain externalities that might affect the life satisfaction of individuals. These externalities could both be social and environmental. For instance, other things being the same, social networks might have positive spillovers when there are support groups for individuals in times of need, but such networks can have negative repercussions when they increase congestion/competition for public goods.

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[1] *Useful comments by Andrea Mervar and a referee are appreciated. The usual disclaimer applies.*

[2] *See Bjornskov (2003), Bjornskov et al. (2007), Malešević (2006), Di Tella and MacCulloch (2006) and Easterlin (2001) for some of the underlying rationales and problems.*

[3] *See also Oswald (1997).*

[4] *In the economics literature, the terms life satisfaction, happiness and well-being are often used interchangeably. However, the fine distinction is that life satisfaction provides an individual's view over longer time, while happiness largely depends on the current state of things. Thus, life satisfaction ratings across nations are likely to be relatively more stable than ratings of happiness.*

Additionally, environmental emissions are perceived to be less harmful by individuals when their private gains outweigh the social losses (e.g., think about a worker at a (polluting) power plant). Further, with increased globalization and the spread of the Internet there is greater awareness about the impact of a country's consumption/production behavior.[5] The influence of these external factors does not seem to have been considered in the extant literature and it is unclear whether policymakers take all these influences into consideration while making allocation/redistribution decisions.

This paper examines the determinants of life satisfaction across a large cross-section of nations. The main contribution lies in ascertaining whether and how various externalities affect the perceptions of well-being and life satisfaction of individuals. Specifically, we consider three types of environmental emissions (greenhouse gases (GHG), NO_X and SO_2 emissions). A country's population density, literacy, unemployment rate, income distribution, democracy and corruption are taken to capture various social influences that affect individuals. What is the influence of various externalities on the life satisfaction of individuals? Are environmental spillovers more powerful than social spillovers in their impact on individual satisfaction? The relatively large number of countries employed in the analysis can also be seen as a contribution of the present research.

The results show that some factors consistently affect life satisfaction whether or not externalities are considered, while others are sensitive to such considerations. Even under each category of spillovers, the influence on satisfaction varies. Further, other things being the same, satisfaction was lower in transition nations, signifying perhaps that these countries were somehow failing to meet expectations of their citizens. Some policy implications are discussed. The next section outlines the model employed and discusses the data used.

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[5] *For instance, the Kyoto Protocol imposes greenhouse gas emissions limitations on signatory nations and was well publicized in the media (http://en.wikipedia.org/wiki/Kyoto_Protocol).*

2   The Model and Data

The theoretical foundation of the present research draws on the basic microeconomic premise of utility or satisfaction maximizing individuals. This satisfaction depends on personal conditions such as economic prosperity, on institutions that affect these conditions (e.g., democracy, economic freedom, etc.), and on spillovers (both social and environmental) that might have a direct or indirect bearing. Some of these factors are exogenous for individuals, while others can be somewhat endogenous, especially over time. Formally, the general form of the relation explaining life satisfactions is denoted by (with i denoting the country),[6]

$$\text{Life satisfaction}_i = f(\text{economic factors}_i, \text{institutions}_i, \text{externalities}_{i,j}) \qquad (1)$$
$$i = 1,...$$
$$j = \text{social, environmental}$$

Consistent with Equation (1) and related discussion, our empirical investigation of the determinants of life satisfaction includes a number of social, economic and institutional variables. Our primary measure of satisfaction is the *Life Satisfaction Index (LSI)*, which is a subjective measure of an individual well-being by New Economics Foundation (http://www.neweconomics.org). Country-level data on people's satisfaction with their lives were collected by conducting surveys with the typical question: "All things considered, how satisfied are you with your life as-a-whole now?" Responses from various surveys are usually expressed so the highest value represents more life satisfaction, with the values of the LSI varying between zero and ten (Veenhoven, 2006).[7] In our sample, life satisfaction was the greatest in Denmark and the lowest in Burundi. Figure 1 shows the distribution of the LSI across countries. Barring a handful of outliers, most countries fall within the band between 4 and 8.

