

SÉMINAIRE

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30/09 Samuel Juhel: Extreme events and indirect economic impacts : A global comparison

Recent climate risk analysis expects that economic impacts from extreme events will increase, mainly by exposure increase. While the direct consequences of natural disasters are felt locally -- where the natural disasters occur -- the consequent functional disruptions often spread through inter-industry flows by creating bottlenecks and delays in the supply chains systems, thus creating indirect economic damages.

Such indirect damages have often proven to make up for a major part of the total social cost of extreme weather events. Quantifying them is therefore crucial to properly account for the consequences of climate-induced disasters. Research in risk and disaster analysis has studied indirect damages for specific past or simulated events (Hurricane Katrina in Louisiana, possible storm surges in Rotterdam, 2007 summer floods in the UK) and how they add up to total damage assessments. So far, however, there is no clear view on the magnitude, at the global scale, of how such indirect impacts export to other countries in the global economy.

This study aims at assessing the potential indirect impacts of global river floods. Here, we use an input-output model, ARIO, that simulates the indirect impacts of natural disasters through trade networks, and which has already been used and assessed several times for disaster analysis in the literature. We use the EORA26 multi-regional input-output table as a basis for representing the global economy. For each country, we compare the 'imported economic impacts', i.e. the impacts on production related to foreign flood events, with the costs of local extreme flood events. We aim to highlight the interrelations of climate impacts between each country, and the potential benefits of international cooperation for adaptation by showing examples of how the local vulnerability translates to global risk.

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12/10 Louis Daumas: Waiting for the transition: The role of expectations in the decarbonisation of the electricity sector

We develop a macroeconomic model of the low-carbon transition of the electricity sector in a closed economy in discrete time. The structure of our modelling framework is based on the representation of the physical and financial stocks and flows of heterogeneous macroeconomic sectors. Our approach extends the existing literature in macroeconomic modelling of transition dynamics by developing a novel bounded rational but forward-looking expectation formation mechanism based on the notion of fictional expectations. This allows us to combine long-term views on system change with more short-term and profit-oriented investment choices in a coherent framework. For investment decisions, we incorporate discrete choice (DC) theory based on probabilistic distributions of future utilization of capital stocks and profits to derive choices of technology. We apply this DC framework to derive investment choices for heterogeneous capital goods today that have different environmental implications for the future and are subject to path dependency. Using our approach, we can provide insights on a wide range of issues that concern transition dynamics. This includes a novel analysis on how stranding of physical assets can occur as a phenomenon resulting from coordination problems on a macroeconomic level due to dissent and different beliefs about the future. Further potential applications of our framework are numerous: we can create taxonomies of transition dynamics following different levels of dissent, determine the role of opinion conflict for the low-carbon transition, relate energy demand growth to dissent, and finally simulate different forms of policy interventions including a carbon price in relation to different levels of dissent.

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04/11 Auriane Meilland: From Léon Walras to Lance Taylor: Model Closures and Theoretical Uncertainty in E3 Modelling

The Energy-Economy-Environment (E3) modelling literature has so far left aside the question of theoretical uncertainty in the building of macroeconomic models or modules. As a matter of fact, most of the latter are based on entrenched neoclassical assumptions, such as marginal pricing, full employment or causality going from savings to investment (Lavoie, 2015). Plus, if exceptions do exist (Bibas et al. (2010), SEURECO (2018)), the relative importance of their departure from classical hypotheses is yet to be assessed. This state of fact is all the more surprising since the Computable General Equilibrium (CGE) community in more traditional branches of economics have long been concerned with such uncertainties. From Sen's (1963) seminal article, the question of the effects of models "closures", i.e, ways to write the causal structure of a given CGE, has indeed elicited intense discussions. The aim of this paper is to put these two literatures together in order to sketch a preliminary picture of the effect of such "closures" on the behaviour of E3 models. For this purpose, we implement a stylised, neoclassical-inspired KLEM framework (Hudson & Jorgenson, 1974) and test a whole spectrum of targets of reduction of energy consumption using different causality structures. Our results show that model outcomes depend highly on the considered closure. Our conclusion is that relying quasi-exclusively on neoclassical assumptions can lead to a misleading and artificially unified picture of transition possibilities. These results are also an invitation to redefine the role of economists as "honest brokers" in facilitating policy debates, through the highlighting of the theoretical and epistemological implications of choosing one closure or the other on modelling results, but also on the understanding of economic phenomena at large.

