

## The Effects of Basic Income on Labour Supply<sup>1</sup>

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### Abstract

This study analyses the effects of basic income on labour supply using the neoclassical model of labour–leisure choice. In addition, we consider various costs (e.g. transaction cost, opportunity cost) and constraints (e.g. liquidity constraint, care constraint) as well as a minimum level of consumption.

The main results are as follows. First, it is expected that the transition from conditional social security (CSS) to full basic income (FBI) will certainly increase the labour supply of existing public assistance recipients. Second, the labour supply effects of the transition in income groups at break-even points would be indeterminate. The labour supply effects depend on the relative size between basic income payments and the tax amounts of non-labour income for basic income payments. Spreading effects, i.e. reducing excessive overworking hours and/or increasing working hours which are now too short, can be expected among these groups. The total effects would be almost zero or slightly positive. Third, it is predicted that the labour supply effects of the above-mentioned transformation in the high-income bracket will also be inconclusive in theory due to the reliance on the relative magnitude between income and substitution effects. In this regard, we highlight that basic income can function as an ‘insurance system’.

Examining the effects, we find extra advantages of FBI over CSS. The size of the opportunity set in groups below the break-even income level would mostly expand. In particular, existing social assistance recipients’ opportunity sets can expand, and their living standards would rise considerably with a high probability. Although the opportunity set for those in the high-income bracket can decrease slightly or substantially, the above-mentioned expected effects and benefits would considerably exceed any losses for those in the high-income class.

**Keywords:** Full Basic Income, Conditional Social Security, Labour Supply, Income Effect, Substitution Effect, Minimum Level of Consumption, Transaction Cost, Opportunity Cost, Liquidity Constraint, Care Constraint

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## 1. Introduction

One of the strongest criticisms of basic income, especially subsistence-level basic income, has been that most people would not work if a basic income sufficient for their livelihood were paid. In other words, full basic income will never have socioeconomic feasibility and sustainability. Studies on basic income's effects on the labour supply have not yet reached a consensus on the direction and magnitude of these effects despite their importance. The lack of this consensus is in stark contrast to the facts that a considerable amount of research has accumulated on basic income's effects on poverty and inequality and that redistribution effects are significantly greater than existing social welfare policies (e.g. social assistance, social insurance, social allowances) (see. e.g. Callan et al., 1999; Garfinkel et al., 2003; Honkanen, 2014; Kim, 2009; Baek, 2010; Kang, 2011).

This study investigates the impact of basic income on the labour supply to answer widespread concerns and fears surrounding the social and economic feasibility and sustainability of basic income. To show that basic income is economically viable and sustainable, it is unnecessary to further emphasise the need to analyse the effects of basic income on labour market, particularly its effects on the labour supply.<sup>2</sup>

This article is structured as follows. First, we suggest an analysis strategy, including the model of analysis, the objects of comparison and the methods of analysis. Second, we review empirical studies focusing on microsimulations. Third, we examine the effects of basic income on labour supply based upon theory. We use the neoclassical model of labour–leisure choice but introduce additional various considerations to better reflect social realities and present analytical results via diverse situations and groups.<sup>3</sup> Fourth, we summarise the analysis results and note the limitations and implications of the study.

## 2. Analysis Strategy

We use the neoclassical model of labour–leisure choice as the analysis model<sup>4</sup> but introduce a

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<sup>2</sup> In fact, the effects of basic income on poverty and inequality cannot be analysed precisely if the first-order effects of the tax-and-share system (Schachtschneider, 2012, 2014; Geum, 2017) are only considered. If the effects of basic income on the labour supply (second-order effects) and macroeconomic structures, such as labour demand, technological change and effective demand (third-order effects), are also appropriately considered, the effects of basic income on poverty and inequality can be estimated more accurately (Sommer, 2016; Yi, 2017: footnote 3).

<sup>3</sup> Naturally, other approaches may or can be more appropriate than the approach based on the neoclassical model of labour–leisure choice. For an interesting discussion on the impact of basic income on employees' intrinsic motivation and work efforts, wages and employment in a behavioural economics perspective, see Pech (2010: Section 4).

<sup>4</sup> In the neoclassical model of labour–leisure choice, leisure is a normal good whose consumption increases as income increases, while labour is considered a bads which is basically to be avoided but that must be done to gain income (for consumption). An individual or household chooses a point at which utility maximises under a given budget constraint and a real wage rate; that is the point at which a budget constraint line and an

variety of additional considerations. These include varied costs (e.g. transaction costs, such as transportation costs, and opportunity costs, such as commute times and care costs), constraints that affect the labour supply (e.g. liquidity constraints and care constraints) and the introduction of minimum consumption levels.

Objects of comparison are set as follows. For basic income, the full basic income (FBI), which is the subsistence-level basic income, is considered instead of the partial basic income (PBI), where the level of payments is less than the minimum cost of living. Therefore, it is supposed that the existing public assistance system is replaced by FBI and that existing social assistance recipients face a lower implicit marginal tax rate. For the comparison with FBI, the current social security system (i.e. the status quo) is established rather than 'no social welfare'.<sup>5</sup> When we compare FBI with 'no social welfare', because a basic income is a non-labour income, so both income and substitution effects work in a negative direction (or in rare cases, null), it is clear that the labour supply will decrease. However, modern welfare states specify the minimum standard of living as a national obligation in the law<sup>6</sup> and operate various social welfare systems (e.g. social assistance, social insurance, social allowance, social services). Therefore, it is unrealistic and inadequate to compare FBI with 'no social welfare' but reasonable to compare FBI with existing social security systems.

The specific analyses consist of empirical studies focusing on microsimulation studies (Section 3) and analysis of effects based on theory (Section 4).

### 3. Review of Empirical Studies

Empirical studies on the effects of basic income on the labour supply are broadly divided into two categories. The first is based upon social experiments conducted by separating the experiment group and the control group for a certain period, and the second involves microsimulation studies analysed using secondary data.

Empirical research based on social experiments can solve problems with omitted variable biases and

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indifference curve meet and at which labour supply and income (or consumption) are determined.

<sup>5</sup> According to Gilroy et al. (2013), the former corresponds to 'conditional social security' and the latter to 'no social security'.

