Did the Paris Agreement Plant the Seeds of a Climate Consistent International Financial Regime?

Dipak Dasgupta, Etienne Espagne, Jean Charles Hourcade, Irving Mintzer, Seyni Nafo, Baptiste Perrissin Fabert, Nick Robins, Alfredo Sirkis

NOTA DI LAVORO

50.2016

Did the Paris Agreement Plant the Seeds of a Climate Consistent International Financial Regime?

Dipak Dasgupta, Etienne Espagne, Jean-Charles Hourcade, Irving Minzer, Seyni Nafo, Baptiste Perissin-Fabert, Nick Robins, Alfredo Sirkis

Mitigation, Innovation and Transformation Pathways
Series Editor: Massimo Tavoni

Did the Paris Agreement Plant the Seeds of a Climate Consistent International Financial Regime?

By Dipak Dasgupta[1], Etienne Espagne[2], Jean-Charles Hourcade[3], Irving Minzer[4], Seyni Nafo[5], Baptiste Perissin-Fabert[6], Nick Robins[7], Alfredo Sirkis[8]

[1]The Energy & Resource Institute (TERI)
[2]Centre d'Etudes Prospectives et d'Information Internationale (CEPII)
[3]Centre International de Recherche sur l'Environnement et le Développement (CIRED)
[4]Johns Hopkins University, School of Advanced International Studies (SAIS)
[5]African Group at the UNFCCC
[6]Commissariat Général au Développement Durable (CGDD)
[7]Inquiry into the Design of a Sustainable Financial System (UNEP)
[8]Centro Brasil no Clima (CBC)

Summary

Finance has been critical to the development of interest and momentum concerning the Paris Agreement, which emerged from COP21. However, a quick scan of the accord could lead many to derive a disappointing picture because of the absence of practical commitments to financial devices that can limit the risks of climate change. We support the opposite view that the text marks a new departure by committing countries to "making financial flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development ». This was matched by parallel developments such as the Financial Stability Board's launch of a new Task Force on climate disclosure. We argue that, further steps now need to be taken within the broader context of financing the new model of prosperity laid out in the UN Sustainable Development Goals (UN, September 2015). At a time of increasing financial uncertainty and inadequate investment in the real economy, putting in place a framework for financing the transition to a low-carbon, resilient model of development is now an economic imperative – and an immense opportunity. Mitigating the systemic risks of climate change while putting the global financial system on a path toward balanced and sustainable development, is in the long-term strategic interests of both industrialized and developing countries and we suggest what practical steps can be accomplished in a near future in this direction.

Keywords: COP 21, Paris Agreement, Climate Finance

JEL Classification: Q5, Q58, F53

Address for correspondence:
Etienne Espagne
CEPII
113 rue de Grenelle
75007 Paris
France
E-mail: etienne.espagne@cepii.fr

Did the Paris Agreement plant the seeds of a climate consistent international financial regime?

By : Dipak Dasgupta[1], Etienne Espagne[2]*, Jean-Charles Hourcade[3], Irving Minzer[4], Seyni Nafo[5], Baptiste Perissin-Fabert[6], Nick Robins[7], Alfredo Sirkis[8].

Abstract

1. *Finance has been critical to the development of interest and momentum concerning the Paris Agreement, which emerged from COP21. However, a quick scan of the accord could lead many to derive a disappointing picture because of the absence of practical commitments to financial devices that can limit the risks of climate change.*
2. *We support the opposite view that the text marks a new departure by committing countries to "making financial flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development ». This was matched by parallel developments such as the Financial Stability Board's launch of a new Task Force on climate disclosure.*
3. *We argue that, further steps now need to be taken within the broader context of financing the new model of prosperity laid out in the UN Sustainable Development Goals (UN, September 2015). At a time of increasing financial uncertainty and inadequate investment in the real economy, putting in place a framework for financing the transition to a low-carbon, resilient model of development is now an economic imperative – and an immense opportunity.*
4. *Mitigating the systemic risks of climate change while putting the global financial system on a path toward balanced and sustainable development, is in the long-term strategic interests of both industrialized and developing countries and we suggest what practical steps can be accomplished in a near future in this direction.*

[1]Distinguished Fellow, The Energy & Resources Institute (TERI), India.

