Macroeconomic Implications of Fiscal Policies and Progressive Taxes: Focused on the Dynamics of the Labor Market

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Abstract

1. Introduction

In this study, the impact of progressive taxes, which have a higher marginal tax rate for high-income earners, as well as monetary and fiscal policies such as transfer payments and unemployment benefits on the macroeconomy and individual economic agents was analyzed using structural models in various aspects. The progressive income tax system is a tax system with a clear trade-off between inequality and efficiency; and transfer payments have recently been not only mentioned often in the discourse on basic income but also widely discussed as a fiscal policy for income preservation in the era of low birth rate and population aging; and unemployment benefits are one of the most representative fiscal policies in the form of employment insurance.

This study contributed to academic and policy research by conducting the following analyses. First, an optimal progressive income tax system that maximizes social welfare in the current economy and in an economy where the demographic structure has changed due to low birth rates and an aging society was analyzed using the heterogeneous-agent overlapping-generations general equilibrium model with Learning-By-Doing (LBD). In addition to providing a methodology that can be applied to a variety of topics in a flexible manner, this study is the first attempt to analyze an optimal progressive tax system in the era of aging population beyond making long-term fiscal projection, making its contribution significant. Second, this study examined how transfer payments change the aggregate unit economy and distribution, such as consumption and labor supply, depending on the taxation method, presenting an analysis of quantitatively understanding the effect of temporary transfer payments such as disaster relief funds on consumption in the future. To this end, it calibrated the HADSGE (Heterogeneous Agent Dynamic Stochastic General Equilibrium) model, in which aggregate shocks that affect all economic agents in every season exist, and performed policy experiments and welfare analysis. In particular, by comparing the welfare levels of each group by scenario, it showed which economic agent will prefer which policy depending on policy changes, which is expected to serve as helpful basic data for policy makers. Third, this study examined how the progressivity of the income tax system and unemployment benefits affect the job search behavior of employed job seekers and unemployed job seekers. For this

purpose, the study calibrated a directed search model in which heterogeneous households and representative companies exist and conducted a policy experiment. Although there is room for improvement in quantitative analysis in that interest rate changes due to policy changes are not reflected due to the assumption of a small-scale open economy, it has made a meaningful contribution in that it provided basic data to analyze the channels of policy effects spreading to heterogeneous workers and job seekers.

The major findings are as follows: First, it was shown that the optimal progressivity of the income tax system in the current steady-state should be about 6 times larger compared to the current progressivity. Second, if the demographic structure changes according to the 'Population Projection for Korea: 2020' published by Statistics Korea, one of the following must be done to secure financial resources: 1) government consumption should decrease by 4%; 2) the average tax rate should be increased; or 3) the progressivity of the income tax system should be lowered. Third, the optimal progressivity in an aging economy was shown to be about 10% lower compared to the optimal progressivity in the current steady-state. Fourth, when transfer payments are financed through a progressive taxation method, GDP, consumption, and investment increase more than when they are financed through a non-progressive taxation method, and such increase was shown to be attributed to the growth in employment of low-income earners. Fifth, decomposing and analyzing the response of total consumption showed that the contribution of progressivity is important and that the median income class prefers a progressive taxation method from a welfare perspective. Sixth, the analysis using a directed search model showed that as the progressivity of the income tax system rises, both capital and unemployment rate drop as a macroeconomic effect, and unemployed job seekers with a high level of asset holdings show more aggressive job search behavior. In addition, when the minimum amount of unemployment benefits or the income replacement rate increases, the capital stock decreases and the unemployment rate increases at a macroeconomic level even though the changes are not quantitatively significant. Distributionally, unemployed job seekers were found to apply for jobs with higher wages (but with a lower probability of finding a job).

The implications of the policy experiments conducted during the analysis are as follows: First, it is suggested that the degree to which social welfare can be improved through redistribution in the reference economy becomes weaker in an aging economy. In particular, an important implication is that when labor supply behavior changes depending on the tax system, the degree can vary depending on how human capital changes. Second, when boosting consumption through transfer payments such as disaster relief funds is needed in the future, it is possible to share in advance with the public the taxation method to cover transfer payments and the expected effects—tax burden, degree of boosting consumption, etc.—and consider implementing it in accordance with what the public has agreed on. This is because it was shown that individual citizens may have different preferred taxation methods given that the same amount of transfer payments has different distributional effects depending on the

taxation method. Lastly, it was found that social insurance such as unemployment benefits is effective in enabling economic agents with low asset holdings to apply for better jobs. This is significant since, apart from simply generating a wealth effect, it suggests that optimal results for everyone can be achieved in an economy where segmented jobs are supplied and supported under equilibrium conditions.

This study was structured as follows: In Chapters 2 to 4, a heterogeneous-agent overlapping-generations general equilibrium model with LBD was introduced for each chapter, an optimal progressivity of the income tax system in the reference economy was derived and analyzed, followed by the analysis of an optimal progressive tax system in an aging economy. In Chapter 5, a HADSGE model was built and calibrated, and the effects of transfer payments on consumption and the economy were analyzed. Chapter 6 built and calibrated a directed search model with search friction and analyzed the effects of the progressivity of the income tax system and unemployment benefits on the macroeconomy and labor market. Chapter 7 presented the conclusion.

2. An Optimal Progressive Tax System in an Economy where LBD is Considered

Chapters 2 and 3 calibrated a heterogeneous-agent overlapping-generations general equilibrium model that describes the current reference economy and derived an optimal progressive tax system. From a methodological perspective, this study is significant in that: 1) it estimated the parameters of the tax function that efficiently estimates the progressivity of the income tax system using the national tax statistics; 2) by reflecting learning through work in the model, it considered that human capital accumulation varies depending on the state of economic activity, and analyzed changes in distributional and economy-wide efficiency due to changes in progressivity.

