

Addressing Climate Change

Is there a role to be played by the IMF?

Peter S. Heller

Introduction

The last year has seen a dramatic change in public perceptions about the importance of climate change. The combination of Al Gore's visually compelling documentary on the impact of climate change and recent evidence of a potentially faster rate of melting of the Greenland ice cap (and a further warmer year in 2007) has created the first turn in public perceptions. Prime Minister Blair's announcement of the results of the *Stern Review* (Stern, 2006), with its chilling projections on the potential magnitude of output losses associated with climate change, followed by news of the EC's new proposals for emissions cuts have further reinforced these perceptions.

Perhaps more powerfully, the issuance of the first of the IPCC reports in February on the scientific basis for climate change solidified the view that it is for real, that it is anthropogenic in nature, and that lingering uncertainties on the likely magnitude of changes over the next century have been sharply reduced. And perhaps most telling, following a World Economic Forum meeting that highlighted a shared concern about climate change, the new chairman of Exxon Mobil modified the corporation's longstanding position by noting that it also is concerned about the potential risks of climate change for society and ecosystems, and is convinced about the importance of efforts to address it (albeit while signaling that the world's dependence on fossil fuels will continue for a long time).¹

Peter S. Heller is AGIP Professor of International Economics at the Bologna Center of the Johns Hopkins Paul H. Nitze School of Advanced International Studies. He was formerly Deputy Director of the Fiscal Affairs Department of the International Monetary Fund.

¹ Speech of Rex Tillerson, Chief Executive of Exxon Mobil to CERA conference (February 13, 2007), http://www2.exxonmobil.com/Corporate/Newsroom/SpchsIntvws/Corp_NR_SpchIntvws_RWT_130207.asp

This article does not seek to venture into this journal's recent debate (Tol and Yohe, 2006; Carter et al., 2006; Byatt et al., 2006) as to the accuracy of the results or the appropriateness of the policy conclusions reached by the *Stern Review*. Rather, it seeks initially to ask whether the policy efforts of countries in regard to climate change would be strengthened if the only truly global institution interacting with *all* countries of the world in a review of their respective economic policies—the International Monetary Fund (IMF or the Fund)—were to take a more active role in encouraging countries to clarify the potential economic and financial impacts of climate change and the policies undertaken to address them. While arguing for such an effort, the article also emphasizes what the IMF *should not* be doing. In the process, it highlights the need for a considerable strengthening in the fabric of the current global institutional architecture established to address climate change issues.

II

The IMF is recognized as the premier global financial institution charged with addressing issues of macroeconomic policy and international finance. While much attention has been paid to the Fund's role in lending to low-income and emerging market countries in the context of balance of payments crises and structural adjustment, a central aspect of the Fund's responsibilities is in the area of surveillance. Under Article IV of its Articles of Agreement, the IMF is charged with fostering external stability by promoting policies conducive to domestic stability and growth. To achieve this objective, the IMF carries out annual discussions with virtually all of its member countries on the substance of their macroeconomic policies and the main economic challenges they confront. These discussions, highlighted in reports discussed by the IMF's Executive Board, give all countries of the world the opportunity to comment on the appropriateness of each country's macroeconomic policies. Most countries have also agreed to allow the IMF to publish these reports on the Fund's external website, providing valuable information to the world at large on each country's economic and financial policies. The Fund also carries out what is called "multilateral surveillance," whereby the Fund semiannually assesses the state of the global economy as well as of global financial market developments, highlighting the key structural concerns and

pressing global imbalances that need to be addressed by the world's economic leaders.

The question can be legitimately raised whether the IMF, which is principally concerned with macroeconomic policies of the current conjuncture (principally the next year or so), should be concerned with issues of climate change, which will have its principal impact only gradually over the longer term.

Three important directions in which the Fund has been moving point to why climate change issues may be relevant to the IMF's work program. First, in relation to its lending to member countries, the Fund has recognized the damage that can arise from countries struck by natural disasters or by other exogenous shocks of a more economic nature (e.g., terms of trade shocks). This has led to the recent establishment of a lending facility—the Exogenous Shocks Facility—to help low-income countries obtain financial resources quickly to deal with the effect of shocks. Countries likely to bear the brunt of the higher frequency of extreme weather events associated with climate change, even in the near future, may be among the candidates most likely to avail themselves of this facility (Lombardi, 2005).