[2] Economist, Centre d'Etudes Prospectives et d'Information Internationale (CEPII), France.

Corresponding author: etienne.espagne@cepii.fr.

[3] Researcher, Centre International de Recherche sur l'Environnement et le Développement (CIRED), France.

[4] Professor, Johns Hopkins University, School of Advanced International Studies (SAIS), USA.

[5] Diplomat, Head of the African Group at the UNFCCC.

[6] Economist, French Ministry of Environment, Commissariat Général au Développement Durable (CGDD), France.

[7] Co-Director, Inquiry into the Design of a Sustainable Financial System (UNEP), United Kingdom.

[8] Executive Director, Centro Brasil no Clima (CBC), Brazil.

Unsurprisingly, celebration of the success of COP21 in Paris is now followed by a wave of concerns, and even some skepticism. UN FCCC Executive Secretary Christiana Figueres recently noted in Davos: *"after 20 years of working towards that goal, that was the easy part"*. Given the Copenhagen trauma, reaching a universal agreement with all countries on board was, of course, a challenging task. But the risk exists that the Paris Agreement, like the agreement reached at COP3 in Kyoto, will remain largely 'unfinished business' (Jacoby et al., 1998). Its ratification by 55 countries representing 55% of world emissions is not evidence of adequate reforms and it is uncertain how the Agreement will be translated into policies and measures that help countries implement real, practical, and transformational climate policies.

However, many elements of the Paris text can assist national leaders in their efforts to tackle the aspects of climate change that make this issue "a truly wicked problem." First, the Paris Agreement contains a *Decision* that has immediate legal effect among all Parties, independent of the vagaries of the ratification process. Second the Paris Agreement itself is an outcome of *the Durban Platform of Action*[9]. The Agreement, which should *"be implemented from 2020,"* has a permanent vocation and will provide the legal basis for climate action today,as well as an opportunity to adapt national economic development strategies to future circumstances.

Because the Decision defines actions to be undertaken before 2020 and will enter immediately into force, its interpretation is critical to the credibility of the post-COP21 process. The Decision has implications that go beyond the formal ratification of the Agreement, to the enforcement of real climate action. The key message is that the short term benefits of a low-carbon transition will advance national development strategies, given the economic and geopolitical conditions that have been realized since the Global Financial Crisis of 2007-2008. These short-term benefits depend on the multiplier effects that would arise from a massive redirection of global financial flows (Aglietta et al., 2015).

The seeds of a climate-friendly financial system?

At first glance, the Agreement only provides general principles which might not attract the attention of policy-makers who think that challenges other than climate change are more pressing and urgent. However, a more careful and constructive interpretation of the text is possible, especially if one inspects closely the content of Article 2 of the Agreement and Paragraphs 54, 57, and 108 of the Decision.

Importantly, Article 2 makes clear that the aim of the Agreement is to strengthen the global response to climate change including by "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development ».

Paragraph 54 (which references paragraph 3 of article 9 of the Agreement) elaborates on the Copenhagen commitment made by industrialized countries. This paragraph illuminates the Copenhagen commitment, recognizing the intent to stimulate a minimum of US$***100 billions in annual North-South transfers before 2020, and promote a flow that will be increased by 2025***. These funds are expected to finance both mitigation and adaptation (i.e., resilience-enhancing) activities. Implementation of the commitment under this paragraph is viewed by the leaders of the G77 as a credibility test for developed countries on their broader commitment to implement the Principle of Common But Differentiated Responsibility (CBDR) that is at the heart of the UN Framework Convention on Climate Change.

Paragraph 57 directs the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the UNFCCC to clarify the accounting methods that will be used to track financial flows. This technical point is of notable importance from a political perspective. During the negotiations in 2015, a specific North/South sticking point

[9] Ad Hoc Working Group on the *Durban Platform* for Enhanced Action created at COP17 in 2011.

emerged: an OECD-CPI report concluded that a level of US$ 62 billions of transfers had already been achieved during 2014. By contrast, an assessment prepared for the Indian Ministry of Finance was only able to confirm that US$ 2 billions of new and additional funding had been transferred from the Convention's Northern to its Southern parties[10].

