

Dosi, Cesare; Moretto, Michele

Working Paper

Global warming and financial umbrellas

Nota di Lavoro, No. 87.2001

Provided in Cooperation with:

Fondazione Eni Enrico Mattei (FEEM)

Suggested Citation: Dosi, Cesare; Moretto, Michele (2001) : Global warming and financial umbrellas, Nota di Lavoro, No. 87.2001, Fondazione Eni Enrico Mattei (FEEM), Milano

This Version is available at:

<https://hdl.handle.net/10419/155250>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

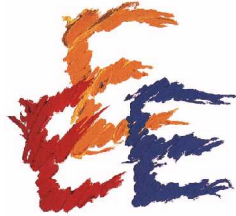
Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Fondazione Eni Enrico Mattei

Global Warming and Financial Umbrellas

Cesare Dosi* and Michele Moretto*

NOTA DI LAVORO 87.2001

OCTOBER 2001

CLIM - Climate Policy and Modelling Policy

*Department of Economics, University of Padova

This paper can be downloaded without charge at:

The Fondazione Eni Enrico Mattei Note di Lavoro Series Index:
http://www.feem.it/web/attiv/_attiv.html

Social Science Research Network Electronic Paper Collection:
<http://papers.ssrn.com/abstract=XXXXXX>

Fondazione Eni Enrico Mattei
Corso Magenta, 63, 20123 Milano, tel. +39/02/52036934 – fax +39/02/52036946
E-mail: letter@feem.it
C.F. 97080600154

SUMMARY

A new instrument for hedging weather risks has made its appearance in the financial arena. Trade in 'weather derivatives' has taken off in the US, and interest is growing elsewhere. Whilst such contracts may be simply interpreted as a new tool for solving a historical problem, the question addressed in this paper is if, besides other factors, the appearance of weather derivatives is somehow related to anthropogenic climate change. Our tentative answer is positive. Since 'global warming' does not simply mean an increase in averaged temperatures, but increased climate variability, and increased frequency and magnitude of weather extremes, derivative contracts may potentially become a useful tool for hedging some weather risks, insofar as they may provide coverage at a lower cost than standard insurance schemes.

Keywords: Global warming, climate variability, insurance coverage, weather derivatives

JEL: G10, Q20

CONTENTS

1. Introduction and scope of the paper	2
2. Background	3
2.1 Global warming and related impacts	3
2.2 What are weather derivatives?	4
3. Hedging risks through insurance contracts and weather derivatives: a text-book comparison	6
3.1 A “standard” insurance contract	6
3.2 A “put” contract	7
3.3 Comparison	9
4. Final remarks	10
References	12

1 Introduction and the scope of the paper

Weather comes in many forms, and has always affected human activities in different ways. When weather patterns vary from the norm, individuals and businesses may incur serious welfare and financial losses. When they significantly vary from the norm, the effects can be catastrophic.

This explains why societies and individuals have always tried to protect themselves against the impacts of adverse weather. Societal or private protection has traditionally taken different forms: regulatory provisions (*e.g.* land-use planning in vulnerable areas) and public insurance (*e.g.* government relief programs); public or private real investments to moderate potential damages (*e.g.* water storage facilities to cope with fluctuations in precipitation rates); and private financial investments, namely purchasing insurance by paying a premium to a private company.

More recently, a new instrument for hedging weather risks has made its appearance in the financial arena: “In the past couple of years the trade in weather derivatives has taken off in America [and] interest is growing elsewhere, not least in Britain where, as everybody knows, weather is the main topic of conversation” (*The Economist*, January 22nd 2000, p. 84)).

The issue addressed in this paper can be summarised as follows: Is the appearance in the financial arena of so-called weather derivatives somehow related to anthropogenic climate change and its expected impacts? In other words: Can we elicit from this appearance that financial operators are tackling the ‘global warming’ scenario more seriously than politicians, and their constituencies, apparently are?

In order to get some preliminary insights about the relationship between global warming and weather derivative trades, we will exploit a very simple, ‘textbook’ model. By adopting a partial equilibrium framework, we will consider an agent, holding an asset whose future value depends on weather patterns. In order to acquire protection against financial losses, the agent can subscribe a ‘standard’ insurance contract. Alternatively, s/he may construct a risk-free portfolio, by buying a weather derivative. Then, we compare the ‘price’ paid to acquire protection against adverse weather conditions under the two alternative coverage schemes, in order to see whether the intrinsic features of global warming’s expected impacts may somehow explain the development of derivative contracts.

The remainder of the paper is organised as follows. Some general information about global warming related impacts, and the weather deriva-

tives which have made their appearance in the market is provided in Section II. In Section III we compare the price paid to acquire protection against adverse weather conditions under the two alternative coverage schemes. Section 4 provides some concluding remarks.

2 Background

2.1 Global warming and related impacts

Climate, i.e. average weather, has always been subject to fluctuation and change. Ice ages and warmer periods have occurred in the past, as a result of various natural causes. However, more recently a non-natural cause of climate change has been identified, namely excessive concentrations of greenhouse gases (GHG) due to human activity, such as burning fossil fuels. According to a recent assessment report by the Intergovernmental Panel on Climate Change (IPCC), the globally averaged surface temperatures have increased by $0.6 \pm 0.2^\circ \text{C}$ over the 20th century, and temperature is projected to warm between 1.4 to 5.8°C by 2100 relative to 1990 (IPCC, 2001).

Since the Earth Summit held in 1992 in Rio de Janeiro, countries have declared their determination to reduce GHG emissions to prevent interference in the climate system. During the 3rd Conference of the Parties to the United Nations Framework Convention on Climate Change, held at Kyoto in 1997, industrial nations agreed to cut their collective emissions to 5 per cent below 1990 levels, in the period 2008-2012. Under the Kyoto Protocol, the United States – which produces almost a quarter of the world’s GHG - would have to undertake a 7% cut, Japan 6%, and the European Union 8%.

In November 2000, countries that backed the Kyoto Protocol met at The Hague, The Netherlands, in order to define the mechanisms to implement emission abatement commitments. However, the Conference failed, officially because of disagreements about these mechanisms. Whilst the US (backed by Japan, Australia and Canada) took the position that countries should be allowed maximum flexibility in meeting their targets (including ‘paying’ other countries, either by trading emission permits or by so-called joint-implementation measures), the EU’s position was that each country should primarily take domestic actions to meet its obligations.

A few weeks later, after President Bush’s appointment, the US Administration took a different position: instead of simply questioning the Kyoto’s implementation mechanisms, President Bush announced the intention to re-define the entire Protocol, namely the timing as well as

the countries' abatement targets. Although this astonished many Americans and the international community, President Bush's statement is consistent with his electoral program. In fact, during the presidential campaign, Mr. Bush had declared his intention to "oppose the Kyoto protocol, because it is ineffective, inadequate and unfair to America. It exempts 80 per cent of the world, including major population centres such as China and India, from compliance".¹

Whilst the prospects for effective international action to tackle GHG emissions are bleak, scientists have continued to add additional evidence about the adverse impacts and disasters from global warming. In February 2001, the Intergovernmental Panel on Climate Change (IPCC) released a new report, which summarises a large research into "Climate Change 2001: Impacts, Adaptation and Vulnerability". Besides updating previous forecasts about the expected changes in globally averaged surface temperatures, the Report provides an in-depth overview of the potential consequences of climate change.

One of the major emerging findings is that, "there would be changes in the variability of climate, and changes in the frequency and intensity of some extreme climate phenomena" (IPCC, 2001, p.3). Both "simple extremes" – such as higher maximum temperatures, higher minimum temperatures, more intense precipitation events – and "complex extremes" – such as intensified droughts and floods – are "very likely" or "likely" in nearly all or many areas.

According to the IPCC Report, such developments "would place upward pressure on insurance premiums and/or could lead to certain risks being reclassified as uninsurable with subsequent withdrawal of coverage" (p. 13). In fact, the costs of ordinary and extreme weather events have already increased rapidly in recent decades. "Part of the observed upward trend in disaster losses over the past 50 years is linked to socio-economic factors, such as population growth, increased wealth, and urbanization in vulnerable areas, and part is linked to climatic factors, such as the observed changes in precipitation and flooding events" (IPCC, 2001, p.13).

2.2 What are Weather Derivatives ?

Weather derivatives were originally designed to provide energy companies with a means of protection against financial losses resulting from unfavourable weather patterns, namely from local temperature fluctuations (Marcus, 1998). However, even firms operating in other sectors – *e.g.* agriculture and the leisure industry – are beginning to be attracted

¹George W. Bush for President Official Site: Issues, "Environment and Natural Resources", www.georgebush.com/issues/environment.html, December, 2000).

by derivative contracts as a weather risk management tool.