Second, since the Asian crisis, the Fund has dramatically expanded its capacity to address the interactions between the macro economy and developments in the financial sector. Global financial institutions are increasingly aware of at least one aspect of the potential impact of climate change developments, viz., the higher probability of costly extreme weather events such as tropical storms. This has been reflected in part by the active role played by the reinsurance sector and in part in the emerging development of financial instruments linked to catastrophic weather-related events. To the extent that these aspects of financial sector operations may have ripple effects on overall financial markets, there is a limited role for the IMF to play in monitoring the potential effects of these developments.

Third, over the last decade or so, the Fund, in its surveillance work, has increasingly focused on long-term issues that are recognized to be either a source of weakness for a country's growth prospects or a factor that could jeopardize the sustainability of its current macroeconomic policy framework. For example, much work has been done on the implications of demographic developments, and in particular, on the consequences of an

aging population for both growth and fiscal positions in major industrial countries. These are developments that will begin within the next decade, but with their largest impact only several decades in the future. Pension and medical insurance promises by governments are seen as an important source of fiscal vulnerability if the age-dependency ratio—relating the elderly population to the working age group—rises as now seems almost certain in the future. Similarly, the Fund has called attention to the prospect that both the current and capital accounts of the balance of payments will be strongly influenced by the progression of aging cohorts through the life cycle.

Similarly, the Fund has taken the long view with regard to countries whose long-term economic prospects may be jeopardized by the eventual depletion of key mineral reserves. Botswana is a good example, where it is recognized that diamond deposits may have peaked so that the prospects of continued growth in export income from this source may be poor. Reorienting economic policies to facilitate a transition to alternative sources of export income is thus an obvious focus of surveillance discussions. Similar examples can be drawn from exporters of other mineral products and fossil fuels.

What are the effects of climate change that would seem to be analogously relevant to the IMF's surveillance efforts? At least four are among the most obvious. All relate to the potential effects of climate change on the economies of member countries, some in the short term, some only over the longer term of the next several decades.

Potential economic effects of climate change

First, scientists continue to clarify and narrow the degree of uncertainty over the potential dimensions and characteristics of the climate change that will take place over at least the next 50 years and most likely the next century, at least on a gross regional basis. These effects will happen *independently* of what actions are taken to mitigate the prospect for a further aggravation of climate change effects later in this century and beyond. Such effects are now well known and include gradual changes in temperature levels in different regions; changes in diurnal temperature ranges and variability; changes in the amount of precipitation expected during different seasons; changes in the frequency and intensity of extreme

weather events; and changes in sea level for different regions of the world. There is also the possibility—albeit very small—of a nonlinear “abrupt climate change” of the kind that would lead to changes in the Gulf Stream or of nonlinear effects on the amount of sea level increase, e.g., if there were to be a much more rapid change in the melting of the Greenland ice cap.

Scientists are able to translate these effects on a rough basis in terms of their potential impact on broad regions of the globe. Increasingly, global climate change models are providing much greater specificity on the impact that may be felt by individual countries and even, as importantly, for different regions in a country.

Clarifying the potential economic effects of each of these dimensions of climate change for a country is an important challenge in and of itself. But in principle, under the UN Framework Convention on Climate Change (UNFCCC), countries have the responsibility to undertake such analyses. What are important to illustrate here are the types of economic effects to which individual countries may be exposed. *Inter alia*, these include:

- (i) *Effects on agricultural productivity* associated with both changes in average and seasonal temperatures, as well as changes in anticipated precipitation rates. While this is well recognized as a problem for tropic zone countries, particularly for countries in Sub-Saharan Africa that are heavily dependent on agriculture, it is also relevant in the agricultural regions of many industrial countries (even those that, at least in the next century, may be net gainers in terms of the impact of temperature change on the agricultural sector);
- (ii) *Loss of territory* associated with the rise in sea level may be gradual, but it will affect many countries with large urban agglomerations along their coastlines. It may also be more abrupt to the extent that a rise in sea level increases the potential exposure to the impact of storm surges (by a factor of 5 to 1). Thus, a half-meter rise in sea level over the next century will expose countries on average to the potential of a 2½-meter additional storm surge possibility. World Bank research has illustrated the breadth of potential risks for some of its client countries (Dasgupta et al., 2007). Some industrial countries (e.g., The Netherlands) would equally be exposed to a substantial risk of severe flooding from storm surges;

- (iii) *Losses of economic infrastructure and life* associated with greater frequency of extreme weather events. Hurricane Katrina of course illustrated this point. It is an issue certainly relevant to countries exposed to the effects of hurricanes and typhoons;
- (iv) *Effects on climate-dependent non-agricultural sectors* (e.g., the tourist sector);
- (v) *Potential losses to countries with a significant fishing industry*, associated with both the bleaching of coral reefs and the increasing acidification of the ocean;²
- (vi) *Effects on health* (spread of some tropical diseases to regions not previously affected as well as increased loss of life associated with higher summer temperatures);
- (vii) *Effects on power usage* (greater cooling costs in the summer, less in the winter); and
- (viii) *Effects of temperature change on the availability of water supply or of power sources*, either as a consequence of the premature melting of glaciers or because of the effects of limited snow accumulation on the availability of spring meltdowns.

Cost of adaptation to these effects

The above effects, each of which will be specific to a particular country, are *overestimated* to the extent that they ignore the impact of actions that countries and populations will take to adapt to their potential occurrence and minimize these potential economic effects. For example, to the extent that countries adapt technologies used in their agricultural sectors, modify their coastal infrastructure or encourage population movements to less exposed areas, the above costs would be lessened, perhaps significantly. But some adaptation costs will be borne by governments, particularly those relating to significant infrastructure investments. Others will be borne by the private sector, with conceivable effects on the balance of payments. Thus, in appraising the potential economic effects of climate change, one would wish to adjust downward the earlier estimates of the economic impact by the effects of adaptation efforts, while *adding* as well the costs of such adaptation initiatives.

² Beyond the effects on marine species there are the uncertainties of how large will be the loss in extant species in the world. Biologists and economists still lack the tools or the models to determine how these losses will translate into economic effects.

Cost of mitigation efforts

It is not necessary to venture into the debate between those who advocate immediate costly mitigation efforts (e.g., the *Stern Review*) and those who suggest the need for a more gradual ramping up of mitigation policies in the next several decades and beyond (Tol and Yohe, 2006; Nordhaus, 2006). What is clear is that almost all knowledgeable experts in the field recognize that mitigation measures *will* need to be put in place in the coming decades. The magnitude and phasing of the costs remain the issue, but whatever they may be, they will need to be absorbed and reflected in a country's economic accounts. For some countries, these costs may prove an unexpected windfall to the extent that they are the beneficiaries of the additional income associated with cap and trade schemes under the Kyoto Protocol, or of investments under the Clean Development Mechanism of the Protocol.³ For others, the costs may prove significant, potentially reducing economic growth rates, adding to fiscal budgets, or straining the balance of payments. Mitigation efforts may also have consequences for some countries' fiscal systems, e.g., if countries were to impose high revenue-yielding carbon taxes. In its technical assistance role, the IMF also may find an increasing demand for guidance on how to restructure tax policy frameworks in this context.

Costs of policy formulation to address climate change

Less likely to be of similar magnitude to the above three dimensions, but nevertheless worth highlighting, is that both individual countries and the global community appear to be substantially underspending in terms of both research and economic policy formulation with respect to climate change. This relates to research to achieve greater clarity on the science and modeling of climate change; in the detailing of the precise effects of climate change on different countries; and on the potential technologies that can facilitate mitigation efforts in energy savings and adaptation efforts in some key sectors.⁴

³ A subsidiary consequence of mitigation efforts for the IMF is the additional demand that may arise for the Fund's technical assistance in the area of tax policy to the extent that countries decide to substitute carbon taxes for other types of tax instruments.