<sup>6</sup> The Constitution of the Republic of Korea (Article 10 of the Constitution, entirely amended on October 29, 1987, and enforced on February 25, 1988) also states the rights of the people and the state's obligation to guarantee the basic human rights as follows: 'All people have dignity and value as human beings, and have the right to pursue happiness. The State shall have the obligation to confirm and guarantee the inviolable basic human rights of individuals' (Article 10); '① Every person has the right to live in human dignity. ② The State shall have an obligation to endeavor to promote social security and social welfare' (Article 34). The same is true for the National Basic Livelihood Security Act (Law No. 13987, partially revised on March 2, 2016, and implemented on August 4, 2016): 'The purpose of this law is to provide the necessary benefits to those who have difficulties in life, to guarantee their minimum living standards and to help them to be self-sufficient' (Article 1); '① Payments under this Act shall be able to maintain a healthy and cultural minimum life' (Article 4).

endogeneity of explanatory variables through random assignments of experiment and control groups; thus, the effects of independent variables on dependent variables can be measured relatively accurately. Nevertheless, this paper does not examine empirical research results founded upon social experiments in detail for the following reasons.<sup>7</sup>

First, it is quite difficult to trust analytical results due to various problems with experimental design as well as inherent limitations of social experiments (Groot, 2004: Ch.4; Marx, 2005; Groot, 2006: 3-4; Noguera and De Wispelaere, 2006: 1-4). Groot (2004: Sections 4.4-4.5) pointed out problems of New Jersey experiment from 1968 to 1972, i.e. the inherent limitations of social experimentation, such as limitations on the possibility of external circumstances changes; the impossibility of identifying various expected effects; limited study periods; and inappropriate considerations for dropouts. Greenberg et al. (1981), Greenberg and Halsey (1983) and Ashenfelter and Plant (1990) also warned about the possibility of biases in estimates due to non-random assignments, misreporting and attrition between experimental and control groups in the income maintenance experiments (IMEs) in the United States (New Jersey/Pennsylvania, Iowa/North Carolina, Gary, Seattle/Denver) in the 1960s and 1970s.

Second, former social experiments did not have the 'exact' design form of a basic income experiment. Above all, conditional cash transfer (CCT) is far from basic income in that conditions are imposed even if their forms are significantly relaxed. Next, unconditional cash transfer (UCT), in contrast to CCT, is common to basic income in that no condition is imposed on receipt, but it is quite different from basic income in that it covers a small portion of the population and has little or no substitution effect. Finally, in relation to negative income tax (NIT), two different views contend with each other: the first pays more attention to commonalities with NIT and basic income (Groot, 2004; Sommer, 2016), and the other focuses on dissimilarities between NIT and basic income (Van Parijs, 1995; Fitzpatrick, 1999). This paper's position on this issue is that both NIT and basic income are included in the guaranteed minimum income (GMI) and they can both be designed to be economically identical; however, it is necessary to make a clear distinction between the two. As Van Parijs (1995) noted, *ex ante* payment vs. *ex post* payment is an important issue when time lags and budget or credit constraints exist, the psychological effects and sense of rights associated with both systems are quite different, and they differ in terms of burden of income investigation and administrative costs. Furthermore, if we intend to cover various income sources apart from labour income for funding basic income and encompassing consumption taxes, ecological or environmental taxes, property taxes, various common resources/goods/wealth, and to consider diverse social benefits and participation income other than basic income, there is no reason to insist on basic income payments combined with NIT (Yi, 2017: 530). The core of the basic income system is a tight combination of tax (and/or

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<sup>7</sup> Refer to Groot (2004: Chs.4-6), Widerquist (2005), Sommer (2016: Section 3.3) and Van Parijs and Vanderborght (2017: 140-144) for evaluations of results of NIT social experiments conducted in the United States and Canada in the 1960s and 1970s.

common resources/goods/wealth) and share, and it is possible to finance resources in the form of an ear-marked tax if necessary.

Third, there is a large time difference between 1960s–70s and now (Yi, 2017: footnote 6). Since labour market and macroeconomic environments differ considerably in the 1960s–70s and today, attempts to derive direct implications from experiments several decades ago would be extremely limited or unprofitable. Moreover, it seems that it will take some time to see the results of basic income social experiments currently being carried out in Finland, the Netherlands (a.k.a. social assistance experiments), Scotland, and Ontario, Canada. Of course, many issues must be contemplated carefully in the future regarding current experiments all over the world, including whether the experiments were designed properly made, whether the experimental results were interpreted properly and how and to what extent the experimental results in a particular area can apply to other areas where socio-economic and political contexts are different.

For these reasons, this study examines Sommer (2016), which is a basic income microsimulation study based on secondary data instead of social experiment-based empirical studies. Even though Sommer (2016) shows some limitations in terms of the 'basic income reform proposal via NIT', it is judged to be superior to other studies in that it constructs a specific 'basic income proposal' in the contexts of a systematic review of the current German welfare and tax laws and then investigates the effects of the 'basic income proposal' on the labour supply.

Sommer (2016) specified the welfare and tax laws of Germany based on 2010 as 'the status quo', and suggested the 'basic income proposal' founded on the taxable income, which is made up of three parts: a section of the zero tax rate in line with the current income tax exemption zone, a section in which the marginal tax rate is 60% and a section in which the marginal tax rate is equal to the German income tax in 2010 (Sections 4.2-4.4).<sup>8</sup> In his proposal, the existing child benefit is replaced by 'basic income', with the identical amount per child paid and the amount of payment raised. As for the tax payment of individual households, 'the status quo' and the 'basic income proposal' are compared as follows. First, marginal tax rate is precisely same for households with annual incomes of €13,471 or more. Next, for households with incomes between €8,004 and €13,471 per year, the implicit marginal tax rate is adjusted to 60%, which means that for most households with annual incomes below €8,004, the current implicit tax rate of 80–100% is changed to 60% to have a higher labour incentive and supply than the current one in the entire income range.

Based on this, Sommer (2016) used the discrete approach to labour supply instead of the continuous

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<sup>8</sup> Of course, in Sommer's proposal, households with annual income tax exemptions of less than €8,004 as of 2010 can choose one of two options: the 'basic income proposal', with 'basic income' starting at 5,340 euros with a 60% implicit marginal tax rate, and 'basic assurance', fixed at 8,004 euros, with a 100% implicit marginal tax rate. However, the 'basic assurance' is considered subordinate to his proposal.

approach to labour supply because the latter does not adequately reflect social realities such as labour market institutions and behaviours of employers and employees; furthermore, it employs the additive random utility assuming rational economic agents (Section 5.2). Using the German Socio-Economic Panel (GSOEP) as the data, Sommer (2016) compared the simulated labour supply of ‘the status quo’ in 2010 with that of the ‘basic income proposal’ as follows (Sections 6.3-6.4).

First, the labour supply of unmarried adults for the ‘basic income reform’ is larger than ‘the status quo’ in both men and women. Thanks to the ‘basic income proposal’, the percentage of those who do not participate in the labour market is lowered by 0.38%p for men and 1.65%p for women. In the case of men, the rate of working for 1 to 40 hours per week is almost unchanged, while the rate of working over 40 hours increases by 0.44%p. In the case of women, the rate of working for 1 to 40 hours per week increases by 1.99%p, while the rate of working over 40 hours decreases by only 0.33%p.

<Table 1> Comparison of working hours for unmarried people before and after the ‘basic income reform’

(Unit: %)

	0	1-40	>40	Σ
Males	14.26 / <i>14.64</i>	38.44 / <i>38.49</i>	47.31 / <i>46.87</i>	100
Females	15.90 / <i>17.55</i>	49.44 / <i>47.45</i>	34.66 / <i>34.99</i>	100

Note: The left side of the separator (/) indicates the value in case of the ‘basic income proposal’, while the right side in italics of the separator expresses the value in case of the ‘status of quo’.

Source: Sommer (2016: Table 6.13).

