KYOTO – several years after

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by

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Contents

Introduction 5

The Crazy World of the Stern Review – Lesson in Flawed Economics 6

Stern Review as a Rationale for Regulatory Endeavours 9

Conclusion 14

References 15
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Introduction

The issue of global climate change makes headlines virtually ever day. Two important documents issued at the end of the last year and due course of this year respectively stirred up scientific as well as ideological debates on climate change. The latter, *Climate Change 2007* Fourth Assessment Report by the IPCC provides a survey of the evidence on global climate change. In other words, this report deals with the „physics“ of climate change. The former document, *Stern Review on the Economics of Climate Change* (Stern Review), shifted the debate to policy matters. It “examines the evidence on the economic impacts of climate change itself, and explores the economics of stabilizing greenhouse gases in the atmosphere” (Stern Review, Executive Summary, p. i).

The conclusions of the Stern Review were striking. Most importantly, it says that “the benefits of strong, early action on climate change outweigh the cost” (Full Executive Summary, p. i.). To put it differently, the review is said to have conducted cost-benefit analysis of dealing with climate change vs. non-dealing. The most important outcome of the analysis as far as economics is concerned is definitely the following:

Using the results from formal economic models, the Review estimates that if we don’t act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year. (Summary of Conclusions, p. vi.)

This statement caught the immediate attention of scientists, environmental activists and politicians as well. From an economic point of view it seemed to remove any doubts about a desirability of global political action on climate change. For instance, the Minister of the Environment of the Czech Republic wrote to major Czech economic newspapers a month after the Stern Review was released:

The worldwide debate on the need of radical action against global climate change has never been so promising or got so far (Bursík, 2006).

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1 Toll (2006) almost immediately after the release of the Review dismissed this claim by saying “non was carried out”. 
However promising or appealing the conclusions of the Stern Review may have appeared to politicians, it was put under scrutiny by top academic economist who criticized it for various reasons.

In its first part, this paper deals with these criticisms. It focuses primarily on strong assumptions made by Stern about the "social discount rate". It surveys the efforts of theoretical economists challenging these assumptions. Moreover, it shows how the debatable discounting used by Stern affected the estimates of costs and benefits of action (or non-action respectively) against global climate change.

In the second part of this paper, it is argued that despite being challenged for its strong assumptions and conclusions, and despite being labeled "alarmist and incompetent" (Toll, 2006), the Stern Review has nevertheless exerted its influence on policy makers and government intentions regarding regulatory design. Evidence is based on policy makers’ responses to the Review. The reason for this “popularity” of the otherwise discredited document may be explained by standard public choice analysis. Therefore, the paper also comments on the issue of bureaucracy, government-sponsored science and regulations.

The Crazy World of the Stern Review – Lesson in Flawed Economics

What distinguishes the Stern Review from previously conducted research on the economics of climate change was apparent immediately after its release. Although, as Toll and Yohe (2006) claim, the Stern Review “does not present new data or a new model” and it is “fundamentally a literature review supported by some new runs of existing models”, its results in calculating the cost of climate change impacts and action against it “are dramatically different from earlier economic models that use the same basic data and analytical structure” (Nordhaus, 2007a, p.3).

How is this possible? Economists came up with an answer. The use of a near-zero discount rate\(^2\) for estimating the cost of non-action is responsible, among other factors, for the unprecedented high numbers presented in the Review. The idea of discounting is a basic tool of economics. The “cost now” and “cost tomorrow” differ due to the existence of time preference.\(^3\) When costs and benefits are

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\(^2\) The exact term is “pure rate of social time preference”, see Nordhaus (2007a, p. 11).

\(^3\) Mises (1949, p. 483) explains the nature of time preference: “Satisfaction of a want in the nearer future is, other things being equal, preferred to that in the farther distant future. Present
distributed over time, we should discount them. It follows from this concept directly, that “cost now” and “cost tomorrow” are not of the same value for people. The question is, however, what discount rate should we use in such an endeavor as the Stern Review? If the discount rate is relatively low, estimate of costs in the far distant future is relatively high and vice versa. This implies that the accurate choice of a discount rate has a significant impact on the results of any cost-benefit analysis dealing with distant future, including the Stern’s.⁴

According to Nordhaus (2007a, p. 13) the discount rate used by the Stern Review is 0.1 %, that is a near-zero rate. Cambridge economist Partha Dasgupta makes the same observation in his comment on the Stern Review (2006, p. 4). Mendelsohn (2006) comes up with an alternative number, which, however, does not significantly decrease the dubiousness of Stern’s approach. He, in relation to the discount rate used in Stern Review, writes:

The report assumes that the discount rate (the “price” of time) for the cost of global change is 0.1 percent above the rate of growth of consumption. Because consumption is assumed to grow at 1.3 per cent, the discount rate is 1.4 per cent.⁵