⁴ See United Nations Foundation and Sigma Xi (2007), "Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable" (February 28, 2007).

What is important to underscore is that these potential costs and impacts have long-term effects, which are analogous, at least in their character, to other structural developments currently taken into account in the IMF's bilateral and multilateral surveillance work. The magnitude of the effects of course would depend on the particular country at issue and the way in which potential climate change factors are likely to influence its growth and vulnerability over the short- and long term.

Together, these three principal points of intersection between the effects of climate change and the work of the Fund suggest that greater attention to the issue would be warranted.

III

To argue the relevance of these issues for the IMF's economic policy discussions with countries does not, however, provide an answer as to how deeply the Fund should take account of climate change matters. The IMF is a world-class institution in terms of its competence on issues of macroeconomic policy—fiscal and monetary matters—as well as on public finances. However, unlike its sister institution, the World Bank, it has a minimal competency in terms of environmental economics. A review of the IMF's website, for example, would illustrate the limited amount of research that has been carried out on the potential macroeconomic dimensions of climate change or on the economic implications of adaptation or mitigation policies. Neither have these issues been addressed in the IMF's surveillance discussions with member countries. Is climate change not an obvious case where the Fund should adhere to the views of its critics that it restrict its focus to its mandate in the areas of short-term macroeconomic policy?⁵ Would not such an extension also conflict with the narrowed substantive focus called for by the IMF's Managing Director (MD) and Executive Board in their recent Medium-Term Strategy (MTS) document (IMF, 2006)?

But the above argumentation on the relevance of climate change issues to the IMF's traditional concerns cannot be so casually dismissed. If the Fund were routinely to ignore matters of considerable structural

⁵ Only very recently, an external advisory panel created by the World Bank and IMF to review Bank-Fund collaboration emphasized that the Bank should have principal responsibilities for growth-related matters. Would not the longstanding concern that the Fund should not go beyond its core expertise and focus on macroeconomic policy apply in this case?

importance which either impinge on a country's long-term development prospects, influence financial sector developments, or contribute to a greater vulnerability to shocks and fiscal risks, then its value as an economic policy adviser would be seriously diminished. A strengthening of bilateral and multilateral surveillance is clearly recognized by the MD in his MTS, with analyses of potential sources of real and financial sector vulnerabilities understood to be part of the Fund's mandate. The challenge is to find a role that the IMF can play in stimulating a focus on the macroeconomic dimensions of climate change matters, while recognizing that it will be inevitably limited in its ability to analyze the complex system of factors which influence *how* these macroeconomic dimensions are determined or resolved.

What can the IMF do in the realm of climate change?

The focus should clearly be on the relationship to surveillance. In its *bilateral surveillance*, the Fund's Article IV consultations provide an opportunity for country authorities to clarify their assessment of the various ways in which climate change developments and climate change policy-related efforts may impact on a country's economy and on the actions being taken to limit any adverse effects. As noted, most countries have accepted the obligation to undertake such assessments under the UNFCCC; the fact that few have done so on a regular basis, or that most have focused almost wholly on issues of mitigation rather than on adaptation only argues for the need to provide further stimulus to the carrying out of such analyses. The fact that the IMF would elevate the discussion of these issues to the level of the finance and/or economic Ministries, as opposed to environmental agencies, may play a beneficial role in fostering the national policy debate on each country's climate change policies.

More specifically, in its bilateral surveillance discussions with authorities, the Fund could ask authorities to clarify:

- (i) The expected impact of climate change factors on various aspects/sectors of a country's economy;
- (ii) What adaptation policies are being pursued, their cost, and how they would lessen the impact that would occur under a business-as-usual (no adaptation) scenario;

- (iii) Whether the country has engaged in any form of self-insurance or reinsurance mechanism to address the potential consequences of extreme weather shocks associated with climate change;
- (iv) What policy actions are being taken with respect to mitigation and their associated fiscal costs;
- (v) Whether there are areas of potential technical assistance needs which the IMF or others may be in a position to provide with regard to addressing the macroeconomic dimensions of climate change;
- (vi) The expected capital inflows that might be associated with participation in the Clean Development Mechanism or any cap and trade emissions facility; and
- (vii) Any concerns associated with a loss of competitiveness of domestic industry that may be arising from mitigation efforts.