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[6] *Note that since we are employing country-level data for the analysis, we are implicitly assuming that all individuals in a nation are alike (or alternately, we can be seen as focusing on a representative individual).*

[7] *Also see Dragos et al. (2007).*

Figure 1 **Life Satisfaction across Nations, 2005**

Source: http://www.neweconomics.org.
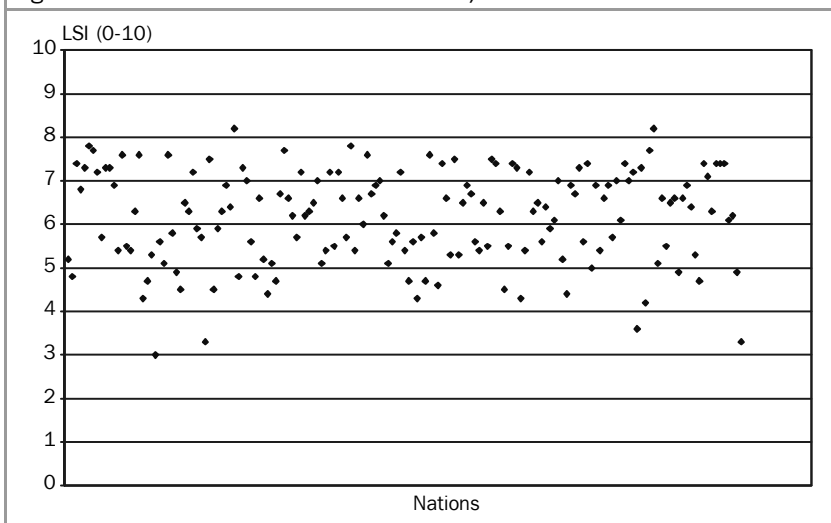
The estimated equation to explain life satisfaction takes the following general form,

$$LSI_i = f(GDPpc_i, EF_i, DEM_i, TRAN, UN_i, INF_i, CORR_i,$$
$$LIT_i, GINI_i, DEN_i, SO_{2i}, NO_{Xi}, GHG_i) \qquad i = 1,...,135 \qquad (2)$$

The data used are for the year 2005 (or the closest year available) and the unit of observation is a country. Details about variable definitions, summary statistics and the sources of data are provided in Table 1. A number of variables shown in Equation (2) have been used in various combinations in the literature to examine happiness or satisfaction, and there are some well-established justifications for including some of them.[8] The main contribution of the present research, however, is in examining the effects of different spillovers on life satisfaction.

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[8] See Frey and Stutzer (2002b) and Inglehart et al. (2004).

Table 1 **Variable Definitions, Summary Statistics and Data Sources**		
Variable	**Definition** **(mean; std. dev.)**	**Source**
LSI	Life Satisfaction Index (larger value, more satisfied, range from 0 to 10, 2005) (6.155; 1.089)	http://www.neweconomics.org
GDPpc	GDP per capita in intl. US$, PPP, 2004 (11360.56; 11831.82)	IMF World Economic Outlook Database
DEM	Index of Political Freedom (larger value, more political freedom, 2005) (-3.162; 1.928)	http://www.freedomhouse.org
EF	Index of Economic Freedom (larger value, more economic freedom, %, 2005) (59.009; 12.024)	http://www.heritage.org
CORR	Corruption Perceptions Index (larger value, more corruption, 2005) (-4.328; 2.235)	http://www.transparency.org
GINI	Gini coefficient (larger value, more inequality, latest available 2001-2005) (38.585; 10.903)	World Development Indicators
LIT	Literacy rate (% of literate population age 15 and over, 2004) (76.958; 20.437)	World Development Indicators
INF	Inflation rate (%, 2004) (5.881; 6.234)	World Development Indicators
UN	Unemployment rate (%, 2005) (8.361; 4.665)	ILO Labor Statistics
DEN	Population density in a country (persons/sq. km, 2005) (172.796; 545.194)	World Development Indicators
TRAN	A dummy variable that takes the value 1 for a transition country and 0 otherwise (0.067; 0.252)	
SO_2	Sulfur dioxide emissions from fuel combustion per capita, in kg. Latest available year from 1994 to 2004. (17.654; 21.475)	UN Statistics Division Environment Statistics
NO_X	Nitrogen oxides emissions from fuel combustion per capita, in kg. Latest available year from 1994 to 2004. (15.084; 17.410)	UN Statistics Division Environment Statistics
GHG	Greenhouse gas emissions (carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O)), in tonnes of CO_2 equivalent per capita. Latest available year from 1994 to 2004. (6.668; 7.560)	UN Statistics Division Environment Statistics

