

# Chair of Economics/Resource Economics 2012

## Professor: Lucas Bretschger

Lucas Bretschger is Full Professor of Economics/Resource Economics and Director of the Center of Economic Research at ETH Zurich. After studying economics at the University of Zurich and working as a financial analyst and research fellow in Zurich and Princeton, he was Full Professor of Economics at the University of Greifswald from 1998 to 2002 before joining ETH Zurich in 2003. He was one of the founders and the first full-term Head of the Department of Management, Technology and Economics (D-MTEC). He created the resource economics group and served on different interdisciplinary platforms, such as the Energy Science Center and the Center for Corporate Responsibility and Sustainability. He is a titular professor at the University of Zurich and a research associate of Oxford University; he is the president of the German Board of Environmental and Resource Economists, a member of the Foundation Council and Executive Committee of the Swiss National Science Foundation, a consultant to the Swiss government on climate issues, a member of the Swiss delegation at international climate negotia-



tions, and the founder of the SURED Conference. His main research interests are the theory and policy of natural resources and the environment, growth, trade, climate, public sector and regional economies. A particular focus is the interface between natural resource supply and innovation-driven growth, analyzed under complex conditions, such as multi-sector economies, globalization, spatial distribution and macroeconomic conditions. This closely reflects the three pillars of the D-MTEC research profile. By integrating resources into modern growth theory, his research contributes to the formulation of strategies on how to achieve sustainable development. The results are documented in numerous books, special journal issues, and articles in peer-reviewed journals.

## Mission Statement of the Group

The group's major goals are the provision of high-level research, excellent teaching and educational platforms, and valuable services to the school, the public sector, and private companies. The group covers all the topics associated with resources and the environment from an economic perspective, specifically the impact of natural resource scarcity and pollution on long-run welfare and associated policies. We aim to demonstrate how and why resource economics is an increasingly important, active, and innovative area in the research on sustainable development. At the same time, our vision is constantly and carefully to develop a new discipline

as an emerging field, which is best characterized by the label of "sustainability economics." Within the broader interdisciplinary approach to sustainability, we seek to find and enable the implementation of rules for a world economy that is intrinsically compatible with the natural environment. By shaping sustainability economics as a new discipline, we aim to be recognized as one of the major research groups in economic sustainability research worldwide. Our broad research background is important for a high-level education program and accurate policy advice, mainly in the fields of energy and climate issues. We aim to actively contribute to prob-

lem solving in the public and private sector with the provision and transfer of knowledge. An equally important task is capacity-building in the scientific community by actively encouraging exchanges with other researchers around the world. By organizing

high-quality academic conferences and workshops, we aim to provide valuable international platforms for scholars to meet and exchange ideas on current sustainability topics.

## Group and Resources

Researchers come from Switzerland, Germany, Italy, France, Netherlands, UK, USA, South Africa, Mexico, Thailand, China, and Russia; about 40 percent of group members are female. Within the general topic of the chair, Group members specialize according to their individual interest and knowledge. We aim at a productive balance between intensive group support and individual initiative and freedom. The group's workflow enables us to exploit gains from specialization, spillovers, and scale effects, which is the basis for providing high quality activities. The group's organization is based on a flat hierarchy and a family-friendly environment.

At the end of 2011, the group included seven postdoctoral researchers, seven doctoral researchers, two student assistants and a secretary. **Julien Daubanes**, **Simone Valente** and **Nujin Suphaphat** specialize in the dynamic and international topics of natural resources in macroeconomic theory. **Christa Brunnschweiler** works on applied resource economics in the field of development and conflict. **Ian MacKenzie's** research focus is environment-related contests, public economics, and public choice. **Roger Ramer** specializes in CGE modeling and has co-developed the CITE simulation model. **Daniel Schiess** has been extending growth theory in the field of general purpose technologies. The doctoral researchers deal with topics that are related to the group's objectives and mission statement. They are supervised jointly by the group's professor and postdocs. The PhD theses of **Therese Werner**, **Filippo Lechthaler**, **Janick Mollet**, **Max Meulemann**, and **Lisa Leinert** deal with a broad variety of environmental issues, ranging from climate policies to responsible investment and re-

source price patterns and all have a strong link to empirical research. In her thesis, **Alexandra Vinogradova** focuses on theoretical resource questions in an international setting, while **Lin Zhang** strengthens our team in terms of numerical modeling in the energy context. As of December 2011, four of the PhD students were financed by internal funding from ETH Zurich, while three had different funding sources (federal ministries, private companies). One of the previous postdocs was entirely funded by third-party money up to mid-2011.