Next, the labour supply of couples for the ‘basic income reform’ is larger than that of ‘the status quo’ generally. Because of the ‘basic income proposal’, the percentage of those who do not participate in the labour market goes down by 1.39%p for men but goes up by 1.05%p for women. For males, the rate of working for 1 to 40 hours per week decreases by 1.65%p, while the rate of working over 40 hours increases by 3.06%p. On the other hand, for females, the rate is almost unchanged in all the categories of 1 to 10 hours, 11 to 20 hours, 21 to 34 hours, 35 to 40 hours and over 40 hours.

Sommer (2016) implies that unlike the myth in which basic income would work in a negative direction in income and substitution effects,<sup>9</sup> the effects of basic income on the labour supply highly depend on specific institutional designs. However, the limitations of the ‘basic income proposal’ in his study are also noticeable: the amount of ‘basic income’ which is set is not sufficient; ‘basic income’ is paid in household units rather than individual units; more fundamentally, it is not ‘genuine’ basic income

<sup>9</sup> This is only true when basic income is compared with ‘no social security’, which is far away from social realities of modern welfare states.

proposal but 'basic income reform via NIT'; and it merely follows the neoclassical model of labour–leisure choice without any important modifications (Yi, 2017). Eventually, considering that there is no place in which a 'genuine' basic income is implemented at the national level, it is judged that implications through theory-based analysis can be much larger and deeper than those through empirical studies.

<Table 2> Comparison of working hours for couples before and after the 'basic income reform'

(Unit: %)

		Husbands			Σ
		0	1-40	>40	
Wives	0	1.67 / 1.93	8.70 / 10.38	22.53 / 19.54	32.90 / 31.85
	1-10	0.41 / 0.59	2.53 / 2.43	3.64 / 3.64	6.59 / 6.66
	11-20	0.86 / 0.96	5.02 / 4.98	8.90 / 8.90	14.78 / 14.84
	21-34	1.16 / 1.44	5.81 / 5.81	11.00 / 10.92	17.97 / 18.17
	35-40	1.80 / 2.19	6.73 / 6.79	5.81 / 5.73	14.34 / 14.71
	>40	0.58 / 0.77	2.63 / 2.67	10.22 / 10.32	13.42 / 13.76
	Σ	6.49 / 7.88	31.41 / 33.06	62.10 / 59.05	100 / 100

Note: The left side of the separator ("/) indicates the value in case of the 'basic income proposal', whereas the right side in italics of the separator expresses the value in case of the 'status of quo'.

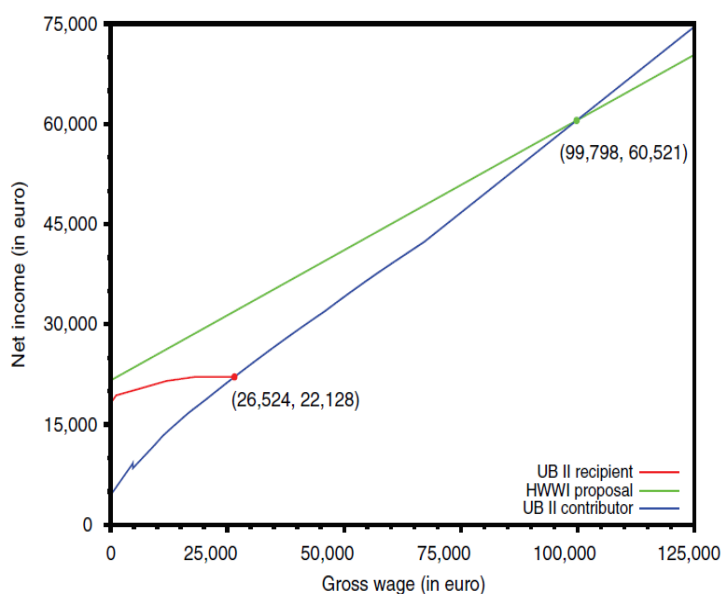
Source: Sommer (2016: Table 6.14).

## 4. Theory-based Analysis

### 4.1. Review

Analysing the current German systems of social welfare, taxation and social contributions, Gilroy et al. (2013) showed that it is possible to design a basic income system which increases labour incentives and supply, with low-income households facing lower marginal tax rates than their current counterparts. In the current system (Hartz IV), public assistance recipients face high marginal tax rates ranging from 80% to 100%, thereby hampering labour incentives and supply, whereas those who refuse public assistance benefits are confronted with a too-low net. On the other hand, in the basic income in the Hamburger Weltwirtschaftsinstitut (HWWI) proposal (Hohenleitner und Straubhaar,

2008), low-income people receive a relatively high net income even though they have low gross wages (escaping from the poverty trap) and face relatively low marginal tax rates from the start, with labour incentives and supply increasing from the present (escaping from the unemployment trap).



<Figure 1> Comparison of Hartz IV's "Unemployment Trap" and HWWI Proposal

Source: Gilroy et al. (2013: Figure 1).

Gilroy et al. (2013) used the terms 'no social security' (NSS), 'conditional social security' (CSS), and 'unconditional basic income' (UBI) under the assumptions of a constant marginal burden and a constant net hourly wage. They analysed individual labour supply effects by supposing heterogeneous individuals with different propensities to consume. In particular, it is interesting to compare CSS to UBI. In the case of UBI for people with high propensities to consume, the direction of the total effect is not clear because income effect works in a positive direction but the substitution effect works in a negative direction ('- +'). In the case of UBI for people with mid-level propensities to consume, the overall effect works in a negative direction, because the income and substitution effects both work in negative directions ('-'). In the case of UBI for individuals with low propensities to consume, the entire effect works in a positive direction since the income effect is equal between CSS and UBI and the substitution effect works in a positive direction ('+'). Because of the transition from CSS to UBI, the total labour market participation rate is expected to increase.

Gilroy et al.'s (2013) study is outstanding because it examines the effects of the transformation from NSS to UBI and from CSS to UBI, particularly employing individuals with diverse propensities to consume. Notably, it seems to be useful for indicating that a prediction that many people would fall into the so-called corner solution in UBI, which means many people would not work in UBI at all, might be immoderate by noticing that forms of indifferent curves are heterogeneous across people.



However, although some assumptions are needed for the simplification and comparability of discussion, the assumptions that a marginal burden and a net hourly wage will be constant in NSS, CSS and UBI seem to be too strict and make the comparison itself somewhat inappropriate.

<Table 3> Comparison of labour supply effects between NSS, CSS and UBI

	A			B			C		
	IE	SE	OE	IE	SE	OE	IE	SE	OE
NSS→UBI	+	-	--+	-	-	-	-	-	-
NSS→CSS	+	-	--+	+	-	--+	0	-	-
CSS→UBI	+	-	--+	-	-	-	0	+	+

Notes: 1) A means a person with a high propensity to consume, B expresses a person with a mid-level propensity to consume and C indicates a person with a low propensity to consume.

2) IE means income effect, SE expresses substitution effect and OE indicates overall effect.

3) NSS stands for no social security, CSS stands for conditional social security and UBI stands for unconditional basic income.

Source: Gilroy et al. (2013: Table 1).