According to Speedwell Weather Derivatives Limited an estimated \$4 billion over-the-counter market in weather derivatives has developed over the last two years in the US (McIntyre, 2000). The world's first exchange-traded weather derivatives were launched in September 1999, when the Chicago Mercantile Exchange (CME) launched contracts based on cold temperatures in New York, Chicago, Atlanta and Cincinnati; later on, the CME added six other cities. In January 2000, the London International Financial Futures and Options Exchange launched an Internet-based experimental market for European weather derivatives (*The Economist*, January 22nd 2000).

The term 'weather derivative' is used to encompass a variety of products used in the weather risk management market (swaps, collars, call and put options). As it goes beyond the scope of the paper to carry out an indepth technical analysis of these products, let us briefly focus only on put contracts which are considered in the comparative analysis proposed in the following Section.

Put options – which, to our knowledge, are probably the most common weather derivative contracts – provide protection against adverse weather. By paying a premium upfront, the buyer will be compensated if a weather variable falls below a predetermined level.²

An example of such put contracts has been recorded by *The Economist*. This example also serves the purpose of illustrating the rationale behind a weather derivative trade:

“Corney & Barrow [is a chain of wine bars-cum-restaurants]; six have places where customers can sit outside. Although it has plenty of regulars, a fifth of the company's summer profits stem from those who come out with the sun [...] The firm wanted to avoid this volatility, so it bought what amounts to 'put' options on bad weather (the right to sell it) from Enron, an energy firm, through Speedwell Weather Derivatives, a consultancy. Enron will pay Corney & Barrow up

²The potential buyer of such options is an agent holding an asset (running an economic activity) closely correlated to the weather variable. However, many analysts have questioned the possibility of using the classic Black-Scholes option model to price weather derivative contracts. This because weather cannot be traded, whilst the Black-Scholes model assumes the existence of a tradable asset on which the pay out on the option is ultimately dependent. However, as argued by McIntyre (2000), this general criticism is wrong, because "the pay out on a weather option [...] is based on a series of weather events, not on the value of weather" (p.1). In other words, the trick consists of finding tradable assets which behave very like the weather variable of interest.

to £15,000 [...] for each Thursday and Friday between June and September on which the temperature in London falls below 24° Celsius [...], up to a maximum of £100,000 for the whole period. This, you might think, is free money for Corney & Barrow: London is not, after all, famed for its blue skies. But Enron [says] it knows what is doing. The knack is to hedge a position with something that is closely correlated. You cannot trade weather, so the next best thing is to trade something that behaves very like it: gas (as it happens, gas prices, which according to Enron are closely correlated with temperature)” (*The Economist*, June 17th 2000, p.99).

3 Hedging risks through insurance contracts and weather derivatives: a text-book comparison

3.1 A 'standard' insurance contract

Let us consider a simple two-period economy in which at time one only two states of nature are possible: ‘good weather’ (GW) or ‘bad weather’ (BW). In this economy only two original assets are negotiated: one risk-free asset with an interest rate r that we set to zero, and a risky asset W .

Under GW the value of the risky asset would rise up to $W + M$, whilst under BW the value would fall to $W - L$. The stationary binomial process of the risky asset’s value can then be represented by the following tree:

$$\begin{array}{rcl}
 & \nearrow W^+ = W + M & \text{with probability } 1 - q \\
 W & & \\
 & \searrow W^- = W - L & \text{with probability } q
 \end{array}$$

The difference $W^+ - W^- = M + L$ indicates the value loss attributable to adverse weather conditions (*e.g.* property damages, sales losses, etc.). Furthermore, to avoid arbitrage profit opportunities, indicating with $R^+ = \frac{W^+ - W}{W}$ and $R^- = \frac{W^- - W}{W}$ the rate of return if the value of the asset moves up (+) and down (-) respectively, we assume that $R^+ > 0 > R^-$.

Consider now an agent holding at time zero the risky asset, which gives her/him utility $u(W)$, where u is a VNM utility function that shares the standard properties, i.e. $u(0) = 0$, $u'(W) > 0$ and $u''(W) < 0$. Let us assume the agent faces a risk-neutral insurance company which,

in return for a premium, p , offers risk coverage. In particular, without any restriction, the insurance policy may consist of partial ($a < 1$) or total ($a = 1$) coverage: by paying ap , under BW the agent will get back $a(M + L)$.

Within this framework, the basic insurance problem is to determine the optimal coverage and the current value of p . If the utility function is defined over the asset end value, to determine the optimal coverage the agent maximizes (Kreps, 1990):

$$\max_a (1 - q)u(W^+ - ap) + qu(W^- - ap + a(M + L))$$

Taking the derivative with respect to a and setting it equal to zero, the optimality condition is:

$$\frac{u'(W + M - ap)}{u'(W - L - ap + a(M + L))} = \frac{q}{1 - q} \frac{p - (M + L)}{p} \quad (1)$$

If, due to competition between insurance companies or to regulatory constraints, the insurance contract is *actuarially fair* - i.e. the premium p is equal to the payout $aq(L + M)$ - the first-order condition (1) reduces to:³

$$\frac{u'(W + M - ap)}{u'(W - L - ap + a(M + L))} = 1$$

As the agent is strictly risk adverse this condition is satisfied only if $a = 1$. Thus the agent will acquire full coverage ($L + M$), by paying a premium:

$$p = q(L + M) \quad (2)$$

3.2 A 'put' contract

In order to explore the role that weather derivative contracts can play to hedge weather risks, we consider the simplest financial option, i.e. a European put option. We assume that the variability of asset W may be spanned by existing tradable assets which are closely correlated to the climate variability affecting W . In other words, we assume that capital markets are sufficiently complete so that it is possible to construct a

³Our assumptions imply the use of expected losses as the fair-value benchmark. However, it is worth noting that, in reality, premiums are often greater than expected losses. As far as catastrophic natural hazards, such as hurricanes, are concerned, Foot (2001) shows that (re)insurance premiums are more than seven times expected loss (US data, 1989-1998).

portfolio of traded securities (a ‘tracking portfolio’) which is perfectly correlated with W .

Indicating with \hat{p} the current value of the derivative under consideration, over the period it would be contingent on the value of W , that is:

$$\begin{array}{l} \nearrow p^+ = \max(E - W^+, 0) = 0 \quad \text{with probability } 1 - q \\ \hat{p} \\ \searrow p^- = \max(E - W^-, 0) = E - W^- \quad \text{with probability } q \end{array}$$

where p^+ and p^- are the end values of the derivative under the event GW and BW, respectively. $E \in [W^-, W^+]$ is the exercise price that, under our assumptions, indicates the level of coverage against adverse weather conditions.

In words, under W^+ the put will not be ‘exercised’, as the underlying asset increases its value above the exercise price. On the contrary, if W^- , as $E - W + L > 0$, the put will be exercised and the asset will be sold at price E . Finally, if $E = W + M$, the agent holding the risky asset will get full coverage.

The put option for the problem at hand can be valued by designing a portfolio consisting of selling a particular number, n , of units of the underlying asset W and lending against them an appropriate amount, $\$B$, at the riskless rate, so that it would exactly replicate the future returns of the option in any state of nature (Trigeorgis, 1996). That is:

$$\hat{p} = B - nW \quad (3)$$

Since after one period the value of the portfolio will be:

$$\begin{array}{l} \nearrow B - nW^+ \quad \text{with probability } 1 - q \\ B - nW \\ \searrow B - nW^- \quad \text{with probability } q \end{array}$$

in order to provide the same return in each state as the option, we need to impose:

$$p^+ = B - nW^+ \quad \text{and} \quad p^- = B - nW^-$$

Solving the two equations for the two unknown, n and B we get:

$$n = -\frac{p^+ - p^-}{W^+ - W^-} > 0, \quad \text{and} \quad B = p^+ + nW^+ \equiv \frac{W^+p^- - W^-p^+}{(W^+ - W^-)} > 0$$

By substituting n and B back into (3) we get:

$$\hat{p} = B - nW \equiv (1 - \hat{q})p^+ + \hat{q}p^- \quad (4)$$

where:

$$\hat{q} = \frac{W^+ - W}{W^+ - W^-} \equiv \frac{M}{M + L} > 0 \quad (5)$$

Note that \hat{q} has certain probability-like-properties, namely $0 < \hat{q} < 1$. It indicates the ‘risk-neutralized’ probability, that is the probability that would prevail in a risk-neutral world where agents are indifferent to risk. Finally, if the agent holding the risky asset W requires full coverage, i.e. $E = W + M$, the price of the weather derivative simplifies to:

$$\hat{p} = \hat{q}(E - W^-) \equiv \hat{q}(L + M) \quad (6)$$

It is evident comparing (2) and (6) that, contrary to the insurance premium, the price of the weather derivative is neither affected by the agent’s utility function, nor by the asset’s intrinsic vulnerability to adverse climatic conditions (q). For instance, by the ability to construct such a riskless hedge, the asset’s owner *de facto* behaves as a risk neutral agent.

