



Research Working Papers

The Role of Technology and Energy Substitution in Climate Change Mitigation

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Substitution between different production inputs is an important mechanism for climate change mitigation.

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Mitigating climate change is critically linked to reducing an economy's reliance on fossil energy. This paper examines U.S. energy dependence, measured by its factor share, using a neoclassical framework in a systematic way. We propose substitution as a simple, explicit economic mechanism for climate change mitigation and understanding energy-saving technical change in terms of observed factor quantities. We show that with time-varying capital equipment and energy substitutability, changes in observed inputs alone can account for most of the variations in the income share of energy over the last 60 years. Advancing the accessibility and quality of capital equipment as well as integrating the dynamic substitutability between energy and capital equipment into the design of climate policies can help economies adapt and achieve environmental policy goals.

JEL classifications: E13, E23, E25, J24, Q41, Q42, Q54, Q55

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Related Research

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