While investigating the labour supply effects of UCT, Mideros and O'Donoghue (2015) attempted to elaborate on or revise the neoclassical model of labour–leisure choice in three respects. First, they introduced a minimum level of consumption and then underscored that leisure is no longer normal goods and that a well-defined indifference curve in the leisure-consumption (or income) curve cannot be drawn if consumption (or income) is below a minimum level of consumption.<sup>10</sup> This is also related to the Marxist thought that a worker who does not own the means of production in capitalist societies can maintain his livelihood by only selling his labour power as a commodity, a point which is completely ignored in the neoclassical model of labour–leisure choice. Their considerations of asymmetry between the cases of consumption (or income) below and above a minimum level of consumption seems to reflect social realities well since labour force participation is forced for those with low incomes to maintain a living if the income is below the minimum cost of living.<sup>11</sup> Studies in

<sup>10</sup> In a similar vein, Gamel et al. (2006: 484) noted the following: 'If standard microeconomic theory is willing to consider that the income effect is only slightly positive for the lowest wage rates, it makes sense that this income effect should become negative for groups on the margins of or entirely excluded from society and that they should perceive leisure time as an inferior goods. In other words, it is the positive or negative direction and not the intensity of the income effect that remains uncertain here.'

<sup>11</sup> Of course, those with low incomes can rely on their families, relatives and welfare systems. However, this is not always possible, and the degree of support may not always be sufficient. It can also cause side effects, such as dependence and shame due to asking for help.

various countries have shown that social transfers can have non-positive income effects for leisure, which can be interpreted as evidence supporting their theoretical validity (Mideros and O'Donoghue, 2015: 251). Second, Mideros and O'Donoghue (2015) explicitly considered various costs accompanying labour market participation. It is worth noting that labour market performance entails a variety of transaction costs (e.g. transportation costs and additional expenditures such as food and clothing associated with work) and opportunity costs (e.g. commuting time, caring costs). UCT can increase the labour supply by preserving these costs. Third, Mideros and O'Donoghue (2015) considered various constraints which can hamper an individual's labour market participation. In particular, liquidity constraints are an important issue in the execution of various businesses, such as self-employment. UCT can affect labour market participation by mitigating liquidity constraints. UCT can also contribute to alleviating care constraints, but this can only be expected if gender equality policies and mitigation policies against labour market gender inequalities are effectively accompanied (Mideros and O'Donoghue, 2015: 251).

In this way, Mideros and O'Donoghue (2015) provided with important insights into basic income's impact on the labour supply by considering three real dimensions which have been overlooked by the neoclassical model of labour-leisure choice. However, because the policy they analysed is not nationwide basic income but UCT, they focused merely on income effects while ignoring substitution effects. Therefore, there is a definite limit to the direct application to the case of basic income. In the following section, we analyse the effects of basic income on the labour supply in different groups based on various situations, considering implications and limitations derived from Gilroy et al. (2013) and Mideros and O'Donoghue (2015).

## **4.2. Theory-based Analysis**

The impact of basic income on the labour supply is examined by three representative groups: existing public assistance recipients, income groups at break-even points and the high-income bracket. First, one of the main goals of FBI is replacement of social assistance, which causes various side effects such as the poverty trap, the unemployment trap, passivisation of recipients, excessive administrative costs, publicity costs and the stigma effect. Thus, we select existing public assistance recipients as a representative analysis group.<sup>12</sup> Second, income groups at break-even points are the groups in which the total tax amount for the basic income payment is the same as the basic income payment under the assumption of unchanged labour supply. It seems that these groups are worth investigating since by doing so, we could judge whether estimates, derived from studies only reflecting the first-order

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<sup>12</sup> Understandably, social assistance recipients are not fixed at all. Instead, many people experience dynamic processes, which means their welfare entries and exits occur repetitively. In light of this point, the poor who do not receive public assistance benefits can be regarded as potential public assistance recipients or risk groups for extreme poverty, which mainly compose blind spots of social assistance. See Lee (2010) for the dynamic characteristics of welfare entry and exit in the National Basic Livelihood Security System in South Korea.

effects of the tax-and-share system, of the effects of basic income on poverty and inequality and percentages of net beneficiaries would be reliable or changeable, if we additionally consider the second-order effects of labour supply changes. Third, it is highly anticipated that the high-income bracket is the representative net burden group in the basic income system, so they are justly selected for analysis. In the analysis, we will set up individuals with different propensities to consume, such as Gilroy et al. (2013). Like Mideros and O'Donoghue (2015), we will consider various costs and constraints.

#### ① Existing public assistance recipients

In the case of existing public assistance recipients, non-labour income in CSS is between zero and the minimum consumption level (hereafter  $C_{\min}$ ). Through the social assistance system, the difference between  $C_{\min}$  and non-labour income is preserved.<sup>13</sup> In FBI, on the other hand, the basic income of  $C_{\min}$  is given regardless of the size of the existing non-labour income. Therefore, if the existing non-labour income is larger than zero, the basic income is larger than the public assistance benefit and the total non-labour income in FBI becomes larger than in CSS, resulting in a negative impact on the labour supply in terms of income effect.

In the case of social assistance, the amount of public assistance received corresponding to the increased labour income is reduced, so an individual or a household is faced with a very high implicit marginal tax rate ranging from 80% to 100%. In the case of basic income, on the other hand, the marginal tax rate is much lower than this. Thus, basic income has a positive impact on the labour supply compared with social assistance in terms of substitution effect.<sup>14</sup>

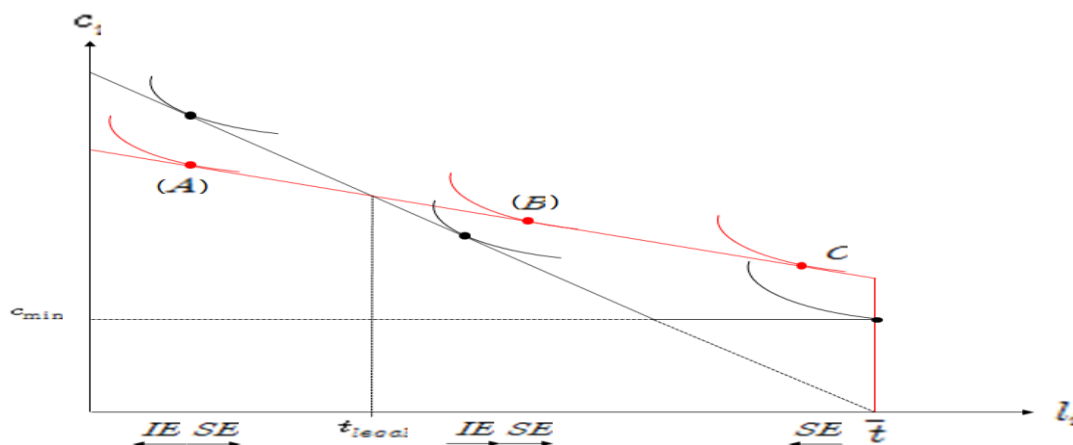
Because the directions of income and substitution effects are different from each other, the direction of the total effect differs case by case. The total effect relies on an individual's propensity to consume. Figure 2 compares the overall effect of each individual type: a high propensity to consume or work A, a mid-level propensity to consume B and a low propensity to consume C, respectively. The figure supposes that the implicit marginal tax rate is 100% and that the total income (or consumption) in

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<sup>13</sup> In fact, the difference between a minimum consumption level and a non-labour income is not fully preserved because of an income conversion of the property, an estimated income and a regarded maintenance cost. An income conversion of the property, an estimated income and a regarded maintenance cost, directly linked to the calculation of recognised income, are parts of the central reform tasks of the National Basic Livelihood Security System in South Korea along with the abolition of family support obligation rule. For more information, refer to Kim and Jeong (2014).