In its *multilateral surveillance*, the Fund could periodically take stock of potential global macroeconomic effects, either associated with policies of mitigation or of the consequences of immediate economic effects from the impact of climate change on some countries. The Fund might also periodically engage in scenario-building analyses which could inform bilateral discussions on what might be possible alternative states of the world that countries might confront, given the remaining uncertainties that characterize the science of climate change.

Finally, in its *work on the financial sector*, the Fund could explore more systematically how the distribution of risk from climate change-related events may be shifted as a consequence of the role of the reinsurance industry and of the use of new financial instruments as well as what might be the potential macroeconomic consequences of any such redistributions in risk.

Obviously, in its discussions with emerging market and developing countries—where the World Bank is also a key player—the IMF should, as much as possible, draw on the Bank's work on climate change issues and, even more desirable, include Bank staff in any discussions with country authorities, in order to ensure that the IMF's focus is limited to the macroeconomic impacts and policy issues posed. Since the World Bank does not focus on industrial countries, it would also be desirable if, on this issue, the IMF in its surveillance discussions with industrial countries could draw on either the expertise of the OECD, the EU, or outside

experts (assuming the World Bank was unwilling to extend its efforts on these issues to such countries).

Some might argue that there is still so much uncertainty on the effects of climate change that the IMF should not address this issue. This is not a compelling argument. There are numerous areas of economic policy concern where the uncertainties are equally large and yet where the Fund feels competent to carry out analyses that inform policy makers. Note the range of potential demographic outcomes that arise when one does projections out for several decades. Note the extraordinary sensitivity of fiscal projections to what is assumed about cost pressures associated with medical care and new technologies. Or the considerable uncertainties associated with the potential for capital market crises arising from the enormous lacuna in data on the cross-positions of various market players in the derivatives market. The Fund can draw on both the expertise of the World Bank and of the various key actors in the IPCC process to narrow the extent of uncertainty and to provide at least a basic starting point for discussions with country authorities on the potential risks involved (see the Appendix to Heller, 2003).

What should the IMF *not* do in this area?

While the IMF's surveillance discussions may stimulate countries to assess the potential macroeconomic consequences of climate change, the IMF certainly cannot advise on the scale of desirable mitigation efforts that a country should pursue, or on the relevance or desirability of alternative approaches to mitigation or adaptation. Neither can it monitor or judge the extent of a country's compliance with the Kyoto Protocol or of its mitigation actions (even if not obligated under the Kyoto Protocol). It also cannot appraise the effects of the various channels of influence of climate change on a country's economy, nor of the potential channels of adaptation that may arise from higher energy prices or various policy initiatives. In effect, the Fund can provide additional incentives for a country to focus on these issues but it must counsel countries to seek guidance from those international institutions that have technical competence on these matters. This also implies that the Fund does not have the expertise or depth to include issues of climate change as part of its policy conditionality in its lending operations.

IV

More broadly, addressing the challenge of climate change will require a far stronger presence by existing international institutions—whether by the Secretariat of the UNFCCC, the International Energy Agency, the UNDP or the United Nations Environmental Program (UNEP). Recent papers (Sokolow, 2007; United Nations Foundation and Sigma Xi, 2007; and Nordhaus, 2006) underscore the enormous complexity of the policy challenges facing the world economy if it is to undertake the policies necessary to ensure both the stabilization of greenhouse gas concentrations at a reasonable target level by mid-century—some would argue for a ceiling of no greater than the doubling of preindustrial levels—and of policies to gradually reduce the concentration thereafter. To do so will require action on the various wedges of mitigation effort that can contribute to such a reduction (Sokolow, 2006).