Using a significantly low discount rate is an arbitrary ethical assumption of this kind: when comparing with ourselves we should treat future generations equally. Well, one might ask: why not? After all, the authors may really believe that. Still, economists object to it on the grounds that a near-zero discount rate is a flight from reality. What it means to use a near-zero discount rate was wittily illustrated by a member of Czech National Bank Board who wrote, in this respect, that if we applied Stern’s discount rate to every-day situations we would in fact be living in a crazy world:

Employees would be indifferent as to whether they get paid next month, in six months or in a year. (...) Prisoners would have no preference as to whether they leave the prison in few months or at the end of their lives (Hampl, 2007).

Such an analytical framework heavily influences the results. Nordhaus (2007a, p. 21) calculated that Stern should have used a 2.7 % discount rate to be consistent

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⁴ Relevant analytical description of the crucial problem of time horizont in a decision making process provided Klaus and Tříška (2007).
⁵ Emphasis added.
with his other assumptions. Schneider (2007, p. 22), in his survey of economists’ responses to the Review, points out the lack of sensitivity analysis in the Review, which would indicate how the results vary according to use of different discount rates. He says in this respect:

Yohe determines that Stern’s estimates do in fact rest largely on the choice of a near-zero discount rate. Substituting 1 percent as the discount rate instead of the rate Stern uses (0.1 %) results in the estimated damages decreasing by 60 percent. Using a 2 percent discount rate decreases the estimates another 20 percent and a 3 percent rate decreases the estimates another 15 percent. Overall, a 3 percent discount rate results in estimated damages that are only one-tenth to one-fifth what Stern estimates, substantially lowering the 5 to 20 percent ("or more") damage estimates that Stern reports.

Thus, as follows from observations of Stern’s critics, the above mentioned assertion that “the benefits of strong, early action on climate change outweigh the cost” is less persuasive than it appears at first sight. In other words, the Stern calculations are vastly exaggerated. Another exaggeration according to Toll and Yohe (2006) is that the vulnerability of economies to climate change “is assumed to be constant over very long periods of time (two or more centuries, to be exact)”. They explain:

The model assumes that vulnerability to climate change is independent of development, but it is widely known that adaptive capacity, and thus net sensitivity and perhaps exposure to climate change, is very site specific and path dependent.

Said in everyday language, the assumption of the Review is „that humans will never develop ways of coping with climate change“ (Schneider, 2007, p. 21). We can see that the Review contains some assumptions that are either unrealistic or overly pessimistic.

Following the debate between theoretical economists, it may well be said that the conclusions of the Stern Review regarding cost-benefit analysis of climate change are untrustworthy and widely recognized as flawed. We naturally would, therefore, expect it to have no credit and influence. Nevertheless, however disputed it may have been in the realm of academic economics, immediately after it was made public the realm of politics and policy making gives us a different picture. There, its conclusions and their scientific credibility were taken for granted and the entire work of Stern’s team treated accordingly.

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6 See also Nordhaus 2007b.
7 The similar conclusion is made by Tríška 2007.
Stern Review as a Rationale for Regulatory Endeavors

*We care and we will act!*

The Stern Review’s sponsor, the British government, was the only government in the world which officially issued a press release and responded to the findings of the Review (Ribón, 2006). Not surprisingly, the response was affirmative and the government presented an action-focused attitude towards global climate change. Plainly, it committed to carry out new policy measures, including the Climate Change Bill (with a goal to reduce carbon dioxide emissions by 60 per cent by 2050), forming international partnerships in order to promote sustainable forestry, promoting bio fuels industry in South Africa, and developing “new measures to encourage individuals to take action”.8 Prime Minster Tony Blair proclaimed that the Stern Review “has demolished the last remaining argument for inaction in the face of climate change” and that “we now know urgent action will prevent catastrophe and investment in preventing it, will pay us back many times over.”9

On November 1, 2006, the European Environment Agency (EEA) published an official statement in which it welcomed the Stern Review and openly adopted the most important, yet the most debatable (as argued above) statement in the document.10 It also called for new policies, namely a) the pricing of carbon, implemented through tax, trading or regulation; b) policy to support innovation and the deployment of low-carbon technologies; c) action removing barriers to energy efficiency.