<sup>14</sup> One may find it possible that in the case of existing public assistance recipients, a budget constraint line in FBI would be equal to or even steeper than that in CSS due to the individualisation of the tax and transfer system, the transformation of the labour income tax system from progressive to flat rate and funding through revenues from common resources/goods/wealth and/or taxation from sources other than labour income. In these scenarios, their opportunity sets are larger than in cases of Figure 2, and the impact on the labour supply in FBI in terms of substitution effects works in a positive direction in comparison to that in CSS.

statutory working hours ( $\bar{t} - t_{social}$ ) is equal to between CSS and FBI, which means that social assistance recipients would benefit thanks to FBI from zero hours to statutory working hours, which would be highly plausible. We also suppose flat-rate taxation on labour income for the simplicity of discussion.



<Figure 2> Comparison of labour supply effects between CSS and FBI (existing public assistance recipients)

Notes: 1) This figure is elaborated from Gilroy et al. (2013: Figure 7) for existing public assistance recipients.

2) Black indicates CSS and red points FBI.

3)  $l_i$ : leisure time,  $\bar{t}$ : exogenously given time,  $c_i$ : consumption,  $c_{min}$ : minimum consumption level,  $t_{social}$ : leisure time in statutory labour time ( $\bar{t} - t_{social}$ ),  $IE$ : income effect,  $SE$ : substitution effect.

4) A and B are not actual situations of the existing public assistance recipients, so they are expressed in parentheses in the sense of a kind of hypothetical option which can be considered in conjunction with the exit from welfare. Therefore, it is inappropriate to directly compare CSS with FBI for A and B.

Figure 2 shows that FBI has a positive impact on the labour supply in terms of income effect and a negative impact on the labour supply in terms of substitution effect compared with CSS in the case of A. Therefore, the entire effect is undetermined. However, it is reasonable to judge that A is not an actual picture of existing public assistance recipients but a hypothetical representation of what they could become in conjunction with the exit from welfare since A's income far exceeds the income threshold below which one can be subsidised because of A's excessive overwork. In the case of B, FBI has a negative impact on the labour supply in terms of income and substitution effects; thus, the total effect is also negative. As in the case of A, B is also not an actual picture of existing public assistance recipients but a hypothetical representation of what they could become in conjunction with the exit from welfare since B's income surpasses the income threshold below which one can be subsidised. Finally, in the case of C, even if the non-labour income in FBI is same as or more than that in CSS, social assistance recipients in CSS face a 100% implicit marginal tax rate and do not participate in the 'normal' labour market, i.e. they remain in the corner solution; thus, it is almost

meaningless to compare the income effect in both systems. The substitution effect, on the other hand, works in a positive direction or it might be not revealed. If some existing public assistance recipients decide not to participate in the labour market at all, despite the reform from CSS to FBI, they remain in the corner solution as in CSS. However, when existing public assistance recipients decide to participate in the labour market, the positive impact on labour supply is affected in FBI in comparison to that in CSS in terms of substitution effect. Both situations are possible, but only the situation in the latter case is shown in Figure 2 because it is expected that the probability of the latter far surpasses that of the former.

It should be noted here that in the transition from CSS to FBI, the sizes of the opportunity sets for the existing public assistance groups in both B and C are larger. Furthermore, the fact that the budget constraint line in FBI is higher than that in CSS in all ranges below the statutory working hours suggests that in FBI, various transaction and opportunity costs could be maintained and liquidity constraints could be relieved. This implies that there might be a positive impact on the labour supply in terms of income effect in the neighbourhood of minimum consumption level. In the case of A, although the total impact is in the direction of reducing the labour supply, excessive overtime work is also diminished, which should have positive effects on individuals, families and society as a whole. It is also noteworthy that in FBI, all the existing public assistance recipients will enjoy more income (or consumption) than  $C_{min}$  (by definition of FBI). Furthermore, some teenagers and young people in social assistance recipients' households are forced to work part-time to make a living in CSS, but in UBI, they can quit working for living and devote themselves to receiving education and training. This can be evaluated negatively in terms of static labour supply but quite positively in terms of dynamic labour supply and overall socio-economic benefits. Taken together, the total effect of FBI on the labour supply is predicted to be positive in the case of existing public assistance recipients.<sup>15</sup>

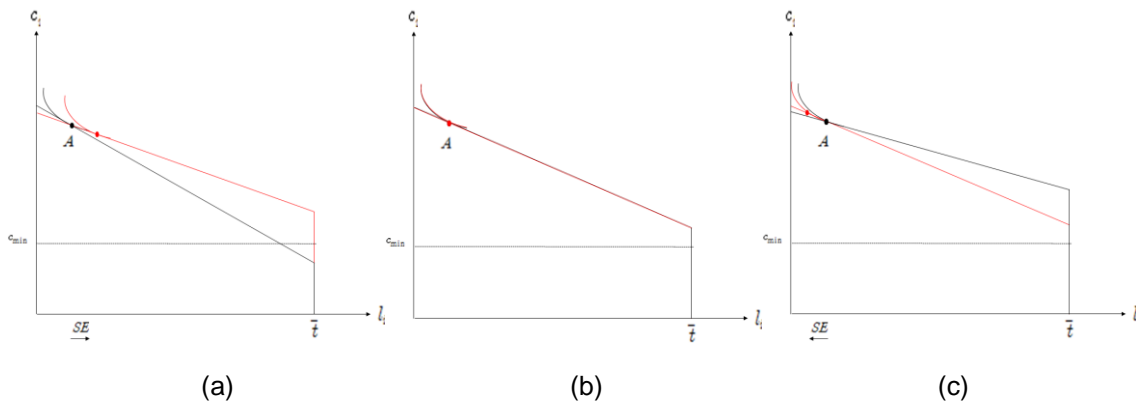
## ② Income groups at break-even points

Income groups at break-even points should be very heterogeneous depending on the ratio of labour income to non-labour income, hours of labour, wage rate, etc. For the sake of simplicity, we will divide these groups into A, B, and C, as above. For simplicity, we assume flat-rate taxation on labour income as previously stated. In all three groups, analysis is performed for three situations: (a) the basic income payment is greater than the non-labour income tax amount for the basic income payment; (b) the basic income payment equals the non-labour income tax amount for the basic income payment; and (c) the basic income payment is less than the non-labour income tax amount for the basic income

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<sup>15</sup> Of course, it is worth noting that the absolute difference in the slopes of budget constraint lines between FBI and CSS relies on specific policies which we can set, i.e. the dependency ratio of labour income taxation in terms of financing FBI in comparison with alternative funding sources. The more we depend on labour income taxation, the flatter the slope of budget constraint line in FBI, which makes FBI less favourable to CSS in terms of labour supply and the substitution effect.

payment.<sup>16</sup>



<Figure 3> Comparison of labour supply effects between CSS and FBI (income groups at break-even points: A)

- Notes: 1) This is elaborated from Gilroy et al. (2013: Figure 7) for A belonging to income groups at break-even points.
- 2) Black indicates CSS, red points FBI.
- 3)  $l_i$ : leisure time,  $\bar{t}$ : exogenously given time,  $c_i$ : consumption,  $c_{\min}$ : minimum consumption level,  $IE$ : income effect,  $SE$ : substitution effect.
- 4) (a) illustrates the case of 'basic income payment > non-labour income tax amount for the basic income payment', (b) expresses the situation of 'basic income payment = non-labour income tax amount for the basic income payment' and (c) indicates the case of 'basic income payment < non-labour income tax amount for the basic income payment'.