3.3 Comparison

We may now compare the ‘price’ paid to acquire full coverage under the two alternative insurance contracts. For given coverage ($L + M$), the price differential, i.e. the difference between the insurance premium (p) and the derivative value (\hat{p}) is given by $\Delta = (q - \hat{q})$. As the ‘risk-neutralized’ probability can be written as $\hat{q} = \frac{1}{1+L/M}$, we get:

$$\frac{\partial \Delta}{\partial L/M} > 0$$

In other words, as the relative magnitude of *harmful* weather patterns (L/M) increases, the relative price of risk coverage by means of a standard insurance contract increases, i.e. it tends to become more appealing to hedge risks through a weather derivative (see Fig.1). Similarly, as:

$$\frac{\partial \Delta}{\partial q} > 0$$

an increase of the risky asset’s intrinsic vulnerability would amplify the range over which it becomes more ‘profitable’ to hedge weather risks through buying a derivative instead of subscribing an insurance contract (see Fig.1).

[fig. 1 about here]

Since, as underlined in the previous Section, global warming is expected to involve changes in the variability of climate, and changes in the frequency and intensity of some extreme climate phenomena (IPCC, 2001), weather derivatives may in principle become an appealing tool for hedging weather risks.

4 Final remarks

Trades in weather derivatives have only recently taken off, and it is too early to say whether they will proliferate in the coming years. For instance, there are many examples of quirky financial products, which did not work, because of the lack of buyers, and then disappeared.

Various market and institutional factors may explain the development and the potential interest towards weather derivatives. Because weather cannot be traded, hedging weather risks through derivative contracts requires finding tradable assets that behave very like it. Since there are plenty of businesses which are exposed to weather conditions, the continuous enlargement and globalisation of financial markets provides dealers with a new opportunity to solve a historical problem, i.e. managing some weather risks, by finding assets closely correlated to climate variability.

Among the other factors which may explain the development of weather derivatives it is also worth mentioning the deregulation of the energy industry, which makes managing the traditional risks related to temperature fluctuations more compelling. Not surprisingly, besides insurance companies, which appear to be natural candidates for weather derivative trades, these products have mostly attracted energy companies, and the mostly actively traded of these products up till now is temperature. However, trades involving companies operating in other sectors, as well as “deals involving precipitation, both snowfall and rainfall, have also been written as well as deals combining precipitation and temperature” (Speedweel Weather Derivatives, 2000, p.1).

Whilst weather derivatives may then be simply interpreted as a new tool for solving a historical problem, the question addressed in this paper has been if, besides the afore-mentioned institutional and economic factors, which undoubtedly play a primary role, other factors may contribute to explain the take-off of these products. In particular, we have focussed on global warming, in order to see whether its related impacts could make weather derivatives an appealing tool for risk coverage.

Our tentative answer is positive. Since, according to scientists, global warming does not simply mean an increase in averaged temperatures, but

increased climate variability, and increased frequency and magnitude of weather extremes, weather derivatives may potentially become a useful tool for hedging risk, insofar as they may provide coverage at a lower cost than ‘standard’ insurance coverage schemes.

It is worth noting that our results stem from a very simple analytical framework which assumes, *inter alia*, that the agent, holding an asset exposed to weather variability, is able to construct a risk-free portfolio, by finding tradable assets which are closely correlated to the climate conditions which affect the asset of interest. Moreover, as an alternative to constructing such a portfolio, we have considered a ‘textbook’ insurance contract, by assuming that insurance premium calculation is based upon actuarial principles. However, if insurers behaved as ‘investors’ - i.e. when selling an insurance contract they considered that they are acquiring an asset - insurance premiums would look more like asset prices, and the potential benefits stemming from directly buying weather derivatives could vanish.

These assumptions obviously affect the possibility of generalising our results, whose robustness should be assessed through a more sophisticated theoretical framework as well through empirical analysis.

However, if more indepth analysis substantially confirms our preliminary findings, it is legitimate to state that, although weather derivatives may appear as quirky products, global warming – and policy-makers’ inaction - is likely to favour their proliferation.

The question is: Will all activities and people, in all continents, be able to hedge the increasing weather risks, they are going to face, by constructing appropriate ‘risk-free portfolios’? We guess that the answer is no, and we should expect to witness over the next years increasing asymmetries, within and between countries, not only in terms of climate vulnerability, but also in terms of risk coverage.

References

- [1] Foot, K.A. (2001), "The Market for Catastrophic Risk: A Clinical Examination". *Journal of Financial Economics* (60), 529-571.
- [2] Intergovernmental Panel on Climate Change (2001), "Climate Change 2001: Impacts, Adaptation, and Vulnerability" (Summary for PolicyMakers). *www.ipcc.ch*.
- [3] Kreps, D.M. (1990), *A Course in Microeconomic Theory*, Harvester Wheatsheaf: New York.
- [4] Marcus, K. (1998), "Weather Derivatives Play Vital Role in Hedging Risk". Earth Satellite Co., October, *www.earthsat.com/energywx/cme/cmearicle.html*.
- [5] McIntyre, R. (2000), "Balck-Scholes Will Do!". SWD Research Paper, Speedwell Weather derivatives Limited. *www.weatherderivs.com/bswilldo.html*
- [6] Speedwell Weather Derivatives (2000), "What are Weather Derivatives" *www.weatherderivs.com/whatwd.html*
- [7] The Economist (2000), "Weather Derivatives - Cold Comfort Farm". January 22nd, 81-84.
- [8] The Economist (2000), "Buying a Financial Umbrella". June 17th, p.99.
- [9] Trigeorgis, L. (1996), *Real Options, Managerial Flexibility and Strategy in Resource Allocation*, MIT Press: Boston, MA.

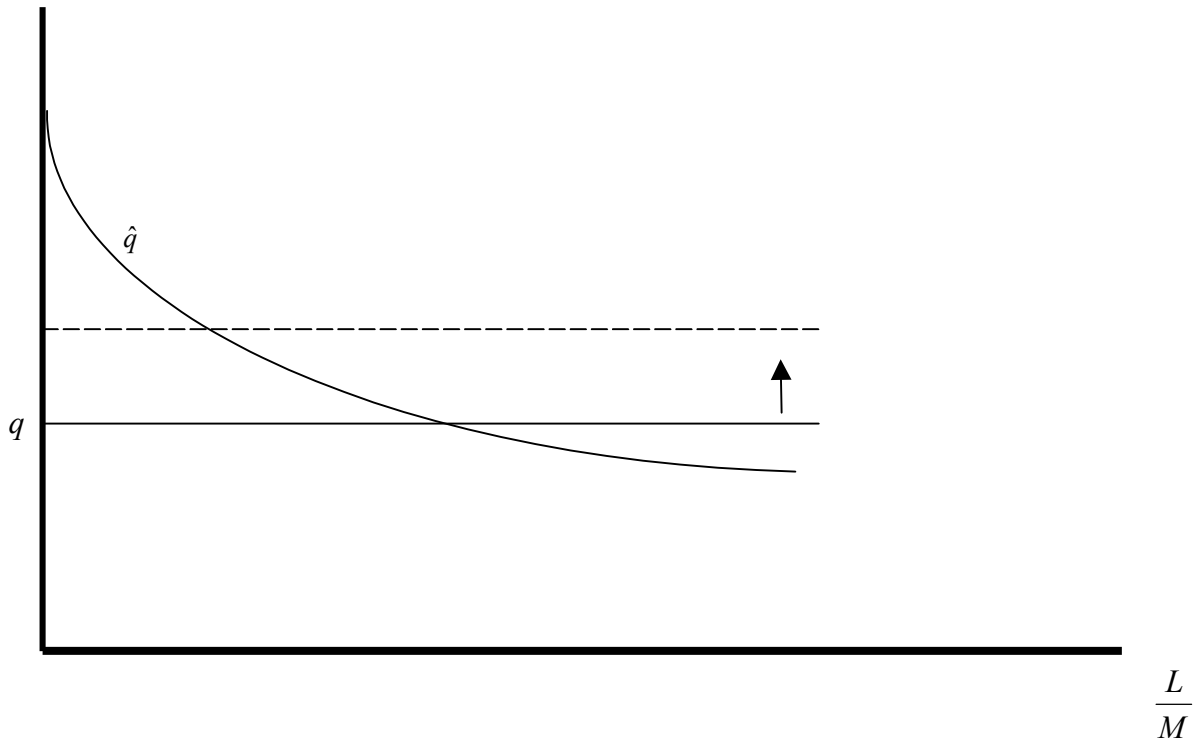


Figure 1

NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Papers Series

Our working papers are available on the Internet at the following addresses:

Server WWW: WWW.FEEM.IT

Anonymous FTP: FTP.FEEM.IT

To order any of these papers, please fill out the form at the end of the list.