An important strategic target is full support for the individual career development of our staff. Since the Chair was founded in 2003, no less than eight postdocs have been appointed full professor or tenured lecturer. **Thomas Steger** was appointed Full Professor of Economics (W3) at the Institute for Theoretical Economics and Macroeconomics at the University of Leipzig in 2007. **Mauro Bambi** became a Lecturer at the Department of Economics and Related Studies of the University of York in 2008. **Hannes Egli** has been a Lecturer and Research Project Group Leader for Economics and Regional Economics at the University of Applied Sciences and Arts in Lucerne since 2008 and is now also head of the Competence Center for Regional Economics. In 2009, **Roger Wehrli** became a lecturer at the University of Applied Sciences and Arts in Lucerne. He works at the Institute of Tourism Economics and is also the Institute's Study Coordinator. In 2010, **Karen Pittel** was appointed head of the Department of Energy, Environment and Exhaustible resources at the Ifo Institute and Professor of Economics (W3) at the LM University of Munich. **Andreas Ziegler** has been Full Professor of Empirical Economics (W3) at

the University of Kassel since April 2011. In March 2012, **Simone Valente** became Research Professor at the Norwegian University of Science and Technology in Trondheim. His research focus is on growth theory, sustainable development, and international trade.

**Christa Brunnschweiler** joined the Norwegian University of Science and Technology in Trondheim as a Research Associate Professor in April 2012, where she continues to work on applied resource economics.



Fig 2. The Resource Economics Group with Guests at the Winterschool 2010 in Ascona

## Research Activities and Achievements

Our research covers the economic analysis of resource markets, the relationship between resources and the economy, and associated policy analysis. For the most part, our publications are aimed at fundamental long-run impacts and not at the current mainstream. The leading field and general journals are now increasingly willing to publish our research. Publications over the last two years, as well as forthcoming articles, reflect the group's ability to contribute to cutting-edge research. Our contributions are published in top-ranking journals, such as *Journal of Environmental Economics and Management*, *Journal of Monetary Economics*, *American Economic Review*, *European Economic Review*, *Scandinavian Journal of Economics*, and *Journal of Economic Dynamics and Control*. We also publish in fully peer-reviewed journals of national research communities and in journals aimed more at a policy audience, such as the *Swiss Journal of Economics and Statistics* and *International Economics and Economic Policy*, which are not (yet) listed in ISI publications. Accordingly, the number of ISI articles and citations only partially reflects the visibility of the group. Citations have picked up recently, but ISI does not cover all relevant papers.

In 2009, one of the most prestigious international prizes in environmental economics, the Erik Kempe Award, was given to Christa Brunnschweiler and Erwin Bulte. In 2008, Julien Daubanes was given the Prize for the Best French Dissertation on Economics and, in 2009, Vivien Kappel was awarded the Zurich Dissertation Prize. Florentine Schwark won the 2010 Best Student Paper Award from the International Association for Energy Economics and Lisa Leinert was awarded the Best Student Paper from the Swiss Association for Energy Economics in 2010.

Important research achievements and related publications can be categorized into various gen-

eral topics. In the field of **resource use** and innovation-driven endogenous **growth**, [1] shows that, contrary to common belief, sub-unitary elasticities of input substitution need not be detrimental for growth with non-renewable resources. In [2], we conclude that higher resource dependency in resource-intensive sectors is not a handicap to economic growth, but is compensated by enhanced research activities. [3] explains that the traditionally assumed nexus between population growth and sustainability needs can be substantially revised in a realistic framework with endogenous growth. Adding the dimension of a **globalized world and trade**, [4] shows that the effects of resource booms are actually determined by the elasticity of input substitution. In **applied resource research**, [5] revises the previous views on the resource curse by distinguishing between "resource abundance" and "resource dependence," which is endogenous to underlying structural factors. Among these factors is societal conflict, which has an impact on behavior, as shown in a prominent case study [6]. In the theory of **resource policy**, [7] stresses the role of preassigned rents and concludes that, contrary to the commonly held view, non-revenue-raising instruments are in many cases preferable to revenue-raising instruments. The main finding of [8] is that, with resource market power, efficient policies may include some strict tax policies and that the trade-off between efficiency and raising tax revenues is relaxed under exhaustibility. In **climate economics**, [9] concludes that undampened climate change is especially unfair to poorer countries because their development prospects are damaged disproportionately. As regards climate policy, [10] shows that the perceived support of different equity rules by countries in climate negotiations is explained by their economic costs rather than by other considerations.