Our estimated Equation (2) includes a set of economic variables to explain life satisfaction. Among these, the economic prosperity in a country is captured by GDP per capita. Other things being the same, it is intuitive to expect that the income of individuals positively affects their perceptions about the quality of life. However, the relationship between income and happiness is complex and has been deemed "puzzling" (Easterlin, 2001). The unemployment rate (UN) and inflation (INF) capture economic uncertainty or the overall economic conditions and are generally perceived to have adverse impacts on satisfaction (Di Tella et al., 2001; Malešević, 2006).[9] Further, greater unemployment (UN), on the other hand, can have perverse effects on crime or lead to increased panhandling in some cases. These activities cause dissatisfaction among individuals not directly affected.

The institutional setup in a country can affect the factors, such as income, that directly affect the satisfaction of individuals. In this regard, we employ the following institutional variables: DEM, EF and TRAN. Greater democracy (DEM) involves a free press and the prevalence of civil liberties. Individuals are likely to be more satisfied when their civil rights are protected and when they feel that they have a voice in influencing social decisions. Special interest groups in democratic societies can organize to alter/influence other institutions. The degree of economic freedom (EF) may have multiple effects on life satisfaction, yet it is primarily a result of the institutional setup, especially regarding regulation, taxation, and banking. Economic freedom (EF) involves fewer checks and balances in the markets. Greater economic freedom will increase satisfaction of the public when fewer checks and balances increase perceived economic opportunities and decrease the frustrations associated with dealing with bureaucratic red tape. Finally, many institutions in transition nations are still evolving. These underdeveloped institutions, along with the heightened expectations of the (newly independent) populace, might affect satisfaction in these cases differently from others (Sanfey and Teksoz, 2007). The economic restructuring associated with transition might also threaten some traditional job security causing dissatisfaction. To capture this effect, we

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[9] *Higher inflation, however, could increase satisfaction in instances where workers' wages are indexed to inflation and sellers perceive higher prices as signals for greater profits.*

include a binary variable, TRAN, that takes the value of one for a transition country in our sample and zero otherwise.

Two broad classes of externalities – social and environmental – are taken into account. A country's population density (DEN), literacy (LIT), income distribution (GINI) and corruption (CORR) are included to address social externalities. The population density in a country (DEN) is included to capture the competition for resources. Greater density can increase satisfaction when it allows the formation of informal social circles; it can decrease satisfaction when there is greater frustration associated with the greater competition for resources in densely populated nations. Singapore was the most densely populated nation in our sample and Namibia was the most sparsely populated. The positive spillover effects of literacy (LIT), especially in terms of reduced criminal activity, have been recognized. Further, more literate individuals are likely to be more satisfied as they are in greater control of their destinies.

A person's satisfaction might be relative and dependent on how one's peers are doing. To account for that, we include the GINI coefficient to reflect the income distribution in a country. It has been noted that European attitudes towards income inequality might differ from those in the United States (Frey and Stutzer, 2002b) and our cross-sectional analysis picks up these differences. Finally, greater corruption (CORR) creates frustrations as resources are distributed according to arbitrary means, which may lead to lower levels of satisfaction. Other things being the same, corrupt institutions (CORR) distort the equity-efficiency balance in a nation and thus are likely to affect life satisfaction. Widespread prevalence of corruption could mean greater dissatisfaction among individuals who are unable to buy their places in queues or among individuals who perceive governmental rules and regulations as somewhat endogenous. In our sample, Iceland was the most corruption-free nation, while Chad and Bangladesh were perceived to be most corrupt.