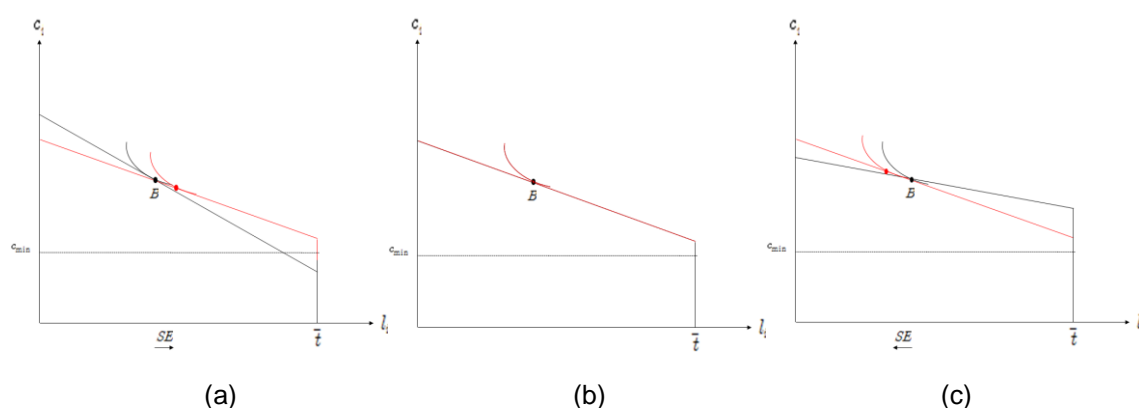
First, we consider the A case (see Figure 3). In all cases of (a), (b) and (c), both budget constraint lines cross at the point since the total income (or consumption) of CSS and FBI must match under the same labour supply. In the case of (a), the impact on the labour supply is zero in terms of income effect, and the impact on the labour supply is negative in FBI compared with CSS in terms of substitution effect; thus, the total effect works in a negative direction. In the case of (b), both the income and substitution effects are equal between CSS and FBI; thus, the overall effect does not work at all. In the case of (c), the income effect is the same in both systems, and the substitution effect works in a positive direction; thus, the entire effect works in a positive direction. In summary, the effects of FBI on the labour supply are different based on the relative size between the basic income payment and the non-labour income tax amount for the basic income payment.

In reality, if the non-labour income is above  $c_{\min}$ , it is predicted that the proportion of (a) would be higher than that of (c) because that it is very unlikely to work for such a long time as the (c) case,

<sup>16</sup> One may wonder if (c) would be feasible during the reform from CSS to FBI since many people at break-even points would pay more labour-income tax in the transition process. However, I believe that the case of (c) would be quite possible when we synthetically consider the effects of individualising the tax and benefit system, transforming the labour income tax system from progressive to flat rate and funding revenues from common resources/goods/wealth and/or taxation from sources other than labour income.

although A has a high propensity to consume. Thus, the total labour supply would be slightly reduced for A. However, it is necessary to allow for excessive overwork in these groups, especially in case of (a), although the total income (or consumption) would be diminished. This diminishment can be beneficial for individuals, families, and society as a whole in terms of reduced overworking time, increased leisure time and improved sharing of domestic and care work. In (a), it is also worth noting that the opportunity set for A in FBI is larger than that in CSS in all ranges of working hours below the current excessive overworking time.

Next, we examine the B case (see Figure 4). In all cases of (a), (b) and (c), both budget constraint lines cross at the point, as in the case of A, since the total income (or consumption) of CSS and FBI must match under the equal labour supply.



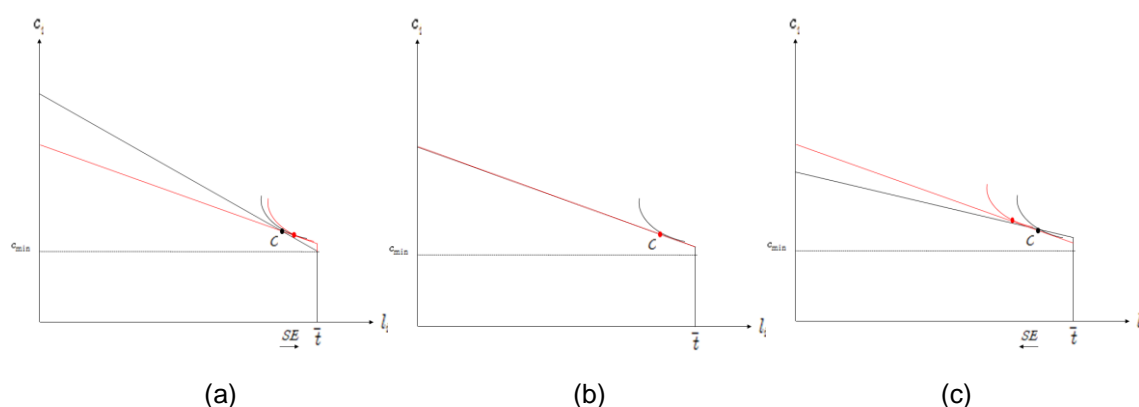
<Figure 4> Comparison of labour supply effects between CSS and FBI (income groups at break-even points: B)

- Notes: 1) This figure is elaborated from Gilroy et al. (2013: Figure 7) for B belonging to income groups at break-even points.  
 2) Black indicates CSS and red points FBI.  
 3)  $l_i$ : leisure time,  $\bar{t}$ : exogenously given time,  $c_i$ : consumption,  $c_{min}$ : minimum consumption level,  $IE$ : income effect,  $SE$ : substitution effect.  
 4) (a) presents the case of 'basic income payment > non-labour income tax amount for the basic income payment', (b) expresses the situation of 'basic income payment = non-labour income tax amount for the basic income payment' and (c) indicates the case of 'basic income payment < non-labour income tax amount for the basic income payment'.

In all cases of (a), (b) and (c), the total income (or consumption) of CSS and FBI must match in the current labour supply. In (a), through the transition from CSS to FBI, the impact on the labour supply is zero in terms of income effect, and the impact on the labour supply is negative in terms of substitution effect; thus, the total effect works in a negative direction. In the case of (b), both the income and substitution effects are the same between CSS and FBI; thus, the overall effect does not work at all. In the case of (c), the income effect is equal in both systems, and the substitution effect works in a positive direction; thus, the entire effect works in a positive direction.

To sum up, the effects of FBI on the labour supply vary according to the relative size between the basic income payment and the non-labour income tax amount for the basic income payment. It is also noteworthy that in (a), the opportunity sets for B in FBI are larger than those in CSS in all ranges below the current working hours.