Paragraph 108 *"recognizes the social, economic, and environmental value of mitigation activities and their co-benefits to adaptation, health, and sustainable development" (SVMA).* This sentence opens a discussion about "positive" carbon pricing (Sirkis, 2015) which would encompass both the social cost of carbon (the value of climate damages that are the consequence of a specified emissions pathway) as well as all the positive co-benefits of mitigation activities (employment, energy security, local environmental amenities). The Government of Brasil first proposed this concept at COP20 in Lima. It was subsequently supported in the UN FCCC negotiations by the Group of 77 and China (G77).

Paragraph 133 recognizes civil society as an important element in the so-called "Paris Alliance" and considers economic actors along with financial institutions as key agents of change. Understanding this paragraph in the context of Paragraph 136 (which applies to "non-party entities" and is not binding upon countries that are Parties to the Convention and have ratified the UNFCCC) underlines the importance of carbon pricing, and paves the way for initiatives by governments, economic actors, and financial institutions to build innovative systems combining carbon pricing with innovative financial instruments.

These paragraphs can be viewed as the underlying principles of deeper structural reforms in the financial sector that are necessary to achieve the objective of Article 2 of the Agreement, i.e. *aligning financial flows along a new trajectory of global economic development that leads to low levels of greenhouse gas emissions and high levels of investment in climate-resilient development*. This Article sends a strong signal to the highest legal authorities of nations by recognizing that the re-alignment of the financial sector is an important objective in its own right and not only as a means for supporting greenhouse gas abatement projects. (LCS-RNet, 2015; UNEP Inquiry, 2015; Canfin and Grandjean, 2015).

Financing the INDCs and shifting the trillions: building on the core of the Paris Agreement

The first practical outcome of the new framework outlined in the Paris Agreement should be to stimulate implementation of the Intended Nationally Determined Contributions (INDCS) that were presented in Paris.

The INDC approach was first seen as a *pis-aller* after the Copenhagen failure (Barret et al., 2015) and as a weak substitute for top-down agreement on national emissions quotas. At COP21 this diplomatic gambit has proved to be a crucial innovation, able to foster a new dynamics among the Parties to the UNFCCC. Most importantly, the INDCs provide a unique lens for examining how each government envisions the alignment between national development strategies and protection of our shared global climate system.

The value of this bottom-up approach has now been confirmed (including a special regime for the Least Advanced Countries and Small Islands) as a means of reaching a *"global peaking of greenhouse gas emissions as soon as possible."* Obviously the current misalignment of thus-far declared INDCs with the over-arching objective of limiting future warming to less than 2°C is also now widely recognized. *(*For additional details on the short-falls in current plans, see further the UNEP Gap Report, 2014; Climate Action Tracker, 2015; Sterman et al., 2015; and GICN, 2015*).*

However, this misalignment does not represent an insurmountable problem, since a ratchet mechanism has been embedded in the INDC platform that requires a revision of national contributions every five years in order to achieve a path toward 'carbon neutrality' by the second half of the 21st Century (See further Article 4 of the

[10]This additionality issue is at the core of a long standing controversy (since the creation of the Global Environment Facility in 1990) whose principle is legitimate but the implementation controversial. It generates disputes that can freeze projects beneficial both for the environment and the development.

Paris Agreement.) What creates a problem is rather the absence of tangible incentives to encourage compliance with the declared INDCs in the short term, and to reinforce them with greater commitments in the future. In the Agreement, there is neither 'gain of cooperation' nor 'penalty for free-riding', as any successful "climate club" would require (Nordhaus, 2015; Espagne, 2015).

This absence of explicit links between climate and development finance with the INDCs may represent an opportunity missed at COP21. Several negotiators felt that it was not appropriate to formalize the links between finance and the INDCs at the present moment, given the lack of complete clarity on the accounting rules that would be applied and the lack of agreement on the meaning of each country's obligation under the principle of CBDR. The CBDR obligation is indeed maintained for developed countries concerning financial transfers in Article 9 of the Paris Agreement, even though the Agreement does not reiterate the old distinction between Annex 1 and non-Annex 1 countries. Perhaps the negotiators' caution was necessary to reach consensus on articles that can now help the Parties to overcome a long-standing stalemate in the negotiations.