Figure 2 Cross-Country Environmental Spillovers

Emissions (per capita)

Countries

Legend: SO₂ kg pc — NOₓ kg pc — CO₂ ton pc
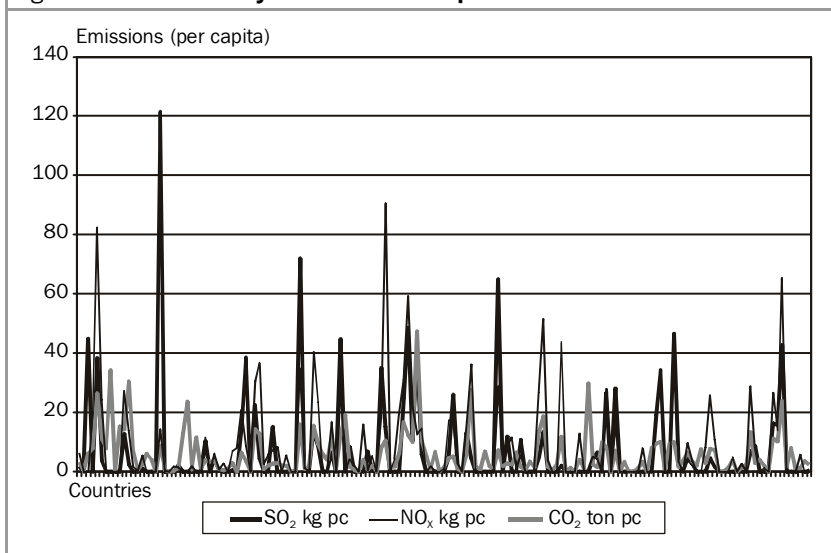
Source: UN Statistics Division Environment Statistics.

Regarding environmental spillovers, we focus on three types of emissions – Sulfur dioxide (SO_2), Nitrogen oxides (NO_X) and greenhouse gases (GHG). Figure 2 shows relative emissions (per capita) across nations. While greater emissions are generally associated with negative connotations, they can have positive attributes for individuals/nations where the perceived direct benefit from emissions is greater than the costs. Manufacturing nations, ceteris paribus, are likely to place different values on emissions than agriculture or service-based economies. Further, the three types of emissions considered differ in terms of their environmental impacts/appearance and in terms of public awareness. For instance, the acid rain concerns have highlighted the SO_2 emissions debate, while GHG emissions have been associated with global warming. This heightened awareness might affect satisfaction related to particular types of emissions relative to emissions that are less newsworthy. Do different types of environmental emissions have similar effects on satisfaction? We turn next to a discussion of our estimation results.

3   Results

Estimation results are presented in Tables 2 and 3, depending on whether environmental externalities are considered. Note that the natural logs of dependent variable (to somewhat "unbound" the LSI index) and GDPpc (to somewhat smoothen out the wide variations) are used. All model variations from Equation (2) were estimated in STATA using OLS, and robust t-statistics based on heteroscedasticity-consistent standard errors are reported. Also note that the number of observations varies across different models and across Tables 2 and 3 due to missing data.[10] The overall fit of the models reported in Tables 2 and 3 is decent with $R^2 \geq 0.54$, and the F-value is statistically significant at least at the 5 percent level. As a further test of the overall specification of the models estimated, the RESET test showed an absence of any significant specification error.[11] We discuss the results from the two tables separately before summarizing the findings.

3.1   Social Externalities and Life Satisfaction

Table 2 examines the socio-economic determinants of life satisfaction, when environmental effects are ignored. The following main points may be noted.