Finally, we consider the C case (see Figure 5). In all cases of (a), (b) and (c), both budget constraint lines cross at the point, as in the cases of A and B, because the total income (or consumption) of CSS and FBI must match under the same labour supply. In (a), through the reform from CSS to FBI, the impact on the labour supply is zero in terms of income effect, and the impact on the labour supply is negative in terms of the substitution effect; thus, the total effect works in a negative direction. In the case of (b), both the income and substitution effects are equal between CSS and FBI; thus, the overall effect does not work at all. In the case of (c), the income effect is the same in both systems, and the substitution effect works in a positive direction; thus, the entire effect works in a positive direction.



<Figure 5> Comparison of labour supply effects between CSS and FBI (income groups at break-even points: C)

- Notes: 1) This figure is elaborated from Gilroy et al. (2013: Figure 7) for C belonging to income groups at break-even points.  
 2) Black indicates CSS and red points FBI.  
 3)  $l_i$ : leisure time,  $\bar{t}$ : exogenously given time,  $c_i$ : consumption,  $c_{\min}$ : minimum consumption level,  $IE$ : income effect,  $SE$ : substitution effect.  
 4) (a) shows the case of 'basic income payment > non-labour income tax amount for the basic income payment', (b) expresses the situation of 'basic income payment = non-labour income tax amount for the basic income payment' and (c) indicates the case of 'the basic income payment < the non-labour income tax amount for the basic income payment'.

To sum up, the effects of FBI on the labour supply are diverse due to the relative size between the basic income payment and the non-labour income tax amount for the basic income payment. It is also noteworthy that in (c), opportunity sets for C in FBI are larger than those in CSS in all ranges above the current working hours, which are now (very) short compared to A and B. It is also worth noting that in the case of (a), the range in which the labour supply could be reduced is narrow, while in (c), the



range in which the labour supply increases is much wider. In (c), the fact that the budget constraint of FBI is higher than that of CSS in all ranges over the present (very) short hours of labour means various transaction and opportunity costs could be maintained and liquidity constraints could be alleviated in FBI. This implies that there may be a positive impact on the labour supply in terms of income effect in the neighbourhood of minimum consumption level, which cannot be caught in the neoclassical model of labour–leisure choice.

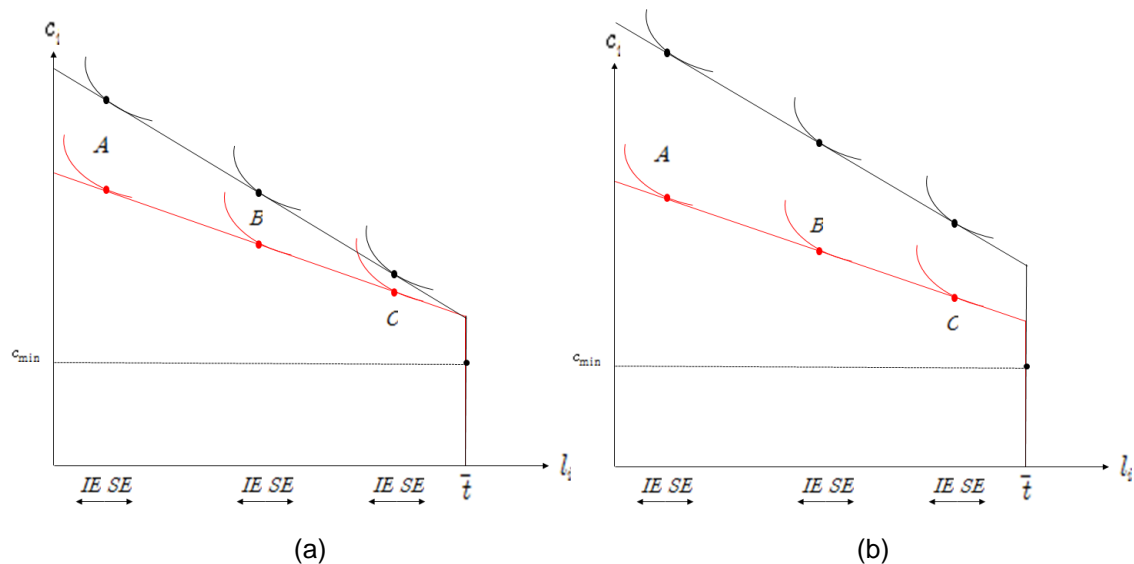
Until now, we investigated nine cases of income groups at break-even points ( $3 \times 3$ ; propensity to consume: A/B/C; relative size of basic income payment and non-labour income tax amount for basic income: (a)/(b)/(c)). In sum, the effects of FBI on the labour supply rely on the relative size of the basic income payment and the non-labour income tax amount for the basic income payment. We find that FBI seems to have outstanding advantages over CSS. First, people can have budget constraints over  $C_{\min}$  for every situation (by definition of FBI). Second, spreading effects, i.e. reducing excessive overworking hours and/or increasing working hours which are now too short, can be expected. Third, the total effects of FBI on the labour supply would be almost insignificant or slightly positive.<sup>17</sup>

### ③ High-income bracket

In most cases, non-labour income is highly likely to be above  $C_{\min}$  among those with high incomes. The relative size of the basic income payment to the non-labour income tax amount for the basic income payment depends on the percentage of the latter to the total funding for basic income. In the case of high-income people, it would be rare for the basic income payment to be above the non-labour income tax amount for the basic income payment. Therefore, we only consider cases of ‘basic income payment = non-labour income tax amount for the basic income payment’ and ‘basic income payment > non-labour income tax amount for the basic income payment’. Here, results in both cases are reported, but the results of the analysis do not change much between two cases. We analyse results with three heterogeneous individuals: A, who has a high propensity to consume; B, who has a mid-level propensity to consume; and C, who has a low propensity to consume. We assume the tax rates on the labour income for the high-income bracket will increase in the case of transformation from CSS to FBI due to financing on the basic income payment. For the sake of simplicity, we also suppose flat-rate taxation on labour income as above.

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<sup>17</sup> Naturally, as in the case of existing public assistance recipients, it is worth noting that the absolute difference in the slopes of budget constraint lines between FBI and CSS depend on specific policies we can set, i.e. the dependency ratio of labour income taxation in terms of financing FBI in comparison to alternative funding sources. The more we rely on labour income taxation, the flatter the slope of the budget constraint line in FBI, which makes FBI less favourable to CSS in terms of labour supply and the substitution effect.



<Figure 6> Comparison of labour supply effects between CSS and FBI (high income bracket)

Notes: 1) This figure is elaborated from Gilroy et al. (2013: Figure 7) for the high income bracket.

2) Black indicates CSS and red points FBI.

3)  $l_i$ : leisure time,  $\bar{l}$ : exogenously given time,  $c_i$ : consumption,  $c_{min}$ : minimum consumption level,  $IE$ : income effect,  $SE$ : substitution effect.

4) (a) illustrates the case of 'the basic income payment = the non-labour income tax amount for basic income payment' and (b) expresses the situation of 'the basic income payment < non-labour income tax amount for basic income payment'.

