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**Master's Thesis of Public Administration**

**Effects of the Basic Pension on Well-being of  
Low-income Elderly Households**

**- Focused on Households Receiving Public Assistance -**

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Seoul National University  
Global Public Administration Major**

**Lee, Woonho**

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**Academic Advisor Kwon, Huck Ju**

**Submitting a Master's Thesis of Public Administration  
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**Graduate School of Public Administration  
Seoul National University  
Global Public Administration Major**

**Lee, Woonho**

**Confirming the master's thesis written by  
Lee, Woonho**

**December 2021**

Chair	<u>Choi, Tae Hyun</u>	(Seal)
Vice Chair	<u>Kum, Hyun Sub</u>	(Seal)
Examiner	<u>Kwon, Huck Ju</u>	(Seal)

# Abstract

Korea is ageing at an unprecedented rate. Korea is expected to enter a ‘super-aged society’ in 2025, which is 25 years after entering the ‘ageing society’ in 2000. In addition, Korea's elderly poverty rate is the highest among OECD member countries. Nearly half of total elderly population is not protected by public pension schemes. In this regard, the Korean government has to cope with this rapid population ageing along with the high elderly poverty rate.

The Basic Pension Scheme, introduced in 2014, is part of the Korean government's policy efforts to respond to these challenges. This pension benefit is provided to seniors in the bottom 70% of income and asset. The Korean government expects that the Basic Pension will greatly improve the well-being of low-income elderly.

Contrary to the expectations of the Korean government, however, the Basic Pension may not contribute to improving the living standards of the elderly, especially the low-income seniors receiving public assistance. This is because there is a possibility that the receipt of the Basic Pension may crowd-out other existing income such as public transfer income, earned income, and private transfer income.

In this regard, the purpose of this study is to empirically find out whether the Basic Pension introduced in 2014 actually contributed to the improvement of living standards of low-income seniors receiving public assistance. To this end, using the 2013 and 2015 data of the Korea Welfare Panel Study, a difference in difference regression analysis was conducted.

According to the multiple regression analysis results, despite the introduction of the Basic Pension, the gross income of the elderly households receiving public assistance did not increase statistically significantly. This is because the receipt of the Basic Pension reduced other public transfer income, such

as National Basic Livelihood Security benefits. Meanwhile, crowd-out effects of Basic Pension on earned income and private transfer income was not observed.

This result suggests that, contrary to the Korean government's expectations, not only the top 30% seniors based on their income and asset, but also the bottom 30% seniors receiving public assistance may not be able to benefit from the Basic Pension. This is because the Basic Pension benefit and the National Basic Livelihood Security benefit are in a state of institutional conflict.

Individual welfare schemes should harmonize with each other in order to protect the elderly comprehensively in a rapid population ageing. The Basic Pension and the National Basic Livelihood Security Schemes are two important pillars to ensure income stability of the low-income elderly, but their operational conflict is acting as a factor that weakens the protection of the state for low-income seniors.

**Keywords:** Population Ageing, Elderly Poverty, Elderly Income, Basic Pension Scheme, National Basic Livelihood Security Scheme, Difference in Difference Analysis

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# 1. Introduction

## 1.1. Backgrounds

The international index for understanding the level of population ageing is the share of the population aged 65 or over (Rouzet et al., 2019). As of 2020, it is 15.7% in South Korea, which is lower than that of other OECD member countries, such as Japan's 27.7%, Germany's 21.2%, Sweden's 19.8%, France's 19.2%, and the UK's 18.2%.

However, South Korea is ageing at the fastest rate among OECD member countries. It entered the 'ageing society' in 2000<sup>1</sup>, but it is expected to enter the 'super-aged society' in 2025. It is only 25 years since it became ageing society (Statistics Korea, 2019). This is an unprecedented speed compared to other OECD member countries, which took nearly 100 years from the ageing society to the super-aged society.

Table 1: Period Taken to Super-aged Society from Ageing Society

(Unit: Years)

France	Sweden	UK*	Germany	Japan	<b>Korea*</b>
154	124	96	77	36	<b>25</b>

\* Korea and the UK are calculated as the expected year of entry into the super-aged society.

\* Source: Calculated from OECD statistics

As such, the elderly population in South Korea is expected to increase

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<sup>1</sup> UN classifies the stages of population ageing based on the share of the population aged 65 or over. When it exceeds 7%, it is called "ageing society", when it exceeds 14%, "aged society", and when it exceeds 20%, "super-aged society".

rapidly, but their economic circumstances are not very robust. The relative poverty rate among senior citizens in South Korea stood at 43.8 percent in 2017, the highest among OECD member countries (OECD, 2019). This means that more than 40 percent of elderly households earn less than 50 percent of median income of total households.

Table 2: Relative Poverty Rate of People Aged 65 or Above

(Unit: percent)

France	Sweden	UK	Japan	US	<b>Korea</b>
3.4	11.3	15.3	19.6	23.1	<b>43.8</b>

\* Source: OECD, Pensions at a Glance 2019

The problem is that Korea's public pension scheme, which is the key element for income support scheme for the elderly, does not cope with these challenges. The National Pension Scheme in Korea (NP) has a short history after introduction. Seniors have reached the age of 60 without paying enough premiums due to its short history. As a result, they could receive only small amount of benefit proportional to their small contribution (Lim, 2017). Furthermore, only those with income were able to sign up at the time of introduction, which result in wide loophole mainly among the low-income elderly. As of 2018, about 50% of the total elderly population are not beneficiaries of public pension including NP (Ministry of Health and Welfare , 2020).

