Unified Theory on the Income Redistribution Effect of Basic Income

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Contents

1. Introduction
2. Income Redistribution Effect of Internally Funded Basic Income Model
3. Income Redistribution Effect of Externally Funded Basic Income Model
4. Unified Theory on the Income Redistribution Effect of Basic Income
5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income
6. Conclusion and Policy Implications

References

1. Introduction

- There are many empirical studies on the income redistribution effect of basic income.
- However, there are very few theoretical-analytical studies on the income redistribution effect of basic income (Miller, 2017: 245-246; Yi, 2017; 2022; Desai and Palermo, 2019).
- As exceptions, Yi (2017) and Miller (2017) mathematically prove that the t% UBI-FIT (Universal Basic Income-Flat Income Tax) model improves the Gini coefficient by exactly t%.

1. Introduction

- **Furthermore, Yi (2022) points out the t% UBI-FIT model has the characteristic of preserving the existing income ranking. Yi (2022) also reveals that in the t% UBI-FIT model, the net benefit amount increases in proportion to the t value, but the rate of net beneficiaries remains the same. In addition, Yi (2022) shows theoretically and analytically how the income redistribution effect of the t% UBI-FIT model changes in terms of the Gini coefficient and the rate of net beneficiaries according to the setting and height of tax exemption point and the form of income distribution.**

1. Introduction

- However, these studies also have limitations in that they only revealed the characteristics of the UBI-FIT model among the various financial models of basic income, namely, the tax model including income tax, the common/social wealth fund model, and the national shared equity rights model for corporations.
- This paper presents a unified theory on the income redistribution effect of basic income. It is based on dividing the basic income model into an internally funded basic income model, in which finance is raised from individuals or households through taxes, and an externally funded basic income model, in which finance is raised from outside individuals or households.

1. Introduction

❖ Structure of the article

- Section 2 discusses the income redistribution effect of the internally funded basic income model, mainly focusing on the UBI-FIT model.
- Section 3 discusses the income redistribution effect of the externally funded basic income model.
- Section 4 presents a unified theory on the income redistribution effect of the internally funded basic income model and the externally funded basic income model.
- Section 5 shows the formulas related to the net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in the three models of basic income.
- Section 6 concludes by suggesting the implications, limitations, and possible analytical applications of this study.

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **The internally funded basic income model is a model that raises financial resources through taxes from individuals or households. Examples include income tax, value-added tax, wealth tax, and individual or household share of land holding tax.**
- **The internally funded basic income model is divided into a basic income model paid by personal income tax and a basic income model paid by taxes other than income tax.**

- The former is characterized by using a single variable called income, whereby each person receives a net benefit amount or pays a net contribution amount (almost) proportional to the size of their income (Yi, 2021).

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **The internally funded basic income model is divided into a model of basic income financed by personal income tax and a model of basic income financed by taxes other than income tax.**

- In the latter case, taxes are paid for the payment of basic income according to wealth or consumption rather than income per se, and as a specific individual, it is no longer possible to receive a net benefit amount or pay a net contribution amount in proportion to each person's income.
- However, in terms of income class, since wealth and consumption have a positive correlation with income, the low-income group tends to become a net benefit group, and even within the lower-income class, the lower the income, the higher the net benefit amount.
- The high-income group tends to become a net contributor group, and even within the high-income class, the higher the income, the higher the net contribution amount.
- This tendency increases/decreases as the correlation between wealth/consumption and income increases/decreases.

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **Among the models of basic income funded by personal income tax, there are UBI-FIT (Universal Basic Income-Flat Income Tax) model, UBI-RIT (Universal Basic Income-Regressive Income Tax) model, and UBI-PIT (Universal Basic Income-Progressive Income Tax) model.**

- Among them, the t% UBI-FIT model, where there is no tax exemption point and basic income is equally distributed to all, is a special form that pays the same amount of basic income to everyone based on the tax paid in proportion to individual income. It has the characteristic of reducing the Gini coefficient by t% by precisely reducing the income gap between each person by t% (Yi, 2022).
- In addition, in the t% UBI-FIT model, the net benefic amount increases in proportion to the t value, while the rate of net beneficiaries is constant (Yi, 2022).
- Furthermore, the t% UBI-FIT model has the characteristic that all those with less than average income become net beneficiaries, those with average income become the break-even point income class, and those with above average income become net contributors (Yi, 2022).
- It also preserves the existing income ranking (Yi, 2022).