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- [2] Pittel, K. and L. Bretschger (2010): The Implications of Heterogeneous Resource Intensities on Technical Change and Growth, *Canadian Journal of Economics* 43: 1173-1197.
- [3] Bretschger, L. (2012): Population Growth and Natural Resource Scarcity: Long-Run Development under Seemingly Unfavorable Conditions, *Scandinavian Journal of Economics*, In Press.
- [4] Peretto, P. and S. Valente (2011): Resources, Innovation and Growth in the Global Economy, *Journal of Monetary Economics*, 58 (4): 387-399.
- [5] Brunnschweiler, C. N. and E.H. Bulte (2008): The Resource Curse Revisited and Revised: A Tale of Paradoxes and Red Herrings, *Journal of Environmental Economics and Management* 55 (3): 248-264.
- [6] Voors, M.J., E.E.M. Nillesen, E.H. Bulte, B.W. Lensink, P. Verwimp and D.P. van Soest (2012): Violent Conflict and Behavior: a Field Experiment in Burundi, *American Economic Review*, In Press
- [7] MacKenzie, I.A., and M. Ohndorf, (2012): Cap-and-Trade, Taxes, and Distributional Conflict, *Journal of Environmental Economics and Management*, 63 (1): 51-65.
- [8] Daubanes, J. (2011): Optimal Taxation of a Monopolistic Extractor: Are Subsidies Necessary? *Energy Economics*, 33(3): 399-403.
- [9] Bretschger, L. and S. Valente (2011): Climate Change and Uneven Development, *Scandinavian Journal of Economics*, 113 (4): 825-845.
- [10] Lange, A., A. Löschel, C. Vogt, and A. Ziegler (2010): On the Self-interested Use of Equity in International Climate Negotiations, *European Economic Review*, 54: 359-375

## Teaching Activities

The group's teaching covers the department's core research subject, but also includes a large variety of services for students of other departments. At the master level, we offer a large number of courses in D-MTEC's MSc and MAS programs on an annual basis, specifically the following (approx. student numbers in brackets): Resource and Environmental Economics (100), Economic Growth and Resource Use (30), Economics of Climate Change (40), Public Choice (30), International Economics (70), and Economic Dynamics (30). We regularly offer important service courses for other departments: Economics of Sustainable Development (60) for the social sciences and Resource and Environmental Economics (140) for the natural sciences; in the past, we have also offered Macroeconomics (80) for agricultural economists, Resource Economics for forest engineers (30), Principles of Economics (250) for the natural sciences, as well as Theory of Long-run Development (50) and Trade and Growth (30) for the social sci-

ences. At the PhD level, we annually offer a specialized course on sustainability economics, which also attracts students from other universities. Additionally, we supervise master theses for MTEC students as well as numerous bachelor theses for students of the Natural Science Department. At the doctoral level, we annually offer a lecture in advanced sustainability economics, as well as the CER-ETH and the CEPE seminars. Results of the teaching evaluations are highly satisfactory. On a scale of 1 to 5 (very good), our core courses on resources and sustainability achieved average scores of between 4.0 and 4.8 for the main questions.

A special program was the organization of two courses in Entrepreneurial Leadership for selected small groups of students. The format culminated in day-long workshops, in which prominent CEOs and board presidents of major companies participated. The group also organized an international PhD Workshop on Environmental and Resource

Economics in 2007 and a winter school at Monte Verità in 2010, as well as courses by such renowned scholars as Pietro Peretto, Pierre Lasserre, Chris Papageorgiou, Yu-chin Chen, Christiane Clemens, and Theo Eicher.

