

## Productivity gain and the structural propagation

Topic: Productivity Analysis I

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When innovation or a new technology enters an industry, it changes the cost and thus price of the commodity produced. Such change in price will initiate technological substitutions in the entire sectors of the economy (call it the structural propagation). In order to assess innovations with respect to welfare, we must hence take the structural propagation effect into account. Since innovation can be measured by the productivity gain, our goal is to measure prospectively the economy-wide welfare gain initiated by any industry-level productivity gain that provoke structural propagation. For that purpose we use multi-sectoral multi-factor production functions and compatible unit cost functions to emulate the structural propagation and the eventual general equilibrium. In so doing, we estimate and use the functional parameters for CES (constant elasticity of substitution) and Cobb-Douglas (unit elasticity) production functions using two sets of timely distant input-output tables. Finally, we use unit productivity gain for one industry (port industry for an example) as a trigger, and estimate its prospective welfare gain along with the structural propagation effects.