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **The income redistribution effect of models of basic income financed by personal income tax can be judged based on the t% UBI-FIT model, where there is no tax exemption point and basic income is equally distributed to all.**

- Compared to the t% UBI-FIT model with the same amount of gross cost, the UBI-PIT model has a higher rate of decrease in the Gini coefficient (that is, over t%) and a larger net benefit amount (thus the ratio of net cost to gross cost increases) and a higher rate of net beneficiaries (that is, some of those with above average income also become net beneficiaries) (Yi, 2022).
- Conversely, compared to the t% UBI-FIT model with the same amount of gross cost, the UBI-RIT model has a lower Gini coefficient decrease (that is, less than t%) and a smaller net benefit amount (thus the ratio of net cost to gross cost decreases) and a lower rate of net beneficiaries (that is, some of those with below average income also become net contributors) (Yi, 2022).

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **Despite the detailed differences between the internally funded basic income models, they have the following commonalities.**

- First, in the payment stage, the same amount of basic income is received, but in the taxation stage, the higher the income (or consumption or wealth), the greater the tax, resulting in a progressive income redistribution effect.
- Second, the difference between gross cost and net cost inevitably occurs, in that the net beneficiaries pay a certain amount of additional tax, although not as much as the amount of basic income, and on the contrary, the net contributors pay additional tax but receive the amount of basic income. It shows that the issue of the fiscal illusion that inevitably occurs in the internally funded basic income model is very important in the debate over the cost of basic income, and that theoretical and practical interventions are essential to overcome it.

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **Despite the detailed differences between the internally funded basic income models, they have the following commonalities.**

- When looking at a particular society as a whole, it is necessary to consider that the internally funded basic income model returns the entire amount equally to all individuals or households based on paying taxes according to their ability to pay only for basic income payment.
- Therefore, the internally funded basic income model is more clearly revealed than the externally funded basic income model in that it operates an income redistribution mechanism to reduce the level of income inequality.
- It does not expand the size of the government's discretionary finances, as in the externally funded basic income model (Geum, 2020).

2. Income Redistribution Effect of Internally Funded Basic Income Model

- **The fact that some of the existing welfare benefits may be abolished or adjusted downward with the introduction of the internally funded basic income model should be dealt with in detail and carefully.**

- However, what I want to emphasize here is that systems based on the concept of the social minimum, such as the National Basic Livelihood Security System in Korea, exist, and the Constitution and the Act support the concept of the social minimum and systems based on it.
- Therefore, microsimulation based on a scenario in which various welfare benefits are completely or largely replaced with the introduction of partial basic income is meaningless because it is hardly realistic (Browne and Immervoll, 2017; Pareliussen, Hwang and Viitamäki, 2018; Choi, 2019).

3. Income Redistribution Effect of Externally Funded Basic Income Model

- **Externally funded basic income model refers to financing from outside the individuals or households.**
- **It is necessary to recognize that this model is an ideal type and that, although it is an ideal type, it is useful because it is different from the internally funded basic income model discussed above in terms of the mechanism of income redistribution effect.**

- Basic income payment through the issuance of sovereign money (Crocker, 2020; Yoo et al., 2021)
- A plan to provide a basic income from fund management profits by creating a common/social wealth fund (Lansley and McCann, 2019; Lansley, McCann and Schifferes, 2018; Lansley and Reed, 2018; Standing, 2019)
- Measures to pay basic income by the state setting up shared equity rights for corporations, etc. (Meade, 1989; Geum, 2018)

3. Income Redistribution Effect of Externally Funded Basic Income Model

- **It is necessary to recognize that this model is an ideal type and that, although it is an ideal type, it is useful because it is different from the internally funded basic income model discussed above in terms of the mechanism of income redistribution effect.**

- For example, even in the case of a plan to provide a basic income from fund management profits by establishing a common/social wealth fund, due to changes in the existing ownership structure, expropriation of commons or various taxes, usage fees, and fees imposed on exclusive commercial use, the income of some individuals or households will change.
- Even if the state establishes shared equity rights for joint stock companies and pays basic income based on it, individuals or households who previously held stocks will receive a smaller dividend for those stocks. That would change the income of some individuals or households.