A first example of what could be possible in the short term is for developed countries to extend their financial pledges concerning the sensitive floor of '100 billions' in the form of public guarantees for low-carbon investments, under the condition that these investments incorporate the SVMA principle defined in paragraph 108 of the Decision. This would lower the risk coefficient of low-carbon investments in developing countries without high budgetary cost for developed countries, since the guarantee would only be called upon if the investments fail. Another option would be a "Global Guarantee Fund" (GGF), mobilizing funds available in multilateral assistance organizations to issue highly-rated green bonds.The proceeds from issuance of these green bonds could be used for financing low-carbon investments (R. Studart& K. Gallagher, 2015)[11] . Both mechanisms would be ***definitely additional*** and will entail little temptation toward non-compliance because the costs for public budgets are much lower than would be the case if reliance was placed solely on direct financial transfers from North to South. Obviously, they are suitable for funding mitigation investments in marketable activities and should be complemented by devices that are apt to fund investments in (a) adaptation (in the form of share of the proceeds of the leveraged investments) and (b)non-marketable activities which are so important for less developed regions (in the form of sovereign bonds for projects incorporating the VSMA).

The principles of such operational devices could be adopted as early as COP22 in Marrakech. Doing so would help to build trust globally, because developing countries, which are currently building their infrastructure, otherwise might soon be locked into carbon-intensive economic development pathways. Implementing such devices would promote a positive interpretation of the CBDR principle[12] and show that developed countries are really committed to helping developing countries to implement their INDCs, securing an 'equitable access to development' for all (Cancun UNFCCC, 2010).

Reducing investment risks of low-carbon investments and massively redirecting financial flows towards these investments will require a credible regulatory framework to ensure environmental integrity in all projects, to hedge against windfall profits, and modulate the traditional arbitrariness of investment choices. Beyond COP22, these SVMA-based mechanisms could become prototypes for wider arrangements[13] to deploy the full potential of Article 2 of the Agreement and "move the trillions" in financial flows towards a low-carbon transition (Sirkis et al., 2015). Recent progress made on Monitoring, Reporting, and Verification (MRV)

---

[11]To hedge against sovereign risks due to political uncertainty, part of the guarantee is deposited upfront into the paid-in capital of GGF. This would not entail a burden on the public finance of the donor. The GGF would tap into this capital in case of non-compliance and readjust accordingly the equity of the country.

[12]A typical and very informative development of a positive interpretation of the Common but Differentiated Responsibility Principle by Chinese experts can be found in (Zou Ji and Fu Sha, 2015).

[13]These arrangements will necessarily incorporate long-term trajectories on which a pull-back force should be hung to incite countries to align their INDCs with the long term universal objective. Such a mechanism is sketched in (Hourcade& Shukla, 2015).

techniques (Bellassen and Stephan, 2015)[14]along with reference to the SVMA principle could be two key pillars of this new framework. In addition, because they would increase the amount of private investments for a given level of carbon pricing, they would reinforce initiatives like the Carbon Pricing Leadership Coalitionand help countries to incorporate carbon price signals in the public policies conducive to achieving their INDCs.

Why should "climate agnostics" be interested in the Paris Agreement?

Those concerned with climate change have to be lucid. Moving beyond 2020, the required trillions towards mitigation and adaptation will be found only if high level policy-makers are convinced this will help them meet their immediate political concerns: i.e.,the gap between the propensity to save and propensity to invest which puts the world economy at risk from secular stagnation (Summers, 2014; Teulings, C. and Baldwin, R. (2014)) and the inadequacy of the global financial safety net (IMF 2016).Many analysts argue that a low-carbon development pathway increasesthe resilience of financial systems (Stern and Calderon, 2014), including vis-à-vis the systemic risks of climate change and of unsustainable economic development, just flagged by the IMF (2016). The challenge regarding climate change, as defined by Mark Carney, the Governor of the Bank of England (Carney, 2015), is to avoid "*the tragedy of the horizons*", that is the temporal mismatch between the financial investor's agenda, the financial regulator's agenda and the economic impacts of arising from the physical process of climate change (climate risk, carbon risk and liability risk). This realization led the G20 (Antalya, November 2015) to ask the Financial Stability Board to study methods for appraising climate-related risk to financial portfolios, and to propose an expanded process of voluntary disclosure. Importantly, the new FSB Task Force was launched symbolically at COP21 – but appears nowhere in the text. Subsequently, under China's Presidency G20 (Shanghaï, February 2016) has given established a new Green Finance Study Group, co-chaired by the Bank of England and the People's Bank of China, focusing on how to improve the ability of the financial system to mobilise private capital for green investments, placing the climate imperative within a much broader frame.