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18/11 Émilien Ravigné : Disentangling the influence of directed technical change on factor shares: a new growth accounting method

Current growth theories do not allow for the study of the evolution of factor shares at aggregate nor sectoral level - without strong assumptions on the elasticity of substitution between capital and labour. We propose a growth accounting framework that disentangles the factor-savings directions of technical change. We build this framework for two goods, capital and labour, and decompose production evolution between factor substitution, capital- and labour-saving technical change. The technical change is the shift from a Leontief production function to a new production function: the convex envelope of two purely factor-saving deformations of the previous Leontief function. We apply this framework to the US between 1987 and 2019 using the KLEMS database. Therefore, we can decompose the annual output growth for all sectors into three components: technical progress L-saving, K-saving, and factor substitution - using the capital per worker ratio. Technical change has more influence on output growth than changes in the capital per worker ratio. This technical change is largely L-saving, although the intensity of K-saving technical change is higher than that of L-saving in more than half the sectors. This theoretical framework is validated by better predicting the evolution of the factors shares than is possible with a CES function calibrated on the same database.

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16/12 Baptiste Parent : Intertwining Biology and Economics: A Reassessment of Gordon's 1954 Fishery Model

Gordon's 1954 article on the economics of fishery is considered as a seminal contribution for the method of bioeconomic modeling, via the coupling of biological and economic variables in a microeconomic model. However, the biological foundations of the fishery model as it is known today seems to have been brought a posteriori by the biologist Schaefer. This constatation opens the question of the role played by biology in Gordon's 1954 model. On the basis of archival material and thorough analysis of Gordon's early research, this paper shows that biological and economic reasoning are closely intertwined in Gordon's work. It identifies several points of connection between the disciplines and helps to disentangle their respective contribution to early bioeconomic modeling. It also allows to provide hypothesis on the interdisciplinarity of Gordon's modeling methodology.

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13/01 Romain Fillon : A climate tipping point under risk-sensitive preferences

The analysis of risky intertemporal social contexts requires an adapted social choice criterion. In particular, for the analysis of an endogenous risk carried by several successive generations such as climate change, the social planner's aversion towards this intertemporal risk should be accounted for. The standard additive social preferences assume temporal risk neutrality while the Epstein-Zin preferences may not be monotonic, yielding counter-intuitive results in risky settings. We analyze the policy implications of using risk-sensitive social preferences with temporal risk aversion under a potential climate tipping event. We first show analytically the mechanisms by which this tipping point affects a risk-sensitive social planner in comparison with a standard social planner exhibiting additive social preferences. We then use a dynamic stochastic recursive model of climate policy with a stylized tipping point. Numerically, we find that temporal risk aversion plays a key but ambiguous role in risky intertemporal contexts: it can marginally decrease or widely increase the SCC in comparison with the additive case depending on the size of the potential risk considered. Risk-sensitive preferences allow us to discuss different social strategies, in particular a potential social preference for catastrophe avoidance. It sheds light on the links between preference for early resolution of uncertainty, temporal risk aversion and self-protection's decisions in risky intertemporal social situations.

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20/01 Louis Daumas : Transition risks, asset stranding and financial instability in a stock-flow consistent model of decarbonation trajectories

This paper develops a stock-flow consistent (SFC) model for the study of transition risks. It contributes to the modelling literature on transition risks in several ways. First, the model allows for an integrated, unified, and simpler picture of transition risks than usual methodologies, typically relying on large-scale, multi-model methods in which financial risks do not feed back onto the real economy. The model also innovates in that it adopts a fully Keynesian view on the transition, allowing for positive growth effects from the transition, while most modelling frameworks used for the study of transition risks build on neoclassical or neo-Keynesian assumptions. Second, it prolongates the emerging literature on ecological SFC (E-SFC) models by focussing on financial transition risks along long-run mitigation pathways driven by a carbon price, while existing proposals either focus on financial policies, explore theoretical considerations, or study short-term dynamics. Finally, this model allows for an explicit representation of asset stranding through capital decommissioning, and of its effect on firms' financial viability. This paper presents the main feature of the model. To illustrate its functioning, it is used to run a set of various decarbonation pathways, symbolised by different carbon prices and carbon budgets, yielding various financial instability metrics. The model concurs with the literature in identifying low magnitudes for transition risks overall, although the precise dynamics of transition risks differs from previous assessment. It is notably found that transition risks are likely to emerge in the medium-to-long run, and that a proper accounting of positive macroeconomic growth effects due to the transition are key in determining the unravelling of transition risks.