- Consistent with intuition, greater economic prosperity (GDPpc) increases satisfaction. Other things being the same, the populations of wealthier nations are more satisfied. The resulting coefficient is positive and statistically significant in all cases. Figure 3 presents the relationship between GDPpc and Life Satisfaction Index. The positive shape of the trend line indicates that life satisfaction increases with the level of economic prosperity.

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[10] *Specifically, the main data limitations in Table 2 stem from three variables: GINI (65 observations), UN (94 observations), and LIT (95 observations). When environmental spillovers are added in Table 3 to the set of variables used in Table 2, the number of countries further declines with SO₂ emissions data for only 63 nations and NOₓ emissions for 98 countries. An additional compounding factor is that different countries with missing obesrvations have different missing variables. However, Ramsey's RESET test supports a general absence of signifcant specification errors in all models estimated (see footnote 11).*

[11] *Details are available upon request.*

Figure 3 **Economic Prosperity and Life Satisfaction**

GDP pc, US$ (PPP), 2004

Life Satisfaction Index
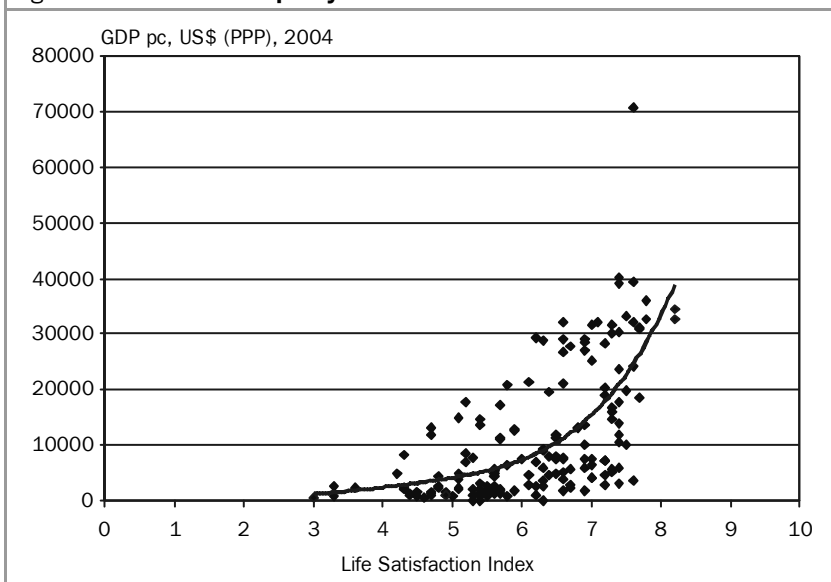
Source: http://www.neweconomics.org and IMF World Economic Outlook Database.

- Greater political freedom (DEM) in a country is likely to lead to greater satisfaction as individuals in more democratic nations are able to better organize to promote their agendas and voice their disagreements. Our results support this notion.

- More economically free nations (EF) have fewer governmental restrictions and greater free trade. Individuals in such nations might feel more satisfied when they perceive greater opportunities (and less red tape). Our results for EF are statistically insignificant in Table 2, suggesting perhaps that, while individuals might care about free economic institutions, their impact is only felt indirectly by most (as opposed to the direct effect of economic prosperity) and thereby is likely not to significantly register.

- Our results show that individuals in transition nations (TRAN) consistently experience lower levels of life satisfaction, irrespective of

whether environmental impacts are considered.[12] One reason for the negative sign on TRAN might be that citizens of transition countries might have inflated expectations about the state's ability to pursue policies that would rapidly lead to higher living standards and other subjective components of well-being. Alternately, the dissatisfaction in this case might be associated with the frustrations from dealing with underdeveloped institutions. Further, in some cases reforms in transition countries have had painful consequences for people experiencing job and retirement insecurity, which could be the source of substantial dissatisfaction.

- Greater unemployment (UN) has generally been shown to lower life satisfaction (Hayo, 2007; Malešević, 2006; Frey and Stutzer, 2000 for evidence from Switzerland), and our results bear this out.