3. Income Redistribution Effect of Externally Funded Basic Income Model

- **It is necessary to recognize that this model is an ideal type and that, although it is an ideal type, it is useful because it is different from the internally funded basic income model discussed above in terms of the mechanism of income redistribution effect.**

- However, in the case of payment of basic income through the creation of a common/social wealth fund or the establishment of shared equity rights for corporations, it is assumed that the effect of the financing plan itself on income redistribution is negligible in that it places an additional economic burden on only a small number of people, it is sufficient to compare ‘before payment of basic income’ and ‘after payment of basic income’ (Desai and Palermo, 2019).

3. Income Redistribution Effect of Externally Funded Basic Income Model

- **It is necessary to recognize that this model is an ideal type and that, although it is an ideal type, it is useful because it is different from the internally funded basic income model discussed above in terms of the mechanism of income redistribution effect.**

- Let the amount of externally funded basic income be equivalent to S times the average income before payment of externally funded basic income (where S>0). If the basic income is paid using the fund management profit of the common/social wealth fund, the income gap of each income class is unchanged in terms of the absolute amount of income, but it decreases in terms of the relative share of income.

3. Income Redistribution Effect of Externally Funded Basic Income Model

- **It is necessary to recognize that this model is an ideal type and that, although it is an ideal type, it is useful because it is different from the internally funded basic income model discussed above in terms of the mechanism of income redistribution effect.**

- More specifically, the Gini coefficient decreases exactly $\frac{S}{1+S} \times 100\%$.

Proof) Let $Gini$ be the Gini coefficient before payment of externally funded basic income.

$$Gini = \frac{1}{2n^2\mu} \sum_{i=1}^{n} \sum_{j=1}^{n} |y_i - y_j|$$

where n is the whole population, μ is the average income before payment of externally funded basic income, y_i is the individual i's income, y_j is the individual j's income.

Here, if the amount of the externally funded basic income is S times μ (where S>0), the size can be expressed as Sμ.

If the same amount of externally funded basic income is paid to everyone, the numerator part of Gini remains the same(because $|(y_i + S\mu) - (y_j + S\mu)| = |y_i - y_j|$), while the denominator part changes from $2n^2\mu$ to $2n^2(1+S)\mu$, so the value of the Gini coefficient decrease from $Gini$ to $\frac{1}{1+S} Gini$. Therefore, the reduction rate of the Gini coefficient becomes $\frac{S}{1+S} \times 100\%$.

4. Unified Theory on the Income Redistribution Effect of Basic Income

- **Section 4 presents a unified theory on the income redistribution effect of basic income based on the above analysis.**
- **It is useful to look at it in two stages.**
  - The first step examines the income redistribution effect of the internally funded basic income model.
  - In the second stage, based on the analysis in the first stage, the income redistribution effect of basic income is analyzed when the externally funded basic income model is additionally considered.
- **The first step considers the income redistribution effect of introducing an internally funded basic income model.**
  - Let the resulting Gini coefficient improvement rate be a%, the rate of net beneficiaries be b%, and the net benefit amount be c (in this case, the net contribution amount is equal to the net benefit amount).

4. Unified Theory on the Income Redistribution Effect of Basic Income

- **The second step examines the income redistribution effect of the total basic income by additionally considering the externally funded basic income model.**

- In the externally funded basic income model, if the basic income payment is S times μ (where S>0), the overall Gini coefficient improvement rate is $\left[a + (100 - a) \times \frac{S}{1+S}\right]$%. If the rate converted from the net contributors to the net beneficiaries is d%, the rate of net beneficiaries is (b+d)%, and the net benefit amount is c+(the number of net beneficiaries when only internally funded basic income is applied)*(the amount of externally funded basic income for person)+(the sum of the net benefit amounts of the additionally entered net beneficiaries due to the payment of externally funded basic income).