So far, these processes stop short of recognizing systemic risk to the financial system that arises from physical impacts of climate change as well as the tensions generated by unsustainable development pathways. Voluntary disclosure might be a first step, but relying only on such voluntary actions will not give sufficient incentive to align financial flows with the Objective of the UNFCCC. (See further Article 2 of the UNFCCC.) Absent an orderly set of incentives, asset managers might not resist the attractiveness of carbon-intensive investments in many regions. And decarbonizing one's investment portfolio is not necessarily synonymous with investing in a low-carbon development path. The voluntary disclosure approach is similar to a (partial and) individual insurance approach. It fails to address the collective nature of climate risk.

It is the role of governments to develop a 'green finance strategy' to make asset owners able to recognize the potential value of carefully structured, adequately "back-stopped" investments in low-carbon and climate resilient infrastructure. However, even if these financial regulatory changes help create a demand for low-carbon assets, they might not be enough to create the necessary supply of low-carbon projects and thus generate a strong economic 'ripple effect'. Ultimately commitments by UN Member States who are Parties to the UNFCCC would be needed to channel the "animal spirits" of financial markets and ensure the emergence of a large and liquid market for low-carbon projects.

The SVMA framework could help give birth to a new class of assets and speed its deepening. This would help the management of financial firms to value the carbon-saving assets critical to achieving success along a national low-carbon development trajectory. Financial institutions would thus be more prone to investing in low-carbon assets, and hold those assets in their core capital accounts, in lieu of cash (or frequently under-

---

[14]These advances in the MRV mechanisms build on the expertise cumulated with the Clean Development Mechanisms (CDM) and Joint Implementation Mechanisms. There is an implicit reference to the JIM in paragraph 37 of the Decision, in relation with paragraph 4 of article 6 of the Agreement.

performing) instruments of sovereign debt. The Basel Committee could even encourage national financial regulators to recognize such investments as part of the Tier 1, core-capital assets of large financial institutions that they are able to use to fulfill the Liquidity Coverage Ratio required under the Basel III Agreement.

Much of this discussion of financial reforms will necessarily be conducted in arenas outside the UNFCCC (e.g., Financial Stability Board, G20, G8, Major Economies Forum, etc.), but not without UNFCCC expertise. Our reading of the text of the Paris Agreement is that the UNFCCC has done an important part of the job,conveying a high level of political legitimacy and facilitating the deployment of the underlying principles, but much this job is yet incomplete. The challenge, which must be addressed as soon as COP22, is to take the practical steps necessary to show that the Paris Agreement provides the seeds for deeper reforms of the global financial system, aligning national development strategies in both industrialized and developing countries with worldwide efforts to protect our common future.

Bibliography

Aglietta, M., Espagne, É., & Fabert, B. P. (2015). A proposal to finance low-carbon investment in Europe.*Policy Brief, France-Stratégie, 2015.*

Aglietta, M., Hourcade, J.-C., Jaeger, C., PerrissinFabert, B. (2015).Financing transition in an adverse context: climate finance beyond carbon finance; *International Environmental Agreements: Politics, Law and Economics* Volume 15 · Number 4 · November 2015 pp 403-420, Springer, DOI 10.1007/s10784-015-9298-1

Barrett, S., Carraro, C., and De Melo, J. (2015).Towards a workable and effective climate regime.*Review of Environment, Energy and Economics (Re3), Forthcoming*.

