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# Endogenous human capital accumulation, comparative advantage and direct vs. indirect redistribution

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## Abstract

Recently, several papers have reexamined the so-called production efficiency theorem and the Atkinson and Stiglitz theorem on commodity taxes in the optimal taxation literature. Naito [J. Public Econ. 71 (1999) 65] showed that indirect redistribution through production distortion or consumption distortion can Pareto-improve welfare and that the two theorems do not necessarily hold when different factors are imperfect substitutes and factor prices are endogenous. On the other hand, Saez J. Public Econ. (2002) forthcoming argued that in the long run, where human capital accumulation is endogenous, the two theorems are still valid. This paper develops reasonable alternative models where individuals accumulate human capital based on their comparative advantage. The present paper shows that the production efficiency theorem is not necessarily valid and that indirect redistribution from the able to the less able such as tariffs and production subsidies can increase efficiency even when skill accumulation is endogenous.

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## 1. Introduction

Whether efficient income redistribution should be done through income taxation alone or should be complemented with other measures such as production distortion or

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consumption distortion is one of the key issues whenever optimal public policies are discussed. With this regard, the production efficiency theorem (Diamond and Mirrlees, 1971), which states that production distortion is not optimal, and the Atkinson and Stiglitz theorem on optimal commodity taxation (Atkinson and Stiglitz, 1976, 1980), which shows that commodity taxation is not necessary in the presence of an optimal income tax system, are the most important results in public finance literature.

However, in public finance literature, researchers started examining those results. For example, Cremer et al. (2001) showed that the Atkinson and Stiglitz theorem does not hold when individuals are different in ability and endowment. Saez (2002) showed that the Atkinson and Stiglitz theorem does not hold when tastes are heterogenous. Naito (1999) showed that in a model similar to the model of Stiglitz (1982), if multiple goods are produced and factor prices are endogenous, the Atkinson and Stiglitz theorem does not necessarily hold, and the production efficiency result does not either.

On the other hand, many of the previous studies on optimal income taxation have received criticism that they did not focus on long-term decisions such as human capital accumulation, but focused on the short-term choices such as labor supply. As a result, it is sometimes argued that the result obtained in the short-run model might not hold in the long run.

In particular, Saez (2003) made skill accumulation endogenous in the model of optimal taxation and analyzed several issues of public policy. He showed that Naito's results are not valid and that the production efficiency theorem and the Atkinson and Stiglitz theorem on commodity taxation are valid when human capital accumulation is endogenous. Since accumulation of human capital has a strong effect on the economy in the long run, and since the implications of the production efficiency theorem and the Atkinson and the Stiglitz theorem are important, the contribution of Saez's paper is substantial.

Despite such contributions, however, we believe that a further investigation would be needed. In many previous analyses involving asymmetric information not only in public finance literature but also in other literature, conclusions were not often robust in the sense that they critically depended on the structure of information and the timing of information revelation. Thus, it is worthwhile investigating the robustness of the result of Saez (2003) with another reasonable set of assumptions. In particular, in this paper, we will show that if higher ability persons have comparative advantage in the sense that the relative return from accumulating skilled human capital to unskilled human capital is higher than that of lower ability persons, the production efficiency theorem does not hold.<sup>1</sup>

To explain the intuition of the present paper, it would be useful to look at the differences between the assumptions in Saez (2003) and those in Naito (1999). In Naito

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<sup>1</sup> In this paper, we only analyze the case of a small open economy due to the limitation of the space. As a result, we only prove that the production efficiency theorem does not hold. In a small open economy, a commodity tax cannot affect the producer prices and, hence, factor prices. Therefore, the Atkinson and Stiglitz theorem holds in a small open economy. On the other hand, the result is changed in a closed economy. In the previous version of the paper, we proved that the Atkinson and Stiglitz theorem does not hold in a closed economy. See Section 5 of the present paper for more discussion. In addition, for proof, please see the previous version of the present paper (Naito, 2003).

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