Winners and Losers in a Knowledge-based Economy: Investigating the Policy Packages for an Inclusive Growth based on a Computable General Equilibrium analysis of Korea

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Author: Yeongjun Yeo

The intrinsic attributes of innovation can be summarized as â€œfactor-biased technological progressâ€•. Firstly, technological innovation accompanies skill-biased technological change (SBTC), which can be described as a shift in the production technology that favors skilled over unskilled labor by increasing its productivity and therefore, its relative demand. Secondly, recent studies on the relationship between innovation and employment structure address that technological progress from innovation causes not only SBTC, but also capital-biased technological change. These intrinsic properties of technological progress have the potentials to deepen social inequalities and polarization by increasing economic returns to high-skilled workers and capitalists in the economic system. Especially, a growing body of recent studies has expressed concerns over the side effects caused by the factor-biased technological change, and propose a wide range of policies to address negative impacts from technological innovation. However, they are rather fragmented, and mostly limited to a single policy instrument. In addition, there has been a lack of quantitative studies on policy impact assessments.
The policy implications, in terms of employment and inequality challenges posed by technological innovations, can be summarized as the need to adopt a broad perspective when preparing policies dealing with these issues, rather than just focusing on a single policy instrument. In this spirit, we advocate that innovation policies should be accompanied by other complementary policies in order to counterbalance the negative impacts of factor-biased technological progress. The question is then how to formulate and coordinate policy options from various dimensions to achieve inclusive growth in the knowledge-based economy. Existing studies, however, often fall short of reflecting the concept of policy mixes, and seem insufficient to draw policy implications in practical senses. In this regard, the present study intends to bridge this gap in the literature.
Considering these limitations of previous studies, this study firstly aims to propose a conceptual framework to investigate the economy-wide impacts of factor-biased technological change and the role of policy packages to deal with this issue, by addressing the limitations of previous studiesâ€™ approaches. Secondly, this study aims to quantitatively assess the macroeconomic impacts of policy packages consisting of innovation, education, and taxation policies to mitigate the structural problems caused by the factor-biased technological change based on the Computable General Equilibrium (CGE) model. Throughout the study, this study aims to investigate and identify the potential roles of policy packages from several different dimensions (i.e., innovation, education, and fiscal policies) by examining the economy-wide impacts of the different types of policy mixes on the economic system based on CGE analysis so as to inform and advise policymakers in designing an appropriate policy package for inclusive growth. We focus on the economy in South Korea, and simulation results for policy scenarios are analyzed in terms of employment structure, economic growth, and income inequality. Our study is significant, in that it is devoted to a macroeconomic analysis in investigating the impacts of different types of policy mixes, and drawing upon policy implications addressing the complementarity of policy instruments. Ultimately, this study expects to shed light on the importance of the policy packages in resolving the side effects of factor-biased technological progress and spur the inclusive growth in the knowledge-based economy.
For the empirical analysis, this study aims to propose a knowledge-based CGE model by incorporating fowling key features: 1) endogenizing innovation-related elements considering the characteristics of knowledge (including, consideration of knowledge as a factor of production, endogenization of knowledge capital investments, and consideration of spillover effects coming from the knowledge accumulation), 2) endogenizing decision-making process on the human capital

accumulation affected by the relative wages of workers and educational investments, 3) designing the endogenous interaction between innovation and human capital accumulation within the production function, 4) describing the intrinsic attributes of technological progress within the production structures, and 5) establishing the model to simultaneously estimate growth and distribution effects with considerations of heterogeneous labor and households within the equational systems and SAM. The economic intuition behind these methodological approaches is that dynamically changing endogenous interaction between the technological progress via innovation activities and human capital accumulation shapes the growth and distribution patterns of the economic system, through interactions with market mechanisms.