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Dear Sir or Madam,

I am recommending Carole Marullaz for the Energy Markets and the Macroeconomy Conference of the NBER. Carole is a macroeconomist with a research agenda in environmental economics. I know her very well: I am her main advisor, we have a research project together, she was my Teaching Assistant for my 1st year PhD course, and she took two of my courses (1st year macro course and 2nd year course on Economic Growth). I meet with her regularly (at least twice per week). She is one of the best students I have interacted with in Zurich: She is highly motivated and already has a well-developed portfolio of papers in environmental macro. Her projects combine both theoretical and empirical work.

In her main research project Carole analyzes how firms' outsourcing decisions shape their measured energy efficiency, and how underpricing of energy leads to misallocation of production across firms' boundaries. Carole starts with the observation that there is enormous heterogeneity in energy efficiency. She posits that it may be partly explained by heterogeneity in how firms decide to source their inputs, particularly whether to produce in-house or to outsource. Using French and Italian firm-level data, she documents that outsourcing does indeed explain in part firm's heterogeneity in energy efficiency. She then builds a model on the fragmentation of production in the vein of Boehm and Oberfield (2023), where goods are produced following certain recipes, and where firms decide endogenously which ingredients to assemble in-house and which one to buy from other firms. If energy is (socially) underpriced, then the allocation of production is inefficient. Carole then matches her model to firm-to-firm Italian data. She then plans to use her calibrated model to re-assess the welfare costs of a given carbon tax, taking into account that firms' organization of production is endogenous. She will then contrast her findings with a "naïve'' measure of the welfare costs that either focuses solely on within firm reallocation, or on within and across firm reallocation but ignoring how firm's boundaries are shaped. I believe that this project has a lot of potential both from an academic standpoint but also for its policy insights. First, she provides an answer to a long-standing mystery in literature (why are firms so heterogeneous in energy efficiency). Second, she is building an original model that build bridges between environmental macroeconomics and the firms boundaries literature. Third, her findings may lead to us to reassess the economic costs of carbon pricing.

Beyond this project, Carole already has a portfolio of papers and a clear research agenda. Two papers related to this project also focus on firms' heterogeneity and environmental policy and use French data. Both papers are particularly concerned about the employment effects of carbon policy. "Firms' response to energy price shocks'', joint with François Fontaine, is an empirical paper that separately studies the firm-level effect of transitory and permanent energy price shocks on firms. This is an important project because both types of shocks are interesting but are relevant for different questions: environmental policy shocks are more likely to look like permanent shocks, while the war in Ukraine for instance is an example of a more transitory

shock. Carole and her co-author find that permanent shocks lead to substantial labor reallocation. They also wrote a note for the French Economic Analysis Council (CAE) based on their project. “The Impact of a Carbon tax on Labor Reallocation: The Role of Firm Heterogeneity and Energy Efficiency”, joint with François Fontaine and Katheline Schubert, is a more theoretical paper that develops a structural search-and-matching model, calibrated to French data, to analyze the effect of carbon taxation on labor. This paper originated as Carole’s MA thesis at PSE.

In addition, Carole, Claudia Gentile and I have a joint project on “The Power of Industrial Policy: The Global Impact of Chinese Subsidies on Solar Innovation and Emissions Reduction’’. The decrease in solar panel prices in the last two decades is one of the most important trends for climate change policy. It was the result of both innovation and a very active industrial policy by China. At the same time, in more recent years, innovation in solar outside of China seems to have slowed down. In this project, we first show using firm-level patent data, that the rise of China led to a contemporaneous decrease in solar innovation outside of China. We then build a trade and growth model to analyze the overall consequences of the Chinese solar industrial policy for innovation and global emissions. Directly working with Carole has been a pleasure: she has really spearheaded the resolution of the model, and she has shown a lot of creativity. She has already presented the paper in numerous occasions including at the NBER conference on “Energy Markets, Decarbonization, and Trade” in Spring 2025.

Carole will be on the academic job market in 2026, and I believe that she would benefit a lot from attending the NBER conference. She already has some experience from an NBER conference, and I am sure that she will participate actively. She is already in the US as she is currently visiting Yale.

Best regards,



David Hémous