CLIM	1.2000	<i>Claudia KEMFERT</i> : <u>The Impacts of Emissions Trading on World Economies. Contemplation of baseline emissions paths and a ceiling on emissions trading</u>
CLIM	2.2000	<i>Pascal FAVARD</i> : <u>Does Productive Capital Affect the Order of Resource Exploitation?</u>
CLIM	3.2000	<i>Robert T. DEACON</i> (xxxix): <u>The Political Economy of Environment-Development Relationships: A Preliminary Framework</u>
SUST	4.2000	<i>Piet RIETVELD and Roberto ROSON</i> : <u>Joint Costs in Network Services: the Two-way Problem in the Case of Unbalanced Transport Markets</u>
CLIM	5.2000	<i>Robert S. PINDYCK</i> (xxxix): <u>Irreversibilities and the Timing of Environmental Policy</u>
MGMT	6.2000	<i>Domenico SINISCALCO, Stefania BORGHINI, Marcella FANTINI and Federica RANGHIERI</i> (xI): <u>The Response of Companies to Information-Based Environmental Policies</u>
SUST	7.2000	<i>Guy D. GARROD, Riccardo SCARPA and Ken G. WILLIS</i> : <u>Estimating the Benefits of Traffic Calming on Through Routes: A Choice Experiment Approach</u>
CLIM	8.2000	<i>ZhongXiang ZHANG</i> : <u>Estimating the Size of the Potential Market for the Kyoto Flexibility Mechanisms</u>
VOL	9.2000	<i>Jean-Christophe PEREAU and Tarik TAZDAIT</i> (xli): <u>Partial and Global Cooperation with Unilateral Commitment in the Presence of Global Environmental Problems</u>
KNOW	10.2000	<i>Giacomo CALZOLARI and Giovanni IMMORDINO</i> : <u>Hormone Beefs, Chloridric Chicken and International Trade: Can Scientific Uncertainty be an Informational Barrier to Trade?</u>
CLIM	11.2000	<i>Laura MARSILIANI and Thomas I. RENSTRÖM</i> (xxxvi): <u>Imperfect Competition, Labour Market Distortions, and the Double Dividend Hypothesis</u>
KNOW	12.2000	<i>Patrizia BUSSOLI</i> : <u>An Empirical Analysis of Technological Convergence Process and RIVs in Europe at the Firm Level</u>
KNOW	13.2000	<i>Luigi BENFRATELLO and Alessandro SEMBENELLI</i> : <u>Research Joint Ventures and Firm Level Performance</u>
KNOW	14.2000	<i>Nicholas S. VONORTAS</i> : <u>US Policy towards Research Joint Ventures</u>
ETA	15.2000	<i>Y.H. FARZIN</i> : <u>The Effects of Emissions Standards on Industry in the Short Run and Long Run</u>
ETA	16.2000	<i>Francis BLOCH and Stéphane ROTTIER</i> (xli): <u>Agenda Control in Coalition Formation</u>
CLIM	17.2000	<i>Giovanni IMMORDINO</i> : <u>Looking for a Guide to Protect the Environment: the Development of the Precautionary Principle</u>
CLIM	18.2000	<i>Hans W. GOTTINGER</i> : <u>Negotiation and Optimality in an Economic Model of Global Climate Change</u>
VOL	19.2000	<i>Paola MILIZIA and Marialuisa TAMBORRA</i> : <u>Juridical Framework of Voluntary Agreements in Italy and Policy Relevance at the Local Level</u>
CLIM	20.2000	<i>Richard S.J. TOL, Wietze LISE and Bob van der ZWAAN</i> (xli): <u>Technology Diffusion and the Stability of Climate Coalitions</u>
CLIM	21.2000	<i>Pietro TEATINI and Giuseppe GAMBOLATI</i> (xlii): <u>The Impact of Climate Change, Sea-Storm Events and Land Subsidence in the Adriatic</u>
CLIM	22.2000	<i>Emiliano RAMIERI</i> (xlii): <u>An Overview of the Vulnerability of Venice to the Impacts of Climate Change and Sea Level Rise</u>
PRIV	23.2000	<i>Bernardo BORTOLOTTI, Marcella FANTINI and Carlo SCARPA</i> : <u>Why do Governments Sell Privatised Companies Abroad?</u>
ETA	24.2000	<i>Carlo CARRARO and Gilbert E. METCALF</i> : <u>Behavioral and Distributional Effects of Environmental Policy: Introduction</u>
ETA	25.2000	<i>Santiago J. RUBIO and Juana AZNAR</i> : <u>Sustainable Growth and Environmental Policies</u>
KNOW	26.2000	<i>Francesca RECANATINI and Randi RYTERMAN</i> : <u>Disorganisation or Self-Organisation?</u>
KNOW	27.2000	<i>Giorgio BARBA NAVARETTI and David TARR</i> : <u>International Knowledge Flows and Economic Performance. An Introductory Survey of the Evidence</u>
SUST	28.2000	<i>Francesca CODA CANATI</i> : <u>Secondary Raw Materials Market Creation: Waste Stock Exchange</u>
KNOW	29.2000	<i>Giorgio BRUNELLO and Simona COMI</i> : <u>Education and Earnings Growth. Evidence from 11 European Countries</u>
CLIM	30.2000	<i>Michael GRUBB</i> : <u>The Kyoto Protocol: an Economic Appraisal</u>
CLIM	31.2000	<i>Gérard MONDELLO and Mabel TIDBALL</i> (xxxix): <u>Environmental Liability and Technology Choice: A Duopolistic Analysis</u>