The model analysis results indicated that, first, the optimal progressivity in the model in which human capital is determined endogenously should be approximately six times greater than in the current system, and that the degree of progressivity is small compared to the economy in which human capital is determined exogenously. These findings lead to a conclusion that changes in labor supply behavior due to changes in progressivity have important significance in determining overall economic efficiency. Specifically, in an economy where human capital is determined through work, the employment rate for those aged 30 to 35 declined sharply due to changes in progressivity. Since human capital accumulation occurs significantly in this age group, the resulting decrease in output and higher constraints in financing means that the degree of progressivity should be reduced compared to an economy in which human capital accumulation is exogenous regardless of the state of economic activity.

3. An Optimal Progressive Tax System in an Aging Economy

Chapter 4 utilized the heterogeneous-agent overlapping-generations general equilibrium model

established in Chapters 2 and 3 to determine the optimal progressive income tax in an aging economy when the demographic structure changes according to the 'Population Projection for Korea: 2020' published by Statistics Korea. It is true that government ministries and research institutes are making efforts to make long-term fiscal projections according to changes in demographic structure. However, there have been few studies that analyzed an optimal progressive tax system by considering the optimal behavior of individual economic agents in detail so this study is expected to be of significant help to both policymakers and researchers.

The model analysis results showed that, if the demographic structure changes according to the 'Population Projection for Korea: 2020' published by Statistics Korea, one of the following must be done to secure financial resources: 1) government consumption should decrease by 4%; 2) the average tax rate should be increased; or 3) the progressivity of the income tax system should be lowered. In particular, it was confirmed that adjusting the progressivity has the effect of increasing the share of taxpayers by 12%p and raising labor supply, leading to an increase in total production by 0.2% compared to the case where financial resources are raised through reduction of government consumption. Additionally, the optimal progressivity in an aging economy was shown to be about 10% lower compared to the optimal progressivity in the current steady-state. However, because the size of the working-age population in an aging economy is smaller than that of the reference economy (2020), the percentage of tax-exempt people is low even though progressivity has decreased. In addition, the level of consumption equivalent variation compared to the economy with a progressivity parameter of 0.07 also moves by a larger margin than the reference economy. Macroeconomic variables such as total production and total consumption also show a greater degree of decrease as the progressivity parameter rises compared to the reference economy (2020). In addition, it was confirmed that the quantitative shortage in total labor was compensated qualitatively through the accumulation of human capital.

4. Effect of Transfer Payments on Boosting Consumption Based on the Level of Progressivity

Chapter 5 calibrated a HADSGE model to analyze how the effect of transfer payments on boosting consumption varies depending on the taxation method. Unlike the models in other chapters, aggregate shocks exist in this model, making it possible to perform analysis for a state of economic fluctuation, different from the stationary equilibrium analysis for a static state. This study is significant in that it not only looked at the effects of transfer payment shocks on consumption in detail but also analyzed which economic agent achieves welfare increases depending on the taxation method (and thus which taxation method is preferred), providing basic data that policymakers can use as practical reference when implementing disaster relief funds or transfer payments policies.

The major findings are as follows: When the government adopts a non-progressive taxation method for additional transfer payments, GDP, consumption, and investment increase, but employment

decreases. From an income distribution perspective, since employment occurs more actively at the bottom of the income distribution, an increase in transfer payments may worsen the overall inequality. On the other hand, when transfer payments are covered by progressive taxation, GDP, consumption and investment increase much more because overall employment increases. Most importantly, the increased employment at this time is mainly generated by low-income earners, thereby reducing the overall inequality.

In addition, decomposing and analyzing the response of total consumption indicated that the contribution of progressivity is quite high. In terms of welfare, the median voters appear to prefer progressive tax policies. However, welfare changes appeared to be very heterogeneous depending on the household characteristics. In general, households with low productivity and few assets preferred progressive tax policies.

The policy implications are as follows: This study showed that both macroeconomic and distributional effects can differ depending on the method of financing fiscal expenditures. In particular, because the welfare of individual economic agents varies heterogeneously depending on the taxation method, sharing such analysis with the public can help to derive social consensus when determining the direction of future fiscal and monetary policy.

5. Analysis of Monetary and Fiscal Policy Effects in an Economy where Unemployment Exists

Unlike the structural models used in the previous chapters, the model used in Chapter 6 has search frictions, enabling the analysis of the macroeconomic and distributional effects of tax policy (progressive income tax) and fiscal policy (unemployment benefits) by considering their impact on individual workers' job change and job search behavior. By constructing a directed search model rather than a random search model, it was possible to analyze how heterogeneous job changers and job seekers change their job and job search behavior according to policy changes in the segmented labor market, making a significant contribution of providing a flexible research tool that can perform various policy analyses.

The major policy experiment results are as follows: First, it was shown that both unemployment rate and capital decreased when the progressivity rose. In particular, capital showed an excessive decrease, which appears to be because the model assumed a small-scale open economy. In addition, when raising the minimum amount and income replacement rate, the unemployment rate increased similarly to the existing exploratory models, but the degree was quantitatively small. Lastly, when the minimum amount is raised, though not monotonous, unemployed job seekers with low asset holdings tend to apply for better quality jobs. This is significant in that it confirms the theoretically discussed effect that unemployment benefits can be positive in terms of increasing the income for low-income individuals, using a two-sided search model.