- Greater inflation (INF) leads to greater life satisfaction. While this result might seem counter-intuitive, there is a plausible explanation. Whereas our data do not enable us to control for wage indexation, an explanation for the positive effect might be that individuals with indexed wages might view inflation relatively favorably. Alternately, there might be some non-linearities in the relation between inflation and life satisfaction (Malešević, 2006) that are not easily captured.

- Individuals in more corrupt nations (CORR) are likely to experience lower levels of satisfaction when they are unable to pay bribes and see others jumping queues for government services. While the coefficient on CORR is negative in Table 2, it is statistically insignificant.

- Greater literacy (LIT) does not seem to appreciably impact life satisfaction, even though the resulting coefficient has a positive sign in Table 2. Thus, any externalities from greater education are not borne out from the (cross-sectional) data.

- The relative distribution of income (GINI) does not significantly affect the level of satisfaction. In other words, any externalities from the relative distribution of income do not seem evident. Earlier results

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[12] *It has been shown that happiness in transition nations might be sensitive to the stage of reforms (Sanfey and Teksoz, 2007). However, unlike the present study, environmental externalities are not generally considered elsewhere.*

from a smaller sample of countries show that greater inequality in fact leads to greater satisfaction (Bjornskov, 2003), while others have found mixed results (Gruen and Klasen, 2005; Sanfey and Teksoz, 2007).

- The density of population in a country, (DEN), proxies for congestion or for competition for resources. Alternately, population density might increase satisfaction when individuals living in close proximity are able to build useful social networks. The social network effect seems dominant in Table 2 (i.e., the sign of DEN is positive and statistically significant).

Table 2 **Social Externalities and Life Satisfaction**			
Dependent variable: Life Satisfaction Index (ln LSI)			
	Model 1a	**Model 2a**	**Model 3a**	**Model 4a**
ln GDPpc	0.084** (7.4)	0.082** (3.6)	0.115** (5.9)	0.071** (4.4)
EF	0.001 (0.4)			
DEM	0.023** (3.1)	0.007 (0.8)		0.032** (2.4)
TRAN	-0.239** (6.2)	-0.289** (5.8)	-0.204** (5.5)	-0.229** (5.7)
UN		-0.008** (2.5)		
INF		0.005** (3.3)		
CORR			-0.002 (0.3)	
LIT		0.002 (1.4)		
GINI				0.002 (1.1)
DEN				0.0001** (2.3)
F-value	64.8**	11.2**	65.9**	32.7**
R^2	0.59	0.59	0.54	0.66
N	135	53	135	64

Notes: Variable definitions are provided in Table 1. Prefix ln denotes natural log. All equations included a constant term. However, the corresponding results are not reported to conserve space. The figures in parentheses are (absolute) t-statistics based on robust standard errors. * denotes statistical significance at the 10 percent level and ** denotes significance at 5 percent or better.

Overall, when environmental externalities are ignored, we see that greater income, democracy, inflation and population density increase satisfaction over a fairly large sample of nations, while lower unemployment also achieves the same outcome. Other things being the same, life satisfaction levels in transition countries are lower. The influences of economic freedom, corruption, literacy and income distribution do not seem to register significantly. Interestingly, a percentage increase in unemployment has a greater negative effect on satisfaction than the positive effect of a 1 percent increase in inflation. Regarding the relative impacts of social externalities, population density and unemployment seem more influential. On the institutional front, democracy and transition stage are more significant. Next, we incorporate both environmental and social externalities in the analysis.

3.2 Social and Environmental Externalities and Life Satisfaction

Table 3 considers the determinants of satisfaction when both social and environmental effects are taken into account. The other control variables remain the same as above (see Equation (2)). Note that the number of observations is lower in this case due to missing data. The following main points emerge from Table 3.