Bellassen, V., and Stephan, N. (Eds.). (2015). *Accounting for Carbon*. Cambridge University Press.

Canfin, P., and Granjean, A. (2015). Mobilizing climate finance*. A roadmap to finance a low-carbon economy. http://www.elysee.fr/assets/Report-Commission-Canfin-Grandjean-ENG.pdf*.

Carney, M. (2015). Breaking the Tragedy of the Horizon–climate change and financial stability. *Speech given at Lloyd's of London by the Governor of the Bank of England*, *29*.

Climate Action Tracker (2015*).*Effect of current pledges and policies on global temperature.

Espagne, E. (2016). "Climate finance at COP21 and after: lessons from the CEPII-France Stratégie climate finance platform," CEPII Policy Brief 2016, CEPII.

GICN, 2015.The INDC counter, aggregation of national contributions and 2°C trajectories. *http://icmc.ipsl.fr/images/publications/scientific_notes/GICN_working_paper2.pdf*

IEA (2015). Energy and climate change, World Energy Outlook special report, OECD, Paris.

International Monetary Fund.The inadequacy of the global financial safety net.International Monetary Fund. IMF staffreport. March 2016.

Jacoby, H. D., Prinn, R. G., &Schmalensee, R. (1998). Kyoto's unfinished business. MIT Joint Program on the Science and Policy of Global Change.

LCS-RNet (2015). A Moment of Truth for the Climate and Sustainable http://lcs-rnet.org/pdf/publications/LCSRNet_Statement_Paris.pdf

Nordhaus, W. (2015). Climate clubs: overcoming free-riding in international climate policy. The American Economic Review, 105(4), 1339-1370.

Sirkis, A. (2015). Positive Pricing of Carbon Reduction: A Low Hanging Fruit, CEPII-France Stratégie Climate Finance http://www.cepii.fr/blog/bi/post.asp?IDcommunique=405

Sirkis, A.; Hourcade, J-C., Dasgupta, D., Studart, R., Gallagher, K., PerrissinFabert, B., Eli da Veiga, J., Espagne, E., Stua, M., Aglietta, M. (2015). *Moving the trillions: a debate on positive pricing of mitigation actions. http://www2.centre-cired.fr/IMG/pdf/moving_in_the_trillions.pdf*

Sterman, J., Jones, A., Johnston, E., Siegel, L.(2015). Climate Interactive Ratchet Success Pathway Assumptions and Result. *https://www.climateinteractive.org/wp-content/uploads/2015/12/Ratchet-Success-14-December-2015.pdf*

Stern, N., and Calderon, F. (2014). Better Growth, Better Climate: The New Climate Economy Report. *The Synthesis Report.*

Studart, R., Gallagher, K. (2015). Guaranteeing Finance for Sustainable Infrastructure: A Proposal. *In* Sirkis et al. 2015.

Summers, L. H. (2014). Reflections on the 'New Secular Stagnation Hypothesis'. Secular stagnation: Facts, causes and cures, 27-40.

Teulings, C., and Baldwin, R. (Eds.). (2014). Secular stagnation: facts, causes, and cures. Centre for Economic Policy Research.

UNEP Inquiry (2015). The financial system we need; aligning the financial system with sustainable development. Report http://web.unep.org/inquiry/publications

UNEP (2014). The Emissions Gap Report http://www.unep.org/publications/ebooks/emissionsgapreport

Zou J., F. Sha (2015):'The challenges of the post-COP21 regime: interpreting the CBDR in the INDC context'.*International Environmental Agreements : Politics, Law and Economics(2015)*DOI 10.1007/s10784-015-9303-8, 421–430

NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:
http://www.feem.it/getpage.aspx?id=73&sez=Publications&padre=20&tab=1
http://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=266659
http://ideas.repec.org/s/fem/femwpa.html
http://www.econis.eu/LNG=EN/FAM?PPN=505954494
http://ageconsearch.umn.edu/handle/35978
http://www.bepress.com/feem/
http://labs.jstor.org/sustainability/