As far as the reaction of environmental think tanks and some interest groups is concerned, the Review has been welcomed and its conclusions communicated further through their own press releases. Recommendations and new suggestions for deepening regulatory policies were made as well.11

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8 The summary of UK government’s plan of action following the Stern Review can be found in Ribón (2006).
9 See http://www.pm.gov.uk/output/Page10300.asp for details.
10 EEA stated: The review, led by Sir Nicholas Stern former World Bank chief economist, estimates that the cost of climate change will be equivalent to losing at least 5% of global gross national product (GDP) each year, if strong action is not taken. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. The cost of reducing greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year with effective, immediate action. For details, see EEA (2006).
Climate Change as a “Public Choice” Issue

It is apparent that many actors who in some capacity deal with the issue of climate change do not really care that there are doubts regarding the conclusions of the Stern Review. As we could see, some of them, at least in a rhetorical sense, base their demand for new policies on those Stern Review findings that are most unreliable. Though, such a position can, however, be explained by standard public choice toolbox.\(^\text{12}\)

In a public choice perspective, it is not “politically incorrect” to claim that the Stern Review exaggerated the severity of problems in order to get the attention of politicians and/or that it served those who sponsored it. After all, Nordhaus (2007a) states: “First, the Review should be read primarily as a document that is political in nature and has advocacy as its purpose.” The incentive of a scientist who works for a government and the incentives of politicians form a symbiosis. Scientists, on the one hand, seek for funds and acknowledgment provided by government. Thus, there is a threat of a selection bias on their part.\(^\text{13}\) Politicians, on the other hand, are given an excellent tool with which to further their goals – they are provided with a scientific rationale for their policies. Quotes by Czech Minister Bursík and by British Prime Minister Blair mentioned above serve as a nice example. As Urbanová and Michaels (2003) put it:

Public choice theory does not judge someone’s honesty or dishonesty. It simply implies that the structure of incentives that scientists – indeed, all individuals – face creates a bias of distortion, in which problems must be exaggerated in order to garner funding. Public choice is a political process – based upon rhetoric as much as fact.

Moreover, when the government-sponsored and government-initiated research not only offers positive statements about the reality but delves into making normative statements about “what is to be done”, what measures “are necessary to take” (by governments themselves, of course) we should be highly suspicious about it.

There is more to the public choice story in this regard. The evidence provided by the Stern Review is so technical that it is virtually unintelligible to ordinary

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\(^{12}\) For a survey of insights of this particular school of thought in economics see for example Mueller (2003), Mueller (2004), van den Hauwe (2000).

\(^{13}\) Toll (2006) pointed to the selection bias in the Stern Review.
people.\textsuperscript{14} The general public, knowing that experts in the field undertook the study and that it may take a significant amount of time to study it thoroughly, gives up any attempt to grasp it and does not resist the politicians’ interpretation of it. In terms of public choice theory, the public is “rationally ignorant”. Then, politicians and interest groups may frighten the public with the document even if its crucial conclusions were disputed by academics.

\textit{The Shape of a Regulatory Landscape}

Politicians will call for action (they naturally demand regulation) and try to do as much as possible to pursue their ends. However, how, to what degree and whether or not their proposals will be implemented in practice is a matter of question and for economists it is hard to predict the regulatory outcome exactly, due to other influential factors. Let’s mention two of them.

Firstly, interest groups and their demands should be taken into account. On one hand, some of these groups may themselves advocate government regulation of their respective industry. They may thus prevent competitors from entering the field as pioneers of economic theory of regulation repeatedly emphasized (Stigler, 1971; Peltzman, 1976; Posner 1974). On the other hand, there are interest groups which invariably oppose regulation, for either ideological or economic reasons.

Secondly, politicians are limited in their regulatory aspirations by the impact of the proposed regulation on the performance of the national economy. Although it happens from time to time that politicians let their irrational economic policies destroy the entire economy in few years (Mao’s policy of „Great Leap“ is an illustrative example), in standard democracies, as some authors believe, there exists a mechanism called „retrospective voting“. Put simply, although voters do not know much about politics, they can tell good from bad and so they get rid of the politicians under whose rule the national economy performed badly. Hence, politicians probably will not choose to impoverish the nation by unwise policies.\textsuperscript{15}

It follows from these observations that the reality of environmental regulation can and probably will somehow differ from appealing claims made by politicians for the public. The final shape of a regulatory landscape in each country will depend on the relative influence of the factors mentioned above. This is, however, an empirical question and should be treated separately.

\textsuperscript{14} As we could see, even the economists differ in their opinion on some technical matters contained in the Stern Review.

\textsuperscript{15} See Fiorina (1981). For a recent critique of retrospective voting see Caplan (2007).
The aftermath of the Stern Review release in the realm of policy making has already been examined above. We have mentioned the „public choice“-mechanism by which, though erroneous, the Stern Review’s conclusions became a part of the rhetoric of politicians and inspired them to call for new interventions. There is another mechanism that might partly be responsible for the credit of the Stern Review among politicians and policy makers. Professor Timur Kuran and Cass R. Sunstein developed a theory of „availability cascades“. Availability cascade is a mechanism through which expressed perceptions trigger chains of individual responses that make these perceptions appear increasingly plausible through their rising availability in public discourse (Kuran and Sunstein, 1999, p. 685).