- Greater economic prosperity (GDPpc) again generally increases satisfaction, although the resulting coefficient attains significance in one case.
- While both economic freedom (EF) and democracy (DEM) raise satisfaction, the statistical significance is rather low.
- As in Table 2, transition nations (TRAN), ceteris paribus, have lower satisfaction levels when all externalities are considered in Table 3.
- Higher unemployment (UN) still reduces satisfaction, although the coefficient is not statistically significant. Bjornskov (2003) also fails to find a statistically significant impact of unemployment on life satisfaction.

Table 3 **Social and Environmental Externalities and Life Satisfaction**			
Dependent variable: Life Satisfaction Index (ln LSI)			
	Model 1b	**Model 2b**	**Model 3b**	**Model 4b**
ln GDPpc	0.040 (1.4)	0.067 (0.9)	0.098** (2.0)	-0.004 (0.05)
EF	0.001 (0.3)			
DEM	0.024 (1.5)	0.008 (0.3)		0.007 (0.2)
TRAN	-0.216** (4.4)	-0.248** (3.6)	-0.195** (4.2)	-0.248** (4.0)
UN		-0.009 (1.1)		
INF		0.004** (2.2)		
CORR			-0.001 (0.1)	
LIT		-0.0002 (0.1)		
GINI				-0.005 (1.5)
DEN				0.0001* (1.7)
SO$_2$	-0.001** (2.3)	-0.001 (1.3)	-0.001* (1.8)	-0.002** (3.3)
NO$_X$	0.001 (1.1)	0.0003 (0.1)	0.00005 (0.1)	0.001* (1.7)
GHG	0.002* (1.8)	0.003** (2.3)	0.003* (1.9)	0.003 (0.5)
F-value	28.4**	13.1**	26.9**	28.2**
R^2	0.69	0.70	0.64	0.75
N	57	27	58	39

Notes: Variable definitions are provided in Table 1. Prefix ln denotes natural log. All equations included a constant term. However, the corresponding results are not reported to conserve space. The figures in parentheses are (absolute) t-statistics based on robust standard errors. * denotes statistical significance at the 10 percent level and ** denotes significance at 5 percent or better.

- The result regarding the effect of inflation (INF) seems robust as the relevant coefficient is positive and statistical significance is supported here.
- Any social externalities from corruption (CORR), literacy (LIT) and income distribution (GINI) do not seem to appreciably matter. These findings are consistent with Table 2.

- The positive spillovers from population density (DEN) are again supported and individuals seem to place positive weights on their proximity with others. This supports the view that "man is a social animal".

- Turning to influence of environmental factors, SO_2 emissions have a negative (and mostly significant) impact on satisfaction. On the other hand, the effects of both NO_X and GHG are positive, although the relative significance is greater in the latter instance. This difference in the perceived effects is interesting and might be dictated by the nature of emission, related publicity and whether individuals/nations' private (direct) gains outweigh the social (indirect or dissipated) costs from these externalities. Figure 4 shows the positive relationship between GHG emissions and LSI.

Figure 4 **Greenhouse Gas Emissions and Life Satisfaction**
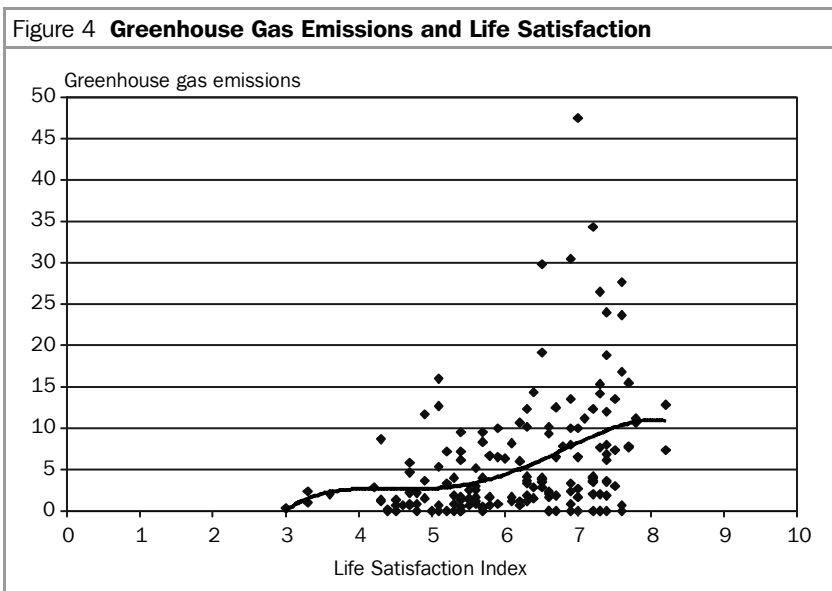
Source: http://www.neweconomics.org and UN Statistics Division Environment Statistics.