Figure 6 shows that the direction of income and substitution effects due to reform from CSS to FBI is equal regardless of A, B, C and (a) and (b) among those with high incomes. Because the transition from CSS to FBI would reduce the incomes of high-income people in all working hour ranges, the income effect works in a positive direction, whereas the substitution effect works in a negative direction due to decreased real wages based on increased taxation of labour income in all working hour ranges. Consequently, relying on the relative size of the income and substitution effects, the directions and magnitudes of the total effect on labour supply would vary; thus, it is difficult to predict those of the entire effect theoretically. Regarding this issue, Jeung et al. (2016: 133) anticipated that the labour supply for those with high incomes would be reduced due to increased tax burdens for funding basic incomes, which implies that a substitution effect would surpass an income effect among the high-income bracket.<sup>18</sup> We note that basic income can play a central role similar to an 'insurance system' in both scenarios. On the one hand, if the labour supply among high-income people

<sup>18</sup> As in the case of existing public assistance recipients and income groups of break-even points, it is worth remarking that the absolute difference in the slopes of budget constraint lines between FBI and CSS relies on specific policies which we can set, i.e. the dependency ratio of labour income taxation in terms of financing FBI compared with alternative funding sources. The more we depend on labour income taxation, the flatter the slope of the budget constraint line in FBI, which makes FBI less favourable to CSS in terms of labour supply and the substitution effect.

increased because of basic income, the tax-and-share mechanism built in the basic income system can alleviate or even reduce inequality due to the increased labour supply. On the other hand, if the labour supply among the high-income bracket decreased due to basic income, some newly created or vacant jobs could be available for lower-income groups (Jeung et al., 2016: 133). In addition, it is also noteworthy that in FBI, like any other group, those with high incomes also have budget constraints with which they can enjoy more income (or consumption) than  $C_{\min}$  (by definition of FBI).

## 5. Conclusion

So far, the effects of basic income on the labour supply have been examined via empirical studies focusing on microsimulations and theory-based analyses. In the present situation, in which there is not yet a country in which a basic income system has been implemented at the national level, there are fundamental limitations to investigating the effects of basic income on the labour supply through social experiment-based empirical studies or microsimulation studies. Therefore, the main results of the study are summarised with the theory-based analysis.

First, a transformation from CSS to FBI is anticipated to increase the labour supply of existing public assistance recipients because of the effects of escaping from poverty and unemployment traps and the impact of mitigating factors that restrict labour market participation and preserve transaction and opportunity costs arising from labour market participation.

Second, the impact of reforming from CSS to FBI on the labour supply of income groups at break-even points differs based on the relative size of the basic income payment and the non-labour income tax amount for basic income payment. In addition, income groups at break-even points have budget constraints with which they can enjoy more income (or consumption) than  $C_{\min}$  in every case (by definition of FBI). Furthermore, a reduction in excessive labour time and an increase in the existing very short labour time can be expected. Overall, it seems that FBI is superior to CSS since the total effects would also be almost zero or slightly positive.<sup>19</sup> The prediction, which is that the total effects of FBI on the labour supply of income groups at break-even points would be non-negative, may imply as follows; the results of the analysis, which were derived by estimating the effects of basic income on poverty and inequality while only considering the first-order effects of the tax-and-share system (see e.g. Kang, 2017), would be quite reliable and reasonable.

Third, the impact of a transition from CSS to FBI on the labour supply of those with high incomes is at least theoretically uncertain. Because income effects work in a positive direction and substitution effects work in a negative direction in all working hour ranges, the direction of the total effects on the

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<sup>19</sup> Gray (2017) guesstimates the effects of a modest basic income on labour force participation by dividing various groups based on employment, demographic and socio-economic status and concluded that a basic income in the £70–90 range would increase among low-skilled or low-wage workers, emphasizing the importance of minimum wage legislation and labour market regulations and protections for workers.

labour supply depends on the relative size of the income and substitution effects. In this regard, we highlight that basic income can function as an 'insurance system' under any scenarios.

An additional finding of this study is that FBI has the following distinct advantages over CSS. First, everyone in FBI has a budget constraint that income (or consumption) is more than  $C_{\min}$  (by definition of FBI). Second, existing public assistance recipients are more likely to voluntarily increase the labour supply by escaping poverty and unemployment traps and alleviating or eliminating costs and constraints factors which could hamper their labour market participation. Of course, in FBI, their opportunity sets are larger in general than those in CSS and their living standards are effectively improved. Third, the size of the opportunity set generally increases for everyone below break-even points, and the impact of basic income on their labour supply is minimal or slightly positive. In addition, social utility improvement is expected due to the alleviation or eradication of poverty and inequality and the mitigation or resolution of other social problems. Even if a transformation from CSS to FBI results in a smaller set of opportunities for the high-income bracket in all working hour ranges, the expected beneficial effects suggested above should far exceed any losses experienced by the high-income bracket. Overall, it is also necessary to note that the low-income group has (far) more marginal utility of money than the high-income bracket.

The limitations of the study are as follows. First, this study is not a general analysis but a partial analysis in that it does not consider labour demand, the social economy sector and other macroeconomic effects as a whole when analysing the impact of basic income on the labour supply. Second, this research lacks any consideration of the institutional natures of the labour market and unequal power relations between employers and employees. Third, even though individuals who have different preferences in terms of labour and consumption are introduced, individual preferences are regarded in this paper as exogenously given, and we do not consider endogeneities and possibilities of dynamic changes in the process of preference formations.<sup>20</sup> Fourth, this article does not concretely present magnitudes and percentages of groups of analyses. We expect further research on these issues.

Finally, it is worth stressing that the advantages of FBI become even clearer if we consider the very important advantages that are not explicitly examined in this paper's analysis but that should be further considered, including labour demand, the social economy sector and other macroeconomic effects. Present socio-economic structures and trends clearly show the real challenges and problems we should confront in the future, such as the coexistence of structural and technical unemployment and the working poor, further increased poverty and inequality, the lack of effective demand in lower-

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<sup>20</sup> Ha (2011) is useful for its discussion of exogeneity and endogeneity in the process of preference formation and related research. The present analysis tells us that through the transformation from CSS to FBI, spreading effects, i.e. reducing excessive overworking hours and/or increasing working hours which are now too short, can be expected, once relevant cultural and institutional arrangements in the labour market are properly supported (see Figures 2–5 in the paper).

income people, the manufacturing industry characterised by jobless growth, labour-saving technological progress, low employment inducement coefficients, and the service industry characterised by extreme job and wage polarisations. What we should do from now on is not to take an effort to increase jobs artificially and forcefully but to foster socio-economic structures to live a 'good life' (*Buen Vivir*) without exclusively relying on and emphasising paid work.<sup>21</sup> FBI is a core ingredient in overcoming the structural overabundance of the labour supply in comparison to labour demand, weakening the centrality of the labour market, stimulating the social economy sector and solving ecological and environmental problems much more effectively and efficiently than the status quo.

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<sup>21</sup> Naturally, many scholars still advocate the idea of job guarantees via a state's direct job creation rather than the basic income guarantee. For detailed and elaborated critiques of the idea of job guarantees, see e.g. Lewis (2012), Noguchi (2012), Standing (2012), Standing (2017: 201-203) and Van Parijs and Vanderborght (2017: 46-48).

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