KNOW	32.2000	<i>Alberto PETRUCCI and Edmund PHELPS</i> : <u>Capital Subsidies Versus Labour Subsidies: A Trade-Off between Capital and Employment?</u>
VOL	33.2000	<i>Petr ŠAUER, Antonín DVORÁK and Petr FIALA</i> : <u>Negotiation between Authority and Polluters – Model for Support of Decision Making in Environmental Policy: Principles and Experimental Case Test</u>
SUST	34.2000	<i>Riccardo SCARPA, George W. HUTCHINSON and Sue M. CHILTON</i> : <u>Reliability of Benefit Value Transfers from Contingent Valuation Data with Forest-Specific Attributes</u>
CLIM	35.2000	<i>Allen PERRY (xlii)</i> : <u>Impact of Climate Change on Tourism in the Mediterranean: Adaptive Responses</u>
CLIM	36.2000	<i>Laura MARSILIANI and T.I. RENGSTRÖM (xxxvi)</i> : <u>Inequality, Environmental Protection and Growth</u>
CLIM	37.2000	<i>Massimiliano MONTINI (xlii)</i> : <u>Italian Policies and Measures to Respond to Climate Change</u>
CLIM	38.2000	<i>Horst STERR, Richard KLEIN and Stefan REESE (xlii)</i> : <u>Climate Change and Coastal Zones. An Overview of the State-of-the-Art on Regional and Local Vulnerability Assessment</u>
CLIM	39.2000	<i>Tullio SCOVAZZI (xlii)</i> : <u>Ideas Behind the New or Updated Mediterranean Legal Instruments</u>
CLIM	40.2000	<i>Dimitrios GEORGAS (xlii)</i> : <u>Assessment of Climatic Change Impacts on Coastal Zones in the Mediterranean. UNEP's Vulnerability Assessments Methodology and Evidence from Case Studies</u>
SUST	41.2000	<i>Herath M. GUNATILAKE and Ujjayant CHAKRAVORTY</i> : <u>Forest Resource Extraction by Local Communities: A Comparative Dynamic Analysis</u>
PRIV	42.2000	<i>Giancarlo SPAGNOLO</i> : <u>Optimal Leniency Programs</u>
CLIM	43.2000	<i>Paolo BUONANNO, Carlo CARRARO, Efrem CASTELNUOVO and Marzio GALEOTTI</i> : <u>Emission Trading Restrictions with Endogenous Technological Change</u>
CLIM	44.2000	<i>Alan S. MANNE and Richard G. RICHEL</i> : <u>A Multi-Gas Approach to Climate Policy – with and without GWPs</u>
WAT	45.2000	<i>Ujjayant CHAKRAVORTY and Chieko UMETSU</i> : <u>Basinwide Water Management: A Spatial Model</u>
CLIM	46.2000	<i>Don FULLERTON, Inkee HONG and Gilbert E. METCALF (xl)</i> : <u>A Tax on Output of the Polluting Industry is not a Tax on Pollution: The Importance of Hitting the Target</u>
PRIV	47.2000	<i>Axel GAUTIER and Dimitri PAOLINI</i> : <u>Delegation and Information Revelation</u>
ETA	48.2000	<i>Andreas PAPANDREOU</i> : <u>Externality, Convexity and Institutions</u>
ETA	49.2000	<i>Cesare DOSI and Michele MORETTO</i> : <u>The Timing of Adoption of Cleaner Technologies: Private Costs and Public Incentives</u>
ETA	50.2000	<i>Michele MORETTO and Roberto TAMBORINI</i> : <u>Liquidity: What can a “Hausbank” do that Other Lenders Cannot Do?</u>
PRIV	51.2000	<i>Michele MORETTO and Paola VALBONESI</i> : <u>Option to Revoke and Regulation of Local Utilities</u>
PRIV	52.2000	<i>Giancarlo SPAGNOLO</i> : <u>Self-Defeating Antitrust Laws</u>
PRIV	53.2000	<i>William L. MEGGINSON and Maria K. BOUTCHKOVA</i> : <u>The Impact of Privatisation on Capital Market Development and Individual Share Ownership</u>
KNOW	54.2000	<i>Giorgio BARBA NAVARETTI, Marzio GALEOTTI and Andrea MATTOZZI</i> : <u>Moving Skills from Hands to Heads: Import of Technology and Export Performance</u>
ETA	55.2000	<i>Elisabetta STRAZZERA, Riccardo SCARPA, Pinuccia CALIA, Guy GARROD and Ken WILLIS</i> : <u>Modelling Zero Bids in Contingent Valuation Surveys</u>
CLIM	56.2000	<i>Paola CONCONI</i> : <u>Can Green Lobbies Replace a World Environmental Organisation?</u>
VOL	57.2000	<i>Paola CONCONI and Carlo PERRONI (xli)</i> : <u>Issue Linkage and Issue Tie-in in Multilateral Negotiations</u>
ETA	58.2000	<i>Fernando JARAMILLO, Hubert KEMPF and Fabien MOIZEAU (xli)</i> : <u>Conspicuous Consumption, Social Status and Clubs</u>
SUST	59.2000	<i>Gianni CICIA and Riccardo SCARPA</i> : <u>Willingness to Pay for Rural Landscape Preservation: A Case Study in Mediterranean Agriculture</u>
CLIM	60.2000	<i>Josef JANSSEN</i> : <u>Will Joint Implementation Survive International Emissions Trading? Distinguishing the Kyoto Mechanisms</u>
CLIM	61.2000	<i>Carlo CARRARO</i> : <u>Costs, Structure and Equity of International Regimes for Climate Change Mitigation</u>
KNOW	62.2000	<i>Alberto BUCCI</i> : <u>On Scale Effects, Market Power and Growth when Human and Technological Capital are Complements</u>
KNOW	63.2000	<i>Alberto BUCCI and H.C. SAGLAM</i> : <u>Growth Maximising Patent Lifetime</u>
WAT	64.2000	<i>Michele MORETTO and Paolo ROSATO</i> : <u>The Value of Licences for Recreational Resources Use</u>
WAT	65.2000	<i>Edi DEFRADESCO and Paolo ROSATO</i> : <u>Recreation Management in Venice Lagoon</u>
KNOW	66.2000	<i>Carlo DELL'ARINGA and Claudio LUCIFORA</i> : <u>Inside the Black Box: Labour Market Institutions, Wage Formation and Unemployment in Italy</u>
CLIM	67.2000	<i>Erkki KOSKELA, Markku OLLIKAINEN and Mikko PUHAKKA</i> : <u>Renewable Resources in an Overlapping Generations Economy without Capital</u>
CLIM	68.2000	<i>A. Lans BOVENBERG and Lawrence H. GOULDER (xl)</i> : <u>Neutralising the Adverse Industry Impacts of CO2 Abatement Policies: What Does it Cost?</u>
KNOW	69.2000	<i>Ioanna KASTELLI</i> : <u>Science and Technology Policy in Greece. Policy Initiatives for R&D Cooperation</u>
CLIM	70.2000	<i>Katrin MILLOCK</i> : <u>Contracts for Clean Development – The Role of Technology Transfers</u>
VOL	71.2000	<i>Alberto CAVALIERE and Fabio FRONTOSO SILVESTRI (xliii)</i> : <u>Voluntary Agreements as Information Sharing Devices: Competition and Welfare Effects</u>

VOL	72.2000	<i>Na Li DAWSON and Kathleen SEGERSON</i> (xliii): <u>Voluntary Agreements with Industries: Participation Incentives with Industry-wide Targets</u>
VOL	73.2000	<i>Patricia M. BAILEY</i> (xliii): <u>The Application of Competition Law and Policy to Environmental Agreements in an Oligopolistic Market</u>
VOL	74.2000	<i>Joanna POYAGO-THEOTOKY</i> (xliii): <u>Voluntary Approaches and the Organisation of Environmental R&D</u>
VOL	75.2000	<i>Scott C. MATULICH, Murat SEVER and Fred INABA</i> (xliii): <u>Cooperative Bargaining to Internalise Open Access Externalities: Implications of the American Fisheries Act</u>
VOL	76.2000	<i>Allen BLACKMAN and James BOYD</i> (xliii): <u>Tailored Regulation: Will Voluntary Site-Specific Environmental Performance Standards Improve Welfare?</u>
VOL	77.2000	<i>Vincenzo DENICOLA'</i> (xliii): <u>A Signaling Model of Environmental Overcompliance</u>
VOL	78.2000	<i>Markus A. LEHMANN</i> (xliii): <u>Voluntary Environmental Agreements and Competition Policy. The Case of Germany's Private System for Packaging Waste Recycling</u>
VOL	79.2000	<i>Hans H.B. VEDDER</i> (xliii): <u>Voluntary Agreements and Competition Law</u>
VOL	80.2000	<i>Thomas P. LYON and John W. MAXWELL</i> (xliii): <u>Self-Regulation, Taxation and Public Voluntary Environmental Agreements</u>
VOL	81.2000	<i>Paola MANZINI and Marco MARIOTTI</i> (xliii): <u>A Bargaining Model of Voluntary Environmental Agreements</u>
VOL	82.2000	<i>Alain NADAI and Benoit MOREL</i> (xliii): <u>Product Ecolabelling, Competition and the Environment</u>
CLIM	83.2000	<i>Simone BORGHESI</i> : <u>Income Inequality and the Environmental Kuznets Curve</u>
KNOW	84.2000	<i>Giorgio BRUNELLO and Massimo GIANNINI</i> : <u>Stratified or Comprehensive? The Economic Efficiency of School Design</u>
KNOW	85.2000	<i>Giorgio BRUNELLO, Simona COMI and Claudio LUCIFORA</i> : <u>The College Wage Gap in 10 European Countries: Evidence from Two Cohorts?</u>
ETA	86.2000	<i>Michael FINUS</i> : <u>Game Theory and International Environmental Co-operation: A Survey with an Application to the Kyoto-Protocol</u>
CLIM	87.2000	<i>Clare GOODESS, Jean PALUTIKOF and Maureen AGNEW</i> (xlii): <u>Climate Change Scenarios for the Mediterranean: A Basis for Regional Impact Assessment</u>
CLIM	88.2000	<i>Ian COXHEAD</i> : <u>Tax Reform and the Environment in Developing Economies: Is a Double Dividend Possible?</u>
SUST	89.2000	<i>Peter BARTELMUS and André VESPER</i> (xliv): <u>Green Accounting and Material Flow Analysis. Alternatives or Complements?</u>
SUST	90.2000	<i>Mark DE HAAN and Steven J. KEUNING</i> (xliv): <u>The NAMEA as Validation Instrument for Environmental Macroeconomics</u>
SUST	91.2000	<i>Jochen JESINGHAUS</i> (xliv): <u>On the Art of Aggregating Apples & Oranges</u>
SUST	92.2000	<i>Jan KOLAR</i> (xliv): <u>Land Cover Accounting in the Czech Republic</u>
SUST	93.2000	<i>Anil MARKANDYA, Alistair HUNT and Pamela MASON</i> (xliv): <u>Valuing Damages for Green Accounting Purposes: The GARP II Approach</u>
SUST	94.2000	<i>Anil MARKANDYA, Pamela MASON and Marialuisa TAMBORRA</i> (xliv): <u>Green National Accounting: Synthesising and Extending the Welfare Based and Sustainability-standard Based Approaches</u>
SUST	95.2000	<i>Martin O'CONNOR</i> (xliv): <u>Towards a Typology of "Environmentally-Adjusted" National Sustainability Indicators: Key Concepts and Policy Application</u>
SUST	96.2000	<i>Anton STEURER</i> (xliv): <u>Towards an Environmental Accounting Framework for the EU</u>
SUST	97.2000	<i>Cesare COSTANTINO, Federico FALCITELLI and Angelica TUDINI</i> (xliv): <u>New Developments in Environmental Accounting at Istat</u>
CLIM	98.2000	<i>Stefan BAYER and Claudia KEMFERT</i> : <u>Reaching National Kyoto-Targets in Germany by Maintaining a Sustainable Development</u>
CLIM	99.2000	<i>ZhongXiang ZHANG</i> : <u>An Assessment of the EU Proposal for Ceilings on the Use of Kyoto Flexibility Mechanisms</u>
KNOW	100.2000	<i>Maria Rosa BATTAGGION and Patrizia BUSSOLI</i> : <u>Italian Policy towards Cooperation in R&D</u>
KNOW	101.2000	<i>Giorgio BARBA NAVARETTI, Patrizia BUSSOLI, Georg VON GRAEVENITZ and David ULPH</i> : <u>Information Sharing, Research Coordination and Membership of Research Joint Ventures</u>
WAT	102.2000	<i>Cesare DOSI and William K. EASTER</i> : <u>Water Scarcity: Institutional Change, Water Markets and Privatisation</u>
WAT	103.2000	<i>Cesare DOSI and Naomi ZEITOUNI</i> : <u>Controlling Groundwater Pollution from Agricultural Nonpoint Sources: An Overview of Policy Instruments</u>
KNOW	104.2000	<i>Alberto PETRUCCI</i> : <u>On Debt Neutrality in the Savers-Spenders Theory of Fiscal Policy</u>
SUST	105.2000	<i>Roberto ROSON and Stefano SORIANI</i> : <u>Intermodality and the Changing Role of Nodes in Transport Networks</u>
CLIM	106.2000	<i>Alain BOUSQUET and Pascal FAVARD</i> : <u>Does S. Kuznets' Belief Question the Environmental Kuznets Curves?</u>
CLIM	107.2000	<i>Ottavio JANNI</i> : <u>EU Biodiversity Conservation in Tropical Countries</u>