The supervision of the PhD thesis is organized around individual discussions of papers and projects; the CER-ETH doctoral program supports

education at the PhD level. Additional group support is given in regular departmental seminars and annual retreats with the group and invited speakers. The group's past PhD students were **Christa Brunnschweiler, Hannes Egli, Gay Saxby, Andreas Kemmler, Eleonora Nillesen, Urs von Arx, Vivien Kappel, Florentine Schwark, Roger Ramer, and Daniel Schiess.**



Figure 3. Participants of the International PhD Workshop on Environmental and Resource Economics, 2007

## Services to the Academic Community

During the professor's term as a head of D-MTEC, many fundamental decisions were taken. The task also involved school-wide activities because of frequent changes at ETH executive board level. A dominant strategic target was the local unification of the department, which started with the planning of the LEE building in 2005. The professor served as a member of the Board of the Energy Science Center, the Scientific Board of Centro Stefano Franscini, the Management Committee of the Competence Center Environment and Sustainability, and the Strategy Commission of the Alliance for Global Sustainability. Outside ETH, he is on the Executive Committee of the Swiss National

Science Foundation and President of the Advisory Board of the Center for Corporate Responsibility and Sustainability. He is the country representative of the European Association of Environmental and Resource Economists and a member of the German Boards of Environmental and Resource Economics and Trade Theory and Policy.

In terms of capacity-building in our field, we highlight the organization of the SURED conference, which compiles innovative current research from resource and sustainability economics. By bringing together leading world experts, junior and senior scholars, the biannual conference is generally

considered a great success, reaching the highest international standards. We also organized the annual meeting of the German Board of Trade Theory and Policy in 2009, the annual meeting of the Swiss Society of Economics and Statistics in 2005, and a Workshop on Economic Integration

## Knowledge and Technology Transfer

Extensive services to the non-academic sector and civil society are a high priority. The professor is a member of the Swiss government's Advisory Body on Climate Change and participated as an official member of the Swiss delegation at the UNFCCC Conferences in Copenhagen in 2009 and in Durban in 2011. He was one of the three main authors of the ETH study on the Energy Future 2011.

In recent years, group members have successfully completed several externally funded research projects for the Swiss Federal Office of Energy and the Federal Office for the Environment, the Swiss Banking Association, the Swiss National Science Foundation, the Cantonal Bank of Zurich, and the Commission for Technology and Innovation. One topic was the development of a fully endogenous growth model to predict future development in the event of various energy and environmental policies were enacted. Other issues included the characteristics and value chains of the Swiss banking sector and responsible sustainable investments. Through an enforced publication strategy,

## Outlook

For the period after 2012, the group has submitted several major research proposals in the fields of energy and growth, sustainable investments, and climate issues. A focus will be the extensive further development of our energy-growth simulation model ("CITE" model), based on our paper published in *Resource and Energy Economics* in 2011. CITE will be made ready to serve further policy evaluations in such important fields as energy, climate, trade, and taxes. Improved predic-

and Growth in Brussels in 2004. The group has edited special issues of leading journals, i.e., *EARE*, *IEEP*, *EDE*, *JEEM* and *EER* and serves on several journal boards. The group referees extensively for all major general and field journals.

with symposia and special talks, project results have been disseminated to the public.

Institutional knowledge transfer is taking place with Oxford University, where two group members are research associates; we also cooperate intensively with Duke University, University of Québec, Tilburg University, the International Monetary Fund, University of Bielefeld, LM University of Munich, University of Leipzig, and the University of Washington. The number of invited talks by members of our group demonstrates the strong international interest in the group and its research impact. We work with a large variety of coauthors, freely chosen by group members.

Special programs have included the organization of the inaugural D-MTEC symposium, the creation of the MTEC foundation, and involvement in the organization of three externally funded chairs at D-MTEC, in particular the founding of the Chair in Risk and Insurance Economics.

tions require further development of our core subjects, such as investments and innovations and the integration of new topics, such as goods and capital trade, international knowledge dissemination, risk and uncertainty.

In order to secure our funding, our service to the international research community, and our institutional backing, we aim to further strengthen our international recognition and outreach. This will

involve all kinds of theoretical, empirical, and policy evaluation research. Locally, the spatial unification with the rest of the department – mainly with economists at the KOF, but also with economists working on natural resources in other departments – would allow a better exploitation of many synergies and benefit future research, teaching and services. As in the past, support and feedback from the school management will be important drivers of our success.