To summarize, when both environmental and social externalities are considered, the social spillovers of population density are significant, while the institutions in transition nations seem to uniquely affect satisfaction. Greater

prosperity still enhances satisfaction, albeit the statistical significance is mixed. The effects of various environmental emissions are not alike, and some forms are more significant than others. Our findings suggest that it might be politically more expedient for governments to control some, but not all, environmental emissions. The concluding section follows.

4   Concluding Remarks

Determinants of life satisfaction have intrigued researchers and policymakers for some time. Using recent cross-country data for a large sample of 135 nations, this paper examines the determinants of life satisfaction. The main contribution lies in examining the sensitivity of life satisfaction to externalities – both social and environmental. Besides contributing to the literature, the results have some implications for the design of effective public policy.

The results show that some factors consistently affect life satisfaction whether or not environmental spillovers are considered, while others are sensitive to the consideration of such externalities. For instance, greater prosperity, population density and inflation increase life satisfaction. The effects of democracy and unemployment are consistent with intuition and somewhat sensitive to the sample size and whether environmental effects are taken into account. Any social externalities from corruption, literacy and income distribution do not seem to appreciably matter. Further, other things being the same, life satisfaction was lower in transition nations in all the models estimated, signifying perhaps that these countries in initial years failed to meet the expectations of their citizens. Some of these findings support those in the literature, and are generally consistent with intuition. However, to our knowledge, none of the studies in the literature has considered the effects of environmental spillovers and performed a similar social-environmental spillover comparison. Turning to the questions posed in the introduction, population density seems an influential social aspect, transition institutions are influential and not all environmental spillovers are alike.

From a policy perspective, greater life satisfaction is associated with greater prosperity and greater democracy. Lower corruption levels or greater economic competition do not seem to be directly reflected in terms of their impact on satisfaction. Increased life satisfaction would benefit from other factors, and consideration of environmental externalities can matter significantly in some cases. Similarly, social spillovers from higher literacy do not seem to register. On the other hand, inflation and unemployment have the opposite effect – perhaps providing an argument regarding where governments should target to be on the Phillips curve. Policies aimed at changing the relative income distribution do not seem to have payoffs in terms of increasing satisfaction. One social spillover that does significantly affect satisfaction is something governments can do little about, especially in the short-run. Specifically, satisfaction seems to go up with greater population density. This is not easily or quickly altered via government actions. On the environmental front, our results show that the effects of various environmental emissions are not alike, and some forms are more significant than others. Specifically, while SO_2 emissions are viewed unfavorably, the opposite is the case with respect to GHG and NO_X emissions. Our findings suggest that it might be politically more expedient for governments to control some, but not all, emissions. Overall, governments would face a tough balancing act trying to weigh their politico-economic objectives against satisfaction maximizing or benevolence motives.

In closing, an important caveat to bear in mind in empirical studies of happiness or satisfaction is the subjective nature of these measures. There is also the fine distinction between "experienced" and "projected" happiness, reflecting people's aspirations for the future (Easterlin, 2001). Future research can shed more light on this issue by using data at a finer level of detail – for instance, focusing on gender and age differences in life satisfaction. Finally, whereas this research has brought the issue of environmental spillovers into focus, educating the public and policymakers about such externalities remains a challenge.

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