VOL	108.2000	<i>Katrin MILLOCK and François SALANIE: <u>Collective Environmental Agreements: An Analysis of the Problems of Free-Riding and Collusion</u></i>
VOL	109.2000	<i>Katrin MILLOCK: <u>The Combined Use of Taxation and Voluntary Agreements for Energy Policy</u></i>
VOL	110.2000	<i>Markus A. LEHMANN: <u>The Impact of Voluntary Environmental Agreements on Firms' Incentives for Technology Adoption</u></i>
SUST	1.2001	<i>Inge MAYERES and Stef PROOST: <u>Should Diesel Cars in Europe be Discouraged?</u></i>
SUST	2.2001	<i>Paola DORIA and Davide PETTENELLA: <u>The Decision Making Process in Defining and Protecting Critical Natural Capital</u></i>
CLIM	3.2001	<i>Alberto PENCH: <u>Green Tax Reforms in a Computable General Equilibrium Model for Italy</u></i>
CLIM	4.2001	<i>Maurizio BUSSOLO and Dino PINELLI: <u>Green Taxes: Environment, Employment and Growth</u></i>
CLIM	5.2001	<i>Marco STAMPINI: <u>Tax Reforms and Environmental Policies for Italy</u></i>
ETA	6.2001	<i>Walid OUESLATI: <u>Environmental Fiscal Policy in an Endogenous Growth Model with Human Capital</u></i>
CLIM	7.2001	<i>Umberto CIORBA, Alessandro LANZA and Francesco PAULI: <u>Kyoto Commitment and Emission Trading: a European Union Perspective</u></i>
MGMT	8.2001	<i>Brian SLACK (xlv): <u>Globalisation in Maritime Transportation: Competition, uncertainty and implications for port development strategy</u></i>
VOL	9.2001	<i>Giulia PESARO: <u>Environmental Voluntary Agreements: A New Model of Co-operation Between Public and Economic Actors</u></i>
VOL	10.2001	<i>Cathrine HAGEM: <u>Climate Policy, Asymmetric Information and Firm Survival</u></i>
ETA	11.2001	<i>Sergio CURRARINI and Marco MARINI: <u>A Sequential Approach to the Characteristic Function and the Core in Games with Externalities</u></i>
ETA	12.2001	<i>Gaetano BLOISE, Sergio CURRARINI and Nicholas KIKIDIS: <u>Inflation and Welfare in an OLG Economy with a Privately Provided Public Good</u></i>
KNOW	13.2001	<i>Paolo SURICO: <u>Globalisation and Trade: A "New Economic Geography" Perspective</u></i>
ETA	14.2001	<i>Valentina BOSETTI and Vincenzina MESSINA: <u>Quasi Option Value and Irreversible Choices</u></i>
CLIM	15.2001	<i>Guy ENGELÉN (xlii): <u>Desertification and Land Degradation in Mediterranean Areas: from Science to Integrated Policy Making</u></i>
SUST	16.2001	<i>Julie Catherine SORS: <u>Measuring Progress Towards Sustainable Development in Venice: A Comparative Assessment of Methods and Approaches</u></i>
SUST	17.2001	<i>Julie Catherine SORS: <u>Public Participation in Local Agenda 21: A Review of Traditional and Innovative Tools</u></i>
CLIM	18.2001	<i>Johan ALBRECHT and Niko GOBBIN: <u>Schumpeter and the Rise of Modern Environmentalism</u></i>
VOL	19.2001	<i>Rinaldo BRAU, Carlo CARRARO and Giulio GOLFETTO (xlili): <u>Participation Incentives and the Design of Voluntary Agreements</u></i>
ETA	20.2001	<i>Paola ROTA: <u>Dynamic Labour Demand with Lumpy and Kinked Adjustment Costs</u></i>
ETA	21.2001	<i>Paola ROTA: <u>Empirical Representation of Firms' Employment Decisions by an (S_s) Rule</u></i>
ETA	22.2001	<i>Paola ROTA: <u>What Do We Gain by Being Discrete? An Introduction to the Econometrics of Discrete Decision Processes</u></i>
PRIV	23.2001	<i>Stefano BOSI, Guillaume GIRMANS and Michel GUILLARD: <u>Optimal Privatisation Design and Financial Markets</u></i>
KNOW	24.2001	<i>Giorgio BRUNELLO, Claudio LUPI, Patrizia ORDINE, and Maria Luisa PARISI: <u>Beyond National Institutions: Labour Taxes and Regional Unemployment in Italy</u></i>
ETA	25.2001	<i>Klaus CONRAD: <u>Locational Competition under Environmental Regulation when Input Prices and Productivity Differ</u></i>
PRIV	26.2001	<i>Bernardo BORTOLOTTI, Juliet D'SOUZA, Marcella FANTINI and William L. MEGGINSON: <u>Sources of Performance Improvement in Privatised Firms: A Clinical Study of the Global Telecommunications Industry</u></i>
CLIM	27.2001	<i>Frédéric BROCHIER and Emiliano RAMIERI: <u>Climate Change Impacts on the Mediterranean Coastal Zones</u></i>
ETA	28.2001	<i>Nunzio CAPPUCCIO and Michele MORETTO: <u>Comments on the Investment-Uncertainty Relationship in a Real Option Model</u></i>
KNOW	29.2001	<i>Giorgio BRUNELLO: <u>Absolute Risk Aversion and the Returns to Education</u></i>
CLIM	30.2001	<i>ZhongXiang ZHANG: <u>Meeting the Kyoto Targets: The Importance of Developing Country Participation</u></i>
ETA	31.2001	<i>Jonathan D. KAPLAN, Richard E. HOWITT and Y. Hossein FARZIN: <u>An Information-Theoretical Analysis of Budget-Constrained Nonpoint Source Pollution Control</u></i>
MGMT Coalition	32.2001	<i>Roberta SALOMONE and Giulia GALLUCCIO: <u>Environmental Issues and Financial Reporting Trends</u></i>
Theory Network	33.2001	<i>Shlomo WEBER and Hans WIESMETH: <u>From Autarky to Free Trade: The Impact on Environment</u></i>
ETA	34.2001	<i>Margarita GENIUS and Elisabetta STRAZZERA: <u>Model Selection and Tests for Non Nested Contingent Valuation Models: An Assessment of Methods</u></i>