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27/01 Anne Guillemot : Expérimenter la vraie vie : le cas de la recharge des véhicules électriques à l'échelle de l'Union européenne

Depuis le tournant des années 2010, le véhicule électrique (VE) occupe une place centrale dans la stratégie de l'Union européenne (UE) en matière de décarbonation des transports et de développement des carburants alternatifs. L'ambition est de permettre son essor sur le marché de masse. Dans cette perspective, la Commission européenne (CE) a porté ses efforts sur l'organisation du développement de l'infrastructure de recharge, autour de deux paramètres : son déploiement et son harmonisation à l'échelle de l'Union.

Cette thèse prend pour point de départ la démarche originale imaginée à la Commission européenne pour impulser l'investissement privé et préparer le déploiement à grande échelle de l'infrastructure de recharge : le co-financement de projets pilotes déployés sur le réseau transeuropéen de transport (RTE-T), offrant à des entreprises pionnières de tester la relation client en conditions réelles, d'investiguer un modèle d'affaires viable et de déterminer les conditions du passage à l'échelle. L'approche a été désignée sous le terme de « real-life trial ».

A partir d'une enquête de type ethnographique, conduite en immersion au sein de deux de ces projets, la thèse propose une réflexion sur la nature et les propriétés du « real-life trial » comme mécanisme d'expérimentation de la recharge « dans la vraie vie », par-delà le concept proposé par la CE. On expose en particulier la façon dont cette démarche se découvre et s'invente sur le terrain au fil des projets, portant l'expérimentation sur des segments non identifiés a priori, comme le déploiement des réseaux de recharge ou le choix des solutions technologiques pour garantir l'accès non restreint à l'infrastructure. On montre que les projets contribuent moins au test d'une activité commerciale assise sur une technologie qui serait suffisamment mature, qu'à l'exploration des conditions et à la mise en forme des paramètres du nouveau système socio-technique de la recharge, qui se construit à l'interface entre l'échelle locale et l'échelle européenne. On conclut que l'expérimentation en conditions réelles, en tant qu'opérateur de transformation, est essentielle dans la conduite de la transition vers la mobilité électrique, et l'on suggère que ce type de démarche mériterait d'être poursuivi et généralisé.

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12/05 Thibault Briera : International public climate finance to close the renewable energy investment gap in developing economies

Reducing the renewable energy investment gap has become urgent for the decarbonization of the energy sector. This gap is due to low private incentives for renewable energy investment rather than a global shortage of capital. Indeed, renewable energy projects (RE) are still seen as risky by investors in many developing countries, hindering regional RE deployment. International public climate finance (e.g., through multilateral development banks) is expected to help close the renewable energy investment gap by both directly financing projects and mobilizing private capital. In this work, we develop a stylized financing cost module that accounts for the interactions between public and private capital. When applied to the IMACLIM-R power sector, we show that current international commitments to public climate finance have little impact on the deployment of RE when the mobilization effect of private capital is small. We discuss the potential impact of these commitments when private capital follows public finance. This highly stylized method opens up possibilities for a more robust representation of the financing costs of energy technologies.

JEUDI 12 MAI À 12H - SALLE DE RÉUNION DU CIRED + ZOOM

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16/06 Simon Jean : Bioeconomic Models for Terrestrial Social-Ecological System Management: A Review

We provide a cartography of 319 bioeconomic models applied to terrestrial habitats by combining a quantitative analysis of methodological criteria and the narratives underlying the equations. Based on a multiple correspondence analysis and clustering techniques, our cartography is organized in four groups. Two of them adopt a conservation perspective: while the first one focuses on how to efficiently preserve species given a limited budget through a cost-effectiveness approach without any biodiversity monetarization, the second one stands for a second generation of models tackling habitat-based conservation measures with specific applications in agriculture and forestry. The last two groups are concerned with the notion of harvesting. Biodiversity is here monetized and the problem is framed as the maximization of the utility of agents derived from the flow of the biodiversity variable raising thus a cost-benefit problem. While the notion of harvesting is mostly applied to endangered species and invasive species in one group, a specific interest for forestry characterizes the second one. The temporal analysis of the database shows that bioeconomic models applied to terrestrial social-ecological systems exhibit an overall recent and ongoing decline. We discuss this result regarding the neighboring methods, especially the correlative and datadriven models. Since a diversity of modeling frameworks is needed to investigate the management of social-ecological systems, especially to embrace different understandings and decrease uncertainty, we provide some challenges for the future of mathematically based bioeconomic models.

JEUDI 16 JUIN À 12H - SALLE DE RÉUNION DU CIRED + ZOOM

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