4. Unified Theory on the Income Redistribution Effect of Basic Income

<Table 1> Some examples of the improvement rate of the Gini coefficient due to the application of the internally funded basic income model and the externally funded basic income model

Gini coefficient reduction rate due to internally funded basic income model (%)	10			20			30		
Ratio of the amount of externally funded basic income to the average income before payment of externally funded basic income (%)	10	20	30	10	20	30	10	20	30
Overall Gini coefficient improvement rate (%)	18.18	25	30.77	27.27	33.33	38.46	36.36	41.67	46.15

Note: The overall Gini coefficient improvement rate is rounded to the third decimal place.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **Section 5 presents formulas related to the net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in the three basic income models.**

- Internally funded basic income model
- Externally funded basic income model
- Mixed model

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **Model 1: Internally funded basic income model**

$$\sum_{i=1}^{n_1}(BI - y_i t_i) = \sum_{i=1}^{n_2}(y_i t_i - BI)$$

where BI is the basic income amount for person, y_i is the individual i's pre-tax income, t_i is the average tax rate for individual i's pre-tax income, n_1 is the number of net beneficiaries, n_2 is the number of net contributors.

In this model,

Gross cost is $\sum_{i=1}^{N} BI$, where N is the number of members of society.

Net cost is $\sum_{i=1}^{n_1}(BI - y_i t_i)$.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **Model 2: Externally funded basic income model**

$$\sum_{i=1}^{N} BI = TEF$$

where BI is the basic income amount for person, TEF is the total amount of external financing.

In this model,

Gross cost is $\sum_{i=1}^{N} BI = TEF$.

Net cost is $\sum_{i=1}^{N} BI = TEF$.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **Model 3: Mixed model**

$$\sum_{i=1}^{n_1}(BI_1 - y_i t_i) + TEF = \sum_{i=1}^{n_2}(y_i t_i - BI_1)$$

where BI_1 is the internally funded basic income amount for person, y_i is the individual i's pre-tax income, t_i is the average tax rate for individual i's pre-tax income, n_1 is the number of net beneficiaries, n_2 is the number of net contributors, and TEF is the total amount of external financing.

In this model,

Gross cost is $\sum_{i=1}^{N} BI_1 + TEF$, where N is the number of members of society.

Net cost is $\sum_{i=1}^{n_1}(BI_1 - y_i t_i) + TEF$.

$BI = BI_1 + \frac{TEF}{N}$.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **The implications of the equations related to the three basic income models to us can be summarized as follows.**

- First, in the internally funded basic income model, the sum of the net benefit amounts for net beneficiaries and the sum of the net contributors are the same. It is said that the model fits the ‘20 vs. 80’ better than ‘1 vs. 99’.
- In the internally funded basic income model, net beneficiaries and net contributors are the same in that they receive basic income, but in terms of economic gains and losses from the introduction of basic income, they are clearly differentiated according to the current economic level.
- Second, in the externally funded basic income model, all members of society become net beneficiaries without distinction between net beneficiaries and net contributors.
- Of course, as pointed out above, in the process of introducing the externally funded basic income model, if the changes in the existing ownership and equity structure, additional economic burdens in the form of taxes, usage fees, etc. are taken into consideration, few people will be net contributors.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **The implications of the equations related to the three basic income models to us can be summarized as follows.**

- In the case of the externally funded basic income model, the stronger the policy intervention in sectors previously owned exclusively or enjoyed economic profits by a few, the more suitable the ‘1 vs. 99’ rather than the ‘20 vs. 80’. This forms the basis for Kwack (2017; 2020, and Kwack and Kwon (2020) to judge the basic income based on urban or platform commons has a greater potential for dynamic expansion than tax financed basic income.
- However, at least for the moment, it seems that the potential size of the financial resources that can be secured through the internally funded basic income model is larger than the potential size of the financial resources that can be secured through the externally funded basic income model. In addition, the former is judged to be superior to the latter in terms of stability and predictability of the size of financial resources.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **The implications of the equations related to the three basic income models to us can be summarized as follows.**

- Third, in the case of the mixed basic income model, it will depend on the specific composition of the internally funded basic income model and the externally funded basic income model, but the size of the rate of net beneficiaries will be highly dependent on the relative weight of the internally funded basic income model and the externally funded basic income model. The higher the relative weight of the externally funded basic income model, the greater the proportion of those located just above the break-even point income in the internally funded basic income model will be converted from net contributors to net beneficiaries. Accordingly, the basic income is closer to the ‘1 vs. 99’ between the ‘20 vs. 80’ and ‘1 vs. 99’. In addition, in the case of the remaining net contributors, if a few are excluded, the amount of net contribution will be reduced.