NRM	35.2001	<i>Carlo GIUPPONI</i> : <u>The Substitution of Hazardous Molecules in Production Processes: The Atrazine Case Study in Italian Agriculture</u>
KNOW	36.2001	<i>Raffaele PACI and Francesco PIGLIARU</i> : <u>Technological Diffusion, Spatial Spillovers and Regional Convergence in Europe</u>
PRIV	37.2001	<i>Bernardo BORTOLOTTI</i> : <u>Privatisation, Large Shareholders, and Sequential Auctions of Shares</u>
CLIM	38.2001	<i>Barbara BUCHNER</i> : <u>What Really Happened in The Hague? Report on the COP6, Part I, 13-25 November 2000, The Hague, The Netherlands</u>
PRIV	39.2001	<i>Giacomo CALZOLARI and Carlo SCARPA</i> : <u>Regulation at Home, Competition Abroad: A Theoretical Framework</u>
KNOW	40.2001	<i>Giorgio BRUNELLO</i> : <u>On the Complementarity between Education and Training in Europe</u>
Coalition Theory Network	41.2001	<i>Alain DESDOIGTS and Fabien MOIZEAU</i> (xlvi): <u>Multiple Politico-Economic Regimes, Inequality and Growth</u>
Coalition Theory Network	42.2001	<i>Parkash CHANDER and Henry TULKENS</i> (xlvi): <u>Limits to Climate Change</u>
Coalition Theory Network	43.2001	<i>Michael FINUS and Bianca RUNDSHAGEN</i> (xlvi): <u>Endogenous Coalition Formation in Global Pollution Control</u>
Coalition Theory Network	44.2001	<i>Wietze LISE, Richard S.J. TOL and Bob van der ZWAAN</i> (xlvi): <u>Negotiating Climate Change as a Social Situation</u>
NRM	45.2001	<i>Mohamad R. KHAWLIE</i> (xlvii): <u>The Impacts of Climate Change on Water Resources of Lebanon-Eastern Mediterranean</u>
NRM	46.2001	<i>Mutasem EL-FADEL and E. BOU-ZEID</i> (xlvii): <u>Climate Change and Water Resources in the Middle East: Vulnerability, Socio-Economic Impacts and Adaptation</u>
NRM	47.2001	<i>Eva IGLESIAS, Alberto GARRIDO and Almudena GOMEZ</i> (xlvii): <u>An Economic Drought Management Index to Evaluate Water Institutions' Performance Under Uncertainty and Climate Change</u>
CLIM	48.2001	<i>Wietze LISE and Richard S.J. TOL</i> (xlvii): <u>Impact of Climate on Tourist Demand</u>
CLIM	49.2001	<i>Francesco BOSELLO, Barbara BUCHNER, Carlo CARRARO and Davide RAGGI</i> : <u>Can Equity Enhance Efficiency? Lessons from the Kyoto Protocol</u>
SUST	50.2001	<i>Roberto ROSON</i> (xlviii): <u>Carbon Leakage in a Small Open Economy with Capital Mobility</u>
SUST	51.2001	<i>Edwin WOERDMAN</i> (xlviii): <u>Developing a European Carbon Trading Market: Will Permit Allocation Distort Competition and Lead to State Aid?</u>
SUST	52.2001	<i>Richard N. COOPER</i> (xlviii): <u>The Kyoto Protocol: A Flawed Concept</u>
SUST	53.2001	<i>Kari KANGAS</i> (xlviii): <u>Trade Liberalisation, Changing Forest Management and Roundwood Trade in Europe</u>
SUST	54.2001	<i>Xueqin ZHU and Ekko VAN IERLAND</i> (xlviii): <u>Effects of the Enlargement of EU on Trade and the Environment</u>
SUST	55.2001	<i>M. Ozgur KAYALICA and Sajal LAHIRI</i> (xlviii): <u>Strategic Environmental Policies in the Presence of Foreign Direct Investment</u>
SUST	56.2001	<i>Savas ALPAY</i> (xlviii): <u>Can Environmental Regulations be Compatible with Higher International Competitiveness? Some New Theoretical Insights</u>
SUST	57.2001	<i>Roldan MURADIAN, Martin O'CONNOR, Joan MARTINEZ-ALER</i> (xlviii): <u>Embodied Pollution in Trade: Estimating the "Environmental Load Displacement" of Industrialised Countries</u>
SUST	58.2001	<i>Matthew R. AUER and Rafael REUVENY</i> (xlviii): <u>Foreign Aid and Direct Investment: Key Players in the Environmental Restoration of Central and Eastern Europe</u>
SUST	59.2001	<i>Onno J. KUIK and Frans H. OOSTERHUIS</i> (xlviii): <u>Lessons from the Southern Enlargement of the EU for the Environmental Dimensions of Eastern Enlargement, in particular for Poland</u>
ETA	60.2001	<i>Carlo CARRARO, Alessandra POME and Domenico SINISCALCO</i> (xlix): <u>Science vs. Profit in Research: Lessons from the Human Genome Project</u>
CLIM	61.2001	<i>Efrem CASTELNUOVO, Michele MORETTO and Sergio VERGALLI</i> : <u>Global Warming, Uncertainty and Endogenous Technical Change: Implications for Kyoto</u>
PRIV	62.2001	<i>Gian Luigi ALBANO, Fabrizio GERMANO and Stefano LOVO</i> : <u>On Some Collusive and Signaling Equilibria in Ascending Auctions for Multiple Objects</u>
CLIM	63.2001	<i>Elbert DIJKGRAAF and Herman R.J. VOLLEBERGH</i> : <u>A Note on Testing for Environmental Kuznets Curves with Panel Data</u>
CLIM	64.2001	<i>Paolo BUONANNO, Carlo CARRARO and Marzio GALEOTTI</i> : <u>Endogenous Induced Technical Change and the Costs of Kyoto</u>
CLIM	65.2001	<i>Guido CAZZAVILLAN and Ignazio MUSU</i> (l): <u>Transitional Dynamics and Uniqueness of the Balanced-Growth Path in a Simple Model of Endogenous Growth with an Environmental Asset</u>
CLIM	66.2001	<i>Giovanni BAIOCCHI and Salvatore DI FALCO</i> (l): <u>Investigating the Shape of the EKC: A Nonparametric Approach</u>

CLIM	67.2001	<i>Marzio GALEOTTI, Alessandro LANZA and Francesco PAULI (I): <u>Desperately Seeking (Environmental) Kuznets: A New Look at the Evidence</u></i>
CLIM	68.2001	<i>Alexey VIKHLYAEV (xlviii): <u>The Use of Trade Measures for Environmental Purposes – Globally and in the EU Context</u></i>
NRM	69.2001	<i>Gary D. LIBECAP and Zeynep K. HANSEN (li): <u>U.S. Land Policy, Property Rights, and the Dust Bowl of the 1930s</u></i>
NRM	70.2001	<i>Lee J. ALSTON, Gary D. LIBECAP and Bernardo MUELLER (li): <u>Land Reform Policies, The Sources of Violent Conflict and Implications for Deforestation in the Brazilian Amazon</u></i>
CLIM	71.2001	<i>Claudia KEMFERT: <u>Economy-Energy-Climate Interaction – The Model WIAGEM -</u></i>
SUST	72.2001	<i>Paulo A.L.D. NUNES and Yohanes E. RIYANTO: <u>Policy Instruments for Creating Markets for Biodiversity: Certification and Ecolabeling</u></i>
SUST	73.2001	<i>Paulo A.L.D. NUNES and Erik SCHOKKAERT (lii): <u>Warm Glow and Embedding in Contingent Valuation</u></i>
SUST	74.2001	<i>Paulo A.L.D. NUNES, Jeroen C.J.M. van den BERGH and Peter NIJKAMP (lii): <u>Ecological-Economic Analysis and Valuation of Biodiversity</u></i>
VOL	75.2001	<i>Johan EYCKMANS and Henry TULKENS (li): <u>Simulating Coalitionally Stable Burden Sharing Agreements for the Climate Change Problem</u></i>
PRIV	76.2001	<i>Axel GAUTIER and Florian HEIDER: <u>What Do Internal Capital Markets Do? Redistribution vs. Incentives</u></i>
PRIV	77.2001	<i>Bernardo BORTOLOTTI, Marcella FANTINI and Domenico SINISCALCO: <u>Privatisation around the World: New Evidence from Panel Data</u></i>
ETA	78.2001	<i>Toke S. AIDT and Jayasri DUTTA (li): <u>Transitional Politics. Emerging Incentive-based Instruments in Environmental Regulation</u></i>
ETA	79.2001	<i>Alberto PETRUCCI: <u>Consumption Taxation and Endogenous Growth in a Model with New Generations</u></i>
ETA	80.2001	<i>Pierre LASSERRE and Antoine SOUBEYRAN (li): <u>A Ricardian Model of the Tragedy of the Commons</u></i>
ETA	81.2001	<i>Pierre COURTOIS, Jean Christophe PÉREAU and Tarik TAZDAÏT: <u>An Evolutionary Approach to the Climate Change Negotiation Game</u></i>
NRM	82.2001	<i>Christophe BONTEMPS, Stéphane COUTURE and Pascal FAVARD: <u>Is the Irrigation Water Demand Really Convex?</u></i>
NRM	83.2001	<i>Unai PASCUAL and Edward BARBIER: <u>A Model of Optimal Labour and Soil Use with Shifting Cultivation</u></i>
CLIM	84.2001	<i>Jesper JENSEN and Martin Hoidt THELLE: <u>What are the Gains from a Multi-Gas Strategy?</u></i>
CLIM	85.2001	<i>Maurizio MICHELINI (liii): IPCC “<u>Summary for Policymakers</u>” in TAR. <u>Do its results give a scientific support always adequate to the urgencies of Kyoto negotiations?</u></i>
CLIM	86.2001	<i>Claudia KEMFERT (liii): <u>Economic Impact Assessment of Alternative Climate Policy Strategies</u></i>
CLIM	87.2001	<i>Cesare DOSI and Michele MORETTO: <u>Global Warming and Financial Umbrellas</u></i>