This then requires that the international community be in a position to assess:

- What countries are doing collectively in terms of mitigation efforts (an effort currently undertaken by countries in collaboration with the UNFCCC);
- How current policy actions are influencing the aggregate level of global emissions and the projected path of greenhouse gas concentrations;
- How any changes in the projected emissions path will impact on the various dimensions of climate change projected in the future;
- The desirability of the different kinds of research and development activities that may be needed to narrow existing uncertainties as to the impact of different levels of greenhouse gas concentrations on projected climate change; and
- The collective adequacy of what countries individually are doing in terms of achieving desirable mitigation targets relative to what might be needed to achieve global objectives of emissions control.⁶

⁶ For example, Sokolow (2006) has underscored the different consequences that will arise according to whether action is taken today along a number of fronts to reduce greenhouse gas emissions as opposed to delays in such action. Delays can significantly modify what is feasible in terms of projected greenhouse gas targets looking ahead several decades.

Are present institutional mechanisms for addressing these issues with countries adequate for the job required? The IMF provides a useful example of how a surveillance mechanism can usefully catalyze routine intensive discussions about one kind of global externality, viz., risks to the international monetary system. Is the existing mandate and financing provided to the various institutions dealing with climate change under the UNFCCC sufficient to carry out the tasks required to address what could be considered a potentially even more serious and dangerous long-term global externality risk? One is immediately struck by the enormous disparity in the relative annual budgets of the UNFCCC (\$26 million) and the IMF (roughly \$1 billion) in dealing with their respective global externalities. While the former does not represent a full aggregation of the outlays on climate change by the international community, the disparity is still telling and worrisome.⁷

References

- Byatt, I., I. Castles, I. Goklany, D. Henderson, N. Lawson, R. McKittrick, J. Morris, A. Peacock, C. Robertson, and R. Skidelsky, 2006, "The Stern Review: A Dual Critique—Part II: Economic Aspects," *World Economics*, Vol. 7, No. 4 (October–December), pp. 199–229.
- Carter, R. M., C. R. de Freitas, I. Goklany, D. Holland, and R. Lindzen, "The Stern Review: A Dual Critique—Part I: The Science," *World Economics*, Vol. 7, No. 4 (October–December), pp. 167–198.
- Dasgupta, S., B. Laplante, C. Meisner, D. Wheeler, and J. Yan, 2007, "The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis," *World Bank Research Working Paper 4136* (World Bank: Washington DC).
- Heller, P., 2003, *Who Will Pay? Coping with Aging Societies, Climate Change, and other Long-Term Fiscal Challenges* (Washington: International Monetary Fund).
- IMF–World Bank, 2007, *Report of the External Review Committee on Bank–Fund Collaboration* (Washington DC).
- IMF, 2006, *The Managing Director's Report on Implementing the Fund's Medium-Term Strategy* (Washington DC).

⁷ The recent report of the International Task Force on Global Public Goods (2006) further reinforces the importance of the need for a strengthening of the effectiveness and the adequacy of the financing for such global public goods as climate change.

Peter S. Heller

Intergovernmental Panel on Climate Change, 2007, *Climate Change 2007: The Physical Science Basis: Summary for Policy Makers* (Paris).

International Task Force on Global Public Goods, 2006, *Meeting Global Challenges* (Stockholm).

Lombardi, D., 2005, "The IMF's Role in Low Income Countries: Issues and Challenges," IMF *Working Paper No. 05/177* (Washington DC).

Nordhaus, W., 2006, "The *Stern Review* on the Economics of Climate Change," <http://nordhaus.econ.yale.edu/SternReviewD2.pdf>

Sokolow, R., 2007, "Good Enough Tools for Global Warming Policy Making," *Philosophical Transactions of the Royal Society A* (doi: 10.1098/rsta.2006.1961)

Sokolow, R., and S. W. Pacala, 2006, "A Plan to Keep Carbon in Check," *Scientific American* (September).

Stern, N., 2006, *The Economics of Climate Change: The Stern Review on the Economics of Climate Change* (London: HM Treasury).

Tol, R., and G. Yohe, 2006, "A Review of the *Stern Review*," *World Economics*, Vol. 7, No. 4 (October–December), pp. 233–250.

United Nations Foundation and Sigma Xi, 2007, *Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable* (Washington DC).