NOTE DI LAVORO PUBLISHED IN 2016

ET	1.2016	Maria Berritella, Carmelo Provenzano: An Empirical Analysis of the Public Spending Decomposition on Organized Crime
MITP	2.2016	Santiago J. Rubio: Sharing R&D Investments in Breakthrough Technologies to Control Climate Change
MITP	3.2016	W. Brock, A. Xepapadeas: Spatial Heat Transport, Polar Amplification and Climate Change Policy
ET	4.2016	Filippo Belloc: Employee Representation Legislations and Innovation
EIA	5.2016	Leonid V. Sorokin, Gérard Mondello: Sea Level Rise, Radical Uncertainties and Decision-Maker's Liability: the European Coastal Airports Case
ESP	6.2016	Beatriz Martínez, Hipòlit Torró: Anatomy of Risk Premium in UK Natural Gas Futures
ET	7.2016	Mary Zaki: Access to Short-term Credit and Consumption Smoothing within the Paycycle
MITP	8.2016	Simone Borghesi, Andrea Flori: EU ETS Facets in the Net: How Account Types Influence the Structure of the System
MITP	9.2016	Alice Favero, Robert Mendelsohn, Brent Sohngen: Carbon Storage and Bioenergy: Using Forests for Climate Mitigation
EIA	10.2016	David García-León: Adapting to Climate Change: an Analysis under Uncertainty
ESP	11.2016	Simone Tagliapietra: Exploring the Potential for Energy Efficiency in Turkey
MITP	12.2016	Gabriel Chan, Carlo Carraro, Ottmar Edenhofer, Charles Kolstad, Robert Stavins: Reforming the IPCC's Assessment of Climate Change Economics
MITP	13.2016	Kenneth Gillingham, William Nordhaus, David Anthoff, Valentina Bosetti, Haewon McJeon, Geoffrey Blanford, Peter Christenn, John Reilly, Paul Sztorc: Modeling Uncertainty in Climate Change: A Multi-Model Comparison
ET	14.2016	Paolo M. Panteghini, Sergio Vergalli: Accelerated Depreciation, Default Risk and Investment Decisions
ET	15.2016	Jean J. Gabszewicz, Marco A. Marini, Ornella Tarola: Vertical Differentiation and Collusion: Cannibalization or Proliferation?
EIA	16.2016	Enrica De Cian, Ian Sue Wing: Global Energy Demand in a Warming Climate
ESP	17.2016	Niaz Bashiri Behmiri, Matteo Manera, Marcella Nicolini: Understanding Dynamic Conditional Correlations between Commodities Futures Markets
MITP	18.2016	Marinella Davide, Paola Vesco: Alternative Approaches for Rating INDCs: a Comparative Analysis
MITP	19.2016	W. Brock, A. Xepapadeas: Climate Change Policy under Polar Amplification
ET	20.2019	Alberto Pench: A Note on Pollution Regulation With Asymmetric Information
EIA	21.2019	Anil Markandya, Enrica De Cian, Laurent Drouet, Josué M. Polanco-Martìnez, Francesco Bosello: Building Uncertainty into the Adaptation Cost Estimation in Integrated Assessment Models
MITP	22.2016	Laura Diaz Anadon, Erin Baker, Valentina Bosetti, Lara Aleluia Reis: Too Early to Pick Winners: Disagreement across Experts Implies the Need to Diversify R&D Investment
ESP	23.2016	Claudio Morana: Macroeconomic and Financial Effects of Oil Price Shocks: Evidence for the Euro Area
EIA	24.2016	Wei Jin, ZhongXiang Zhang: China's Pursuit of Environmentally Sustainable Development: Harnessing the New Engine of Technological Innovation
EIA	25.2016	Doruk İriş, Alessandro Tavoni: Tipping Points and Loss Aversion in International Environmental Agreements
ET	26.2016	Doruk İriş, Jungmin Lee, Alessandro Tavoni: Delegation and Public Pressure in a Threshold Public Goods Game: Theory and Experimental Evidence
EIA	27.2016	Stefan P. Schleicher, Angela Köppl, Alexander Zeitlberger: Extending the EU Commission's Proposal for a Reform of the EU Emissions Trading System
EIA	28.2016	Tomas Ekvall, Martin Hirschnitz-Garbers, Fabio Eboli, Aleksander Sniegocki: A Systemic Approach to the Development of a Policy Mix for Material Resource Efficiency
EIA	29.2016	Silvia Santato, Jaroslav Mysiak, Carlos Dionisio Pérez-Blanco: The Water Abstraction License Regime in Italy: A Case for Reform?
MITP	30.2016	Carolyn Fischer: Strategic Subsidies for Green Goods
MITP	31.2016	Carolyn Fischer: Environmental Protection for Sale: Strategic Green Industrial Policy and Climate Finance
ET	32.2016	Fabio Sabatini, Francesco Sarracino: Keeping up with the e-Joneses: Do Online Social Networks Raise Social Comparisons?
MITP	33.2016	Aurora D'Aprile: Advances and Slowdowns in Carbon Capture and Storage Technology Development
EIA	34.2016	Francesco Bosello, Marinella Davide, Isabella Alloisio: Economic Implications of EU Mitigation Policies: Domestic and International Effects
MITP	35.2016	Shouro Dasgupta, Enrica De Cian, and Elena Verdolini: The Political Economy of Energy Innovation