To put it simply, what people believe may, to some extent, depend on what others believe. This case is called „informational cascade“. The other special case is a „reputational cascade“ which, shortly means that people believe something because it is expected of them. The very mechanism, as is apparent from the definitions provided, is not necessarily linked with correct information or believes. People may simply have irrational beliefs and these may spread easily throughout the society. Who triggers the cascade? Kuran and Sunstein write that „availability entrepreneurs“ are responsible:

Social agents who understand the dynamics of availability cascades and seek to exploit their insights may be characterized as availability entrepreneurs. Located anywhere in the social system, including the government, the media, nonprofit organizations, the business sector, and even households, these entrepreneurs attempt to trigger availability cascades likely to advance their own agendas (p. 687).

Thus, as far as our topic is concerned, we can portray Stern’s team as an availability entrepreneur. And, yet, a highly successful one! He managed to spread certain ideas based on the dubious analysis but no one, apart from the academic world, cares. Let’s have a look at an example from the Czech Republic where politicians were also responsive to the Stern Review.

16 Kuran and Sunstein (2007): “Informational cascade occurs when people with incomplete personal information on a particular matter base their own beliefs on the apparent beliefs of others” (p. 685).
17 These authors, again: “In the case of a reputational cascade, individuals do not subject themselves to social influences because others may be more knowledgeable. Rather, the motivation is simply to earn social approval and avoid disapproval. In seeking to achieve their reputational objectives, people take to speaking and acting as if they share, or at least do not reject, what they view as the dominant belief” (686–7).
The Stern Review inspired the adoption of the *Climate Change Bill* (see above), which aims to reduce the UK’s carbon emissions by 60% by 2050. The assessment of the bill (Regulatory Impact Assessment) mentions the Stern Review 37 times as a rationale for the measure, including the debatable numbers.\(^\text{18}\) The UK is now in the process of adopting the *Climate Change Bill*. Last month, several members of the Chamber of Deputies of Parliament of the Czech Republic proposed adopting a measure concerning tradable permits. In the measure, the following is said to be a goal for the Czech Republic:

Czech Republic will reduce its production of greenhouse-gas emissions by 50% by 2050 compared to its production in the year 2000.\(^\text{19}\)

In the assessment of the measure it is said:

In respect to these striking facts Great Britain recently came up with an initiative to shape a legislation that would mandate a quantitative goal of reducing greenhouse-gas emissions. According to the intentions of the British government, greenhouse-gas emissions should be reduced by 60%. Without an international cooperation, however, not much can be achieved. Therefore, the British initiative is meant to be an impulse for the rest of the world. Czech Republic thus has an opportunity to react upon this initiative and adopt a similar measure.

Here we have a mix of “informational” and “reputational” cascades.\(^\text{20}\) The erroneous information contained in the Stern Review found its way into the British government proposal and was there used as justification of it. Then, the British government proposal served as an inspiration for the Czech legislation proposal. Without any reference to the Stern Review and, of course, without any reference to the fact that the Stern Review might be a hoax. Thus, it lives its own life despite the fact that it should have been rejected publicly as false.

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\(^{19}\) See [http://www.psp.cz/sqw/text/tiskt.sqw?O=5\&CT=316\&CT1=0](http://www.psp.cz/sqw/text/tiskt.sqw?O=5\&CT=316\&CT1=0)

\(^{20}\) As Kuran and Sunstein say: “Reputational and informational cascades are not mutually exclusive. Ordinarily, they exhibit interactions and even feed on one another” (p. 687).
Conclusion

This paper dealt with the Stern Review and its aftermath in the realm of policy making. It surveyed the academic economics literature which fundamentally challenged its assumptions and conclusions. The paper delved into the problem of a debatable discount rate and showed how its use by Stern’s team affected the results. Together with other assumptions, it rendered the whole document overly pessimistic.

Second, the reactions of politicians and some policy makers to the release of the Stern Review were examined. The Review was welcomed and served, then, as a rationale for regulatory policies, which politicians had wanted to adopt beforehand but which had not been backed up by robust economic analysis. The Stern Review, it has been argued, filled the gap. Some public choice comments were made on it.

Third, another possible explanation of the influence of Stern Review was briefly presented. This is an “availability cascade” explanation. It was demonstrated by the case of the new Czech regulatory measure which was inspired by the British Climate Change Bill which, in turn, was inspired and justified by the Stern Review.

In summary, even though the Stern Review cannot be seen, from the economic point of view, as a great piece of science, it nevertheless has a great influence on policy design. Whether it will exert its influence far in the future is a matter of question. The recent development of current debates offers very little optimism.
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