The phase after 2012 will imply the renewal of important elements of the group. After the successful promotion of several researchers and the election of postdocs as professors, a new team will have to be built in order to successfully continue operations. There is increasing competition for researchers in the climate and energy fields, but recent applications and recruitments have shown that, as a group, we are internationally attractive, giving us a very promising outlook for the future.

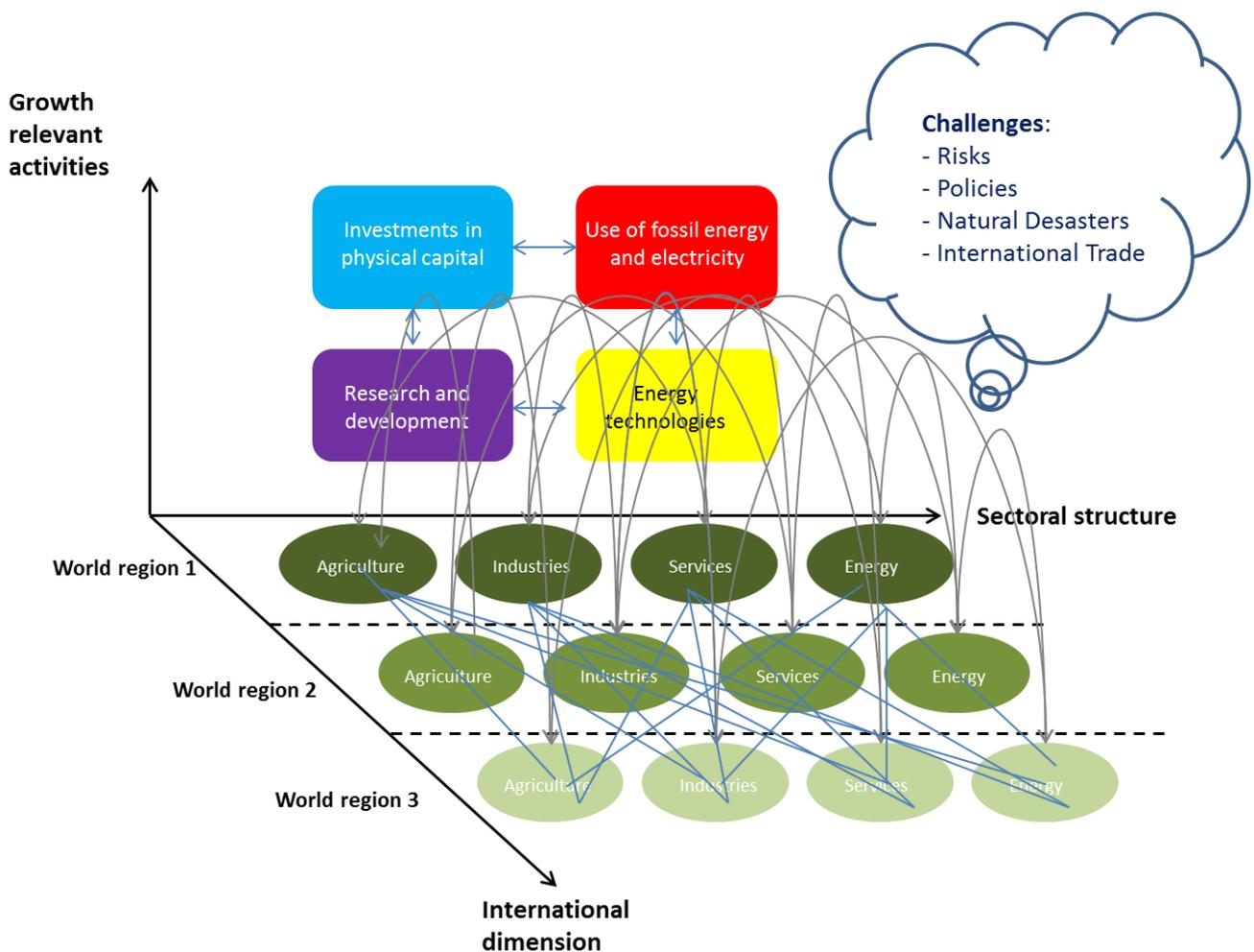


Fig. 4 The CITE Model Extended