MITP	36.2016	Roberta Distante, Elena Verdolini, Massimo Tavoni: Distributional and Welfare Impacts of Renewable Subsidies in Italy
MITP	37.2016	Loic Berger, Valentina Bosetti: Ellsberg Re-revisited: An Experiment Disentangling Model Uncertainty and Risk Aversion
EIA	38.2016	Valentina Giannini, Alessio Bellucci, Silvia Torresan: Sharing Skills and Needs between Providers and Users of Climate Information to Create Climate Services: Lessons from the Northern Adriatic Case Study
EIA	39.2016	Andrea Bigano, Aleksander Śniegocki, Jacopo Zotti: Policies for a more Dematerialized EU Economy. Theoretical Underpinnings, Political Context and Expected Feasibility
ET	40.2016	Henry Tulkens: COP 21 and Economic Theory: Taking Stock
MITP	41.2016	Shouro Dasgupta, Enrica De Cian: Institutions and the Environment: Existing Evidence and Future Directions
MITP	42.2016	Johannes Emmerling, Laurent Drouet, Lara Aleluia Reis, Michela Bevione, Loic Berger, Valentina Bosetti, Samuel Carrara, Enrica De Cian, Gauthier De Maere D'Aertrycke, Tom Longden, Maurizio Malpede, Giacomo Marangoni, Fabio Sferra, Massimo Tavoni, Jan Witajewski-Baltvilks, Petr Havlik: The WITCH 2016 Model - Documentation and Implementation of the Shared Socioeconomic Pathways
MITP	43.2016	Stefano Carattini, Alessandro Tavoni: How Green are Economists?
ET	44.2016	Marco Di Cintio, Sucharita Ghosh, Emanuele Grassi: Firm Employment Growth, R&D Expenditures and Exports
ESP	45.2016	Nicola Cantore, Patrick Nussbaumer, Max Wei, Daniel Kammen: Energy Efficiency in Africa: A Framework to Evaluate Employment Generation and Cost-effectiveness
MITP	46.2016	Erin Baker, Valentina Bosetti, Ahti Salo: Finding Common Ground when Experts Disagree: Belief Dominance over Portfolios of Alternatives
MITP	47.2016	Elena Verdolini, Laura Diaz Anadón, Erin Baker, Valentina Bosetti, Lara Aleluia Reis: The Future Prospects of Energy Technologies: Insights from Expert Elicitations
MITP	48.2016	Francesco Vona, Giovanni Marin, Davide Consoli: Measures, Drivers and Effects of Green Employment: Evidence from US Local Labor Markets, 2006-2014
ET	49.2016	Thomas Longden: The Regularity and Irregularity of Travel: an Analysis of the Consistency of Travel Times Associated with Subsistence, Maintenance and Discretionary Activities
MITP	50.2016	Dipak Dasgupta, Etienne Espagne, Jean-Charles Hourcade, Irving Minzer, Seyni Nafo, Baptiste Perissin-Fabert, Nick Robins, Alfredo Sirkis: Did the Paris Agreement Plant the Seeds of a Climate Consistent International Financial Regime?