- (xxxvi) This paper was presented at the Second EFIEA Policy Workshop on “Integrating Climate Policies in the European Environment. Costs and Opportunities”, organised by the Fondazione Eni Enrico Mattei on behalf of the European Forum on Integrated Environmental Assessment, Milan, March 4-6, 1999
- (xxxvii) This paper was presented at the Fourth Meeting of the Coalition Theory Network organised by the Fondazione Eni Enrico Mattei, CORE of Louvain-la-Neuve and GREQAM of Marseille, Aix-en-Provence, January 8-9, 1999
- (xxxviii) This paper was presented at the International Conference on “Trade and Competition in the WTO and Beyond” organised by the Fondazione Eni Enrico Mattei and the Department of International Studies of the University of Padua, Venice, December 4-5, 1998
- (xxxix) This paper was presented at the 3rd Toulouse Conference on Environment and Resource Economics, organised by Fondazione Eni Enrico Mattei, IDEI and INRA and sponsored by MATE on “Environment, Energy Uses and Climate Change”, Toulouse, June 14-16, 1999
- (xl) This paper was presented at the conference on “Distributional and Behavioral Effects of Environmental Policy” jointly organised by the National Bureau of Economic Research and Fondazione Eni Enrico Mattei, Milan, June 11-12, 1999
- (xli) This paper was presented at the Fifth Meeting of the Coalition Theory Network organised by the Fondazione Eni Enrico Mattei and the CODE, Universitat Autònoma de Barcelona, Barcelona January 21-22, 2000
- (xlii) This paper was presented at the International Workshop on "Climate Change and Mediterranean Coastal Systems: Regional Scenarios and Vulnerability Assessment" organised by the Fondazione Eni Enrico Mattei in co-operation with the Istituto Veneto di Scienze, Lettere ed Arti, Venice, December 9-10, 1999.
- (xliii) This paper was presented at the International Workshop on “Voluntary Approaches, Competition and Competitiveness” organised by the Fondazione Eni Enrico Mattei within the research activities of the CAVA Network, Milan, May 25-26, 2000.
- (xliv) This paper was presented at the International Workshop on “Green National Accounting in Europe: Comparison of Methods and Experiences” organised by the Fondazione Eni Enrico Mattei within the Concerted Action of Environmental Valuation in Europe (EVE), Milan, March 4-7, 2000
- (xlv) This paper was presented at the International Workshop on “New Ports and Urban and Regional Development. The Dynamics of Sustainability” organised by the Fondazione Eni Enrico Mattei, Venice, May 5-6, 2000.
- (xlvi) This paper was presented at the Sixth Meeting of the Coalition Theory Network organised by the Fondazione Eni Enrico Mattei and the CORE, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, January 26-27, 2001
- (xlvii) This paper was presented at the RICAMARE Workshop “Socioeconomic Assessments of Climate Change in the Mediterranean: Impact, Adaptation and Mitigation Co-benefits”, organised by the Fondazione Eni Enrico Mattei, Milan, February 9-10, 2001
- (xlviii) This paper was presented at the International Workshop “Trade and the Environment in the Perspective of the EU Enlargement”, organised by the Fondazione Eni Enrico Mattei, Milan, May 17-18, 2001
- (xlix) This paper was presented at the International Conference “Knowledge as an Economic Good”, organised by Fondazione Eni Enrico Mattei and The Beijer International Institute of Environmental Economics, Palermo, April 20-21, 2001
- (l) This paper was presented at the Workshop “Growth, Environmental Policies and + Sustainability” organised by the Fondazione Eni Enrico Mattei, Venice, June 1, 2001
- (li) This paper was presented at the Fourth Toulouse Conference on Environment and Resource Economics on “Property Rights, Institutions and Management of Environmental and Natural Resources”, organised by Fondazione Eni Enrico Mattei, IDEI and INRA and sponsored by MATE, Toulouse, May 3-4, 2001
- (lii) This paper was presented at the International Conference on “Economic Valuation of Environmental Goods”, organised by Fondazione Eni Enrico Mattei in cooperation with CORILA, Venice, May 11, 2001
- (liii) This paper was circulated at the International Conference on “Climate Policy – Do We Need a New Approach?”, jointly organised by Fondazione Eni Enrico Mattei, Stanford University and Venice International University, Isola di San Servolo, Venice, September 6-8, 2001

2000 SERIES

MGMT	<i>Corporate Sustainable Management</i> (Editor: Andrea Marsanich)
CLIM	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti)
PRIV	<i>Privatisation, Antitrust, Regulation</i> (Editor: Bernardo Bortolotti)
KNOW	<i>Knowledge, Technology, Human Capital</i> (Editor: Dino Pinelli)
WAT	<i>Water and Natural Resources Management</i> (Editor: Carlo Giupponi)
SUST	<i>Sustainability Indicators and Impact Assessment</i> (Editor: Marialuisa Tamborra)
VOL	<i>Task Force on Voluntary Agreements</i> (Editor: Rinaldo Brau)
ETA	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)

2001 SERIES

MGMT	<i>Corporate Sustainable Management</i> (Editor: Andrea Marsanich)
CLIM	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti)
PRIV	<i>Privatisation, Antitrust, Regulation</i> (Editor: Bernardo Bortolotti)
KNOW	<i>Knowledge, Technology, Human Capital</i> (Editor: Dino Pinelli)
NRM	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
SUST	<i>Sustainability Indicators and Environmental Evaluation</i> (Editor: Marialuisa Tamborra)
VOL	<i>Voluntary and International Agreements</i> (Editor: Carlo Carraro)
ETA	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)

SUBSCRIPTION TO "NOTE DI LAVORO"

Starting from January 1998 Fondazione Eni Enrico Mattei issues a Periodic E-mail "Note di Lavoro" Bulletin listing the titles and the abstracts of its most recent Working Papers.

All the "Note di Lavoro" listed in the Bulletin are available on the Internet and are downloadable from Feem's web site "www.feem.it".

If you wish to receive hard copies you may choose from the payment options listed in the following table (minimum order: 10 papers)*.

*Orders for individual papers should clearly indicate the "Nota di Lavoro" number and can therefore be issued for published papers only.

All orders must be sent by fax to:

"Publications Office" - Fondazione Eni Enrico Mattei: Fax +39+2+52036946

PAYMENT OPTIONS

How many papers?	What's the price?	How to pay?
10 or more*	US\$ 4.00 each ITL 7,000 each	By Credit card or Bank transfer
Annual subscription (approx. 100 papers/year)	US\$ 250.00 ITL 425,000	By Credit card or Bank transfer

***Please fill out the Working Paper Subscription Form indicating your preferences (Periodic E-mail "Note di Lavoro" Bulletin, Annual subscription, Order for individual papers - minimum 10*)!**

✂.....

WORKING PAPER SUBSCRIPTION FORM

Name: _____

Affiliation(if applicable): _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

I wish to: Amount due:

receive the Periodic E-mail Working Papers Bulletin

place a full annual subscription for 2001 (US\$ 250.00/ITL 425,000) _____

order no.....individual papers (minimum 10 papers at US\$ 4.00/ITL 7,000 each)* _____

Total _____

I will pay by:

VISA American Express Card No. _____ Expiration Date: _____

Signature: _____

Bank transfer in US\$ (or Italian Lire in Italy) to Fondazione Eni Enrico Mattei - account no. 39341-56 -

SWIFT ARTIITM2 - ABI 03512 - CAB 01614 - Credito Artigiano - Corso Magenta 59, 20123 Milano, Italy.

Copy of the bank transfer should be faxed along with the order.

Please return this duly completed form to:

"Publications Office" - Fondazione Eni Enrico Mattei - Corso Magenta, 63 - 20123 Milano, Italy