5. Formulas related to net benefit amount, net contribution amount, rate of net beneficiaries, and rate of net contributors in three models of basic income

- **The three implications summarized above provide implications regarding the political feasibility and sustainability of basic income, at least in terms of economic gains or losses (benefits or contributions) to individuals and households due to the introduction of basic income.**

- The internally funded basic income model can outperform the externally funded basic income model (at least for now) in terms of financial stability and potential size of resources.
- On the other hand, the externally funded basic income model can be superior to the internally funded basic income model in terms of the size of the rate of net beneficiaries and the burden of contribution of the net contributors.
- In addition, in terms of labor supply, the internally funded basic income model has both a substitution effect (due to a tax rate increase) and an income effect (due to an increase in non-labor income), whereas the externally funded basic income model has only an income effect, so the latter has an advantage over the former.

6. Conclusion and Policy Implications

- **Implications**

- This paper presents a unified theory on the income redistribution effect of basic income that encompasses both the internally funded basic income model and the externally funded basic income model.
- The internally funded basic income model and the externally funded basic income model show distinct differences in the mechanism of income redistribution, size of the net beneficiaries, income and substitution effects related to labor supply, possible changes in ownership structure, and financial stability and potential size of resources.
- Based on an understanding of the relative strengths and weaknesses of the internally funded basic income model and the externally funded basic income model, and a political understanding of the preference and support for basic income, it is important to specifically arrange and construct a whole basic income model that guarantees political feasibility and sustainability.

6. Conclusion and Policy Implications

- **Limitations**

- In discussing the income redistribution effect of the internally funded basic income model and the externally funded basic income model, this paper has a limitation that only the direct effects of taxation and transfer are considered.
- It can be said that the discussion on the income redistribution effect of the internally funded basic income model and the externally funded basic income model considering the labor supply effect and macroeconomic effect required an empirical analysis rather than a theoretical analysis.

6. Conclusion and Policy Implications

- **Possible analytical applications**

- We can apply the income redistribution effect of the externally funded basic income model discussed in this paper to the case of the Alaska Permanent Fund Dividend (APFD).
- Although the APFD is not paid to all Alaskan residents, it is true that most of the residents are paid, and the annual per capita payment is the same. Therefore, we can calculate the (maximum) improvement rate of APFD's Gini coefficient when the direct effect is considered by using the Alaskan average per capita income before APFD payments and the APFD's per capita payment data each year.
- There are various mechanisms that can produce indirect effect. A representative mechanism that will increase the income redistribution effect of APFD is that income inequality would have worsened if a small number of people had monopolized the profits of oil development without the creation of the APFD.

6. Conclusion and Policy Implications

- **Possible analytical applications**

- As a mechanism to reduce or even reverse the income redistribution effect of APFD, income inequality could be further reduced if the welfare system had been operated by targeting the socially disadvantaged, including the low-income class, instead of distributing the same amount to all residents with certain qualifications.
- In addition, if the decrease in labor supply due to APFD payments occurs especially among the low-income class, there may be a mechanism to exacerbate income inequality due to APFD payments. However, according to Jones and Marinescu (2022), it appears that this mechanism either did not work or, if they did, had only a negligible effect.
- If the synthetic control method used by Jones and Marinescu (2022) is applied to the analysis of income redistribution effect of APFD, it is possible to compose a Synthetic Alaska and compare it with Alaska in terms of the Gini coefficient, and the result can be compared with the result considering only the direct effect of APFD payment. By doing so, we can comprehensively estimate the magnitude and direction of the income redistribution effect of APFD, the magnitude of the direct effect, and the overall magnitude and direction of the indirect effects.

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Thank you very much for your attention.