In this regard, the Korean government had no choice but to introduce a new welfare scheme to support low-income elderly (Lee, 2019). New scheme is called Basic Old-age Pension (BOP) which was introduced in 2008. This is to protect the low-income elderly who are not protected by NP. Unlike NP which is based on the contribution of subscribers, this scheme is a kind of public assistance that financed with taxes. With the introduction of BOP, senior citizens aged 65 or older at the bottom 70% based on their income and asset can receive this benefit.

However, its small amount of benefit was controversial. As of 2008, the maximum monthly amount was KRW 100,000, which was only 26.3% of the minimum cost of living (KRW 463,000) for a single-person household at the time. In response to this problem, the Korean government has decided to increase benefit amount gradually. As a result, in 2014, the existing BOP scheme was substituted by a Basic Pension scheme (BP), and the maximum benefit was raised to KRW 200,000 per month. Since then, the benefit has been continuously increased. the elderly can receive up to KRW 300,000 per month as of 2021. (Ministry of Health and Welfare , 2020). As of 2019, the number of recipients of the Basic Pension reached 5.35 million and the total budget reached 1.47 trillion won. Now, the Basic Pension scheme has been established as Korea's representative income support scheme for the elderly.

## **1.2. The Purpose of Research**

The Korean government expects that BP will alleviate the elderly poverty because its target group is wide enough to cover bottom 70% of elderly population.

Contrary to its expectation, however, BP may not have significant impact on livelihood of the low-income elderly. This is because BP may crowd out other existing income such as public transfer income, earned income and private transfer income.

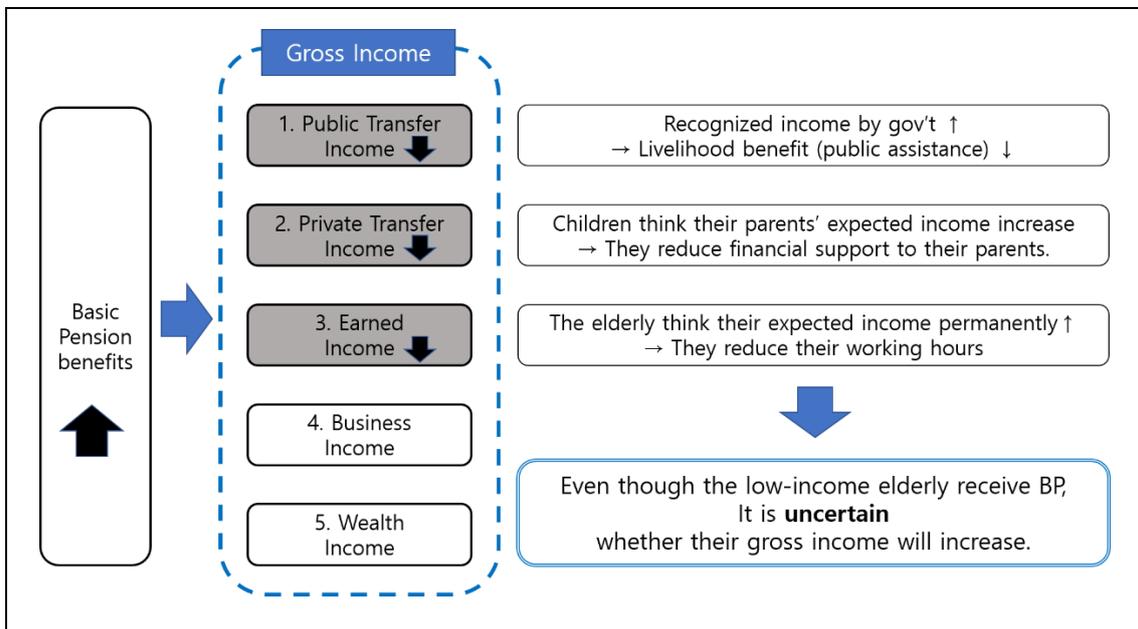
First, BP may reduce other welfare benefits. For example, public assistance benefit is negatively associated with recipient's income level. BP may increase elderly's income level recognized by government, which result in decrease in public assistance benefits. (Lee et al., 2016).

Second, BP may reduce financial support from grown-up children (Antonji et al., 1996; Chun & Park, 2011, Kim, 2008). It can ease the burden on grown-up children to support their parents. Children might expect that their parents can make a living without their assistance.

Third, BP can reduce the work incentive of the elderly (Boskin, 1977; Gruber, 2002; Hur & Park, 2019; Sung and Lee, 2018). Seniors may think that they can keep their current income level even if they reduce working hours after introduction of BP.

These can be called as crowd-out effects of BP on other existing incomes. It can be summarized as the figure below.

Figure 1: The Expected Crowd-out Effect of Basic Pension on Incomes



In this regard, the purpose of this study is to find out whether BP has improved the living standards of low-income elderly households. To examine this, this study will compare the elderly income (public transfer income, earned income and private transfer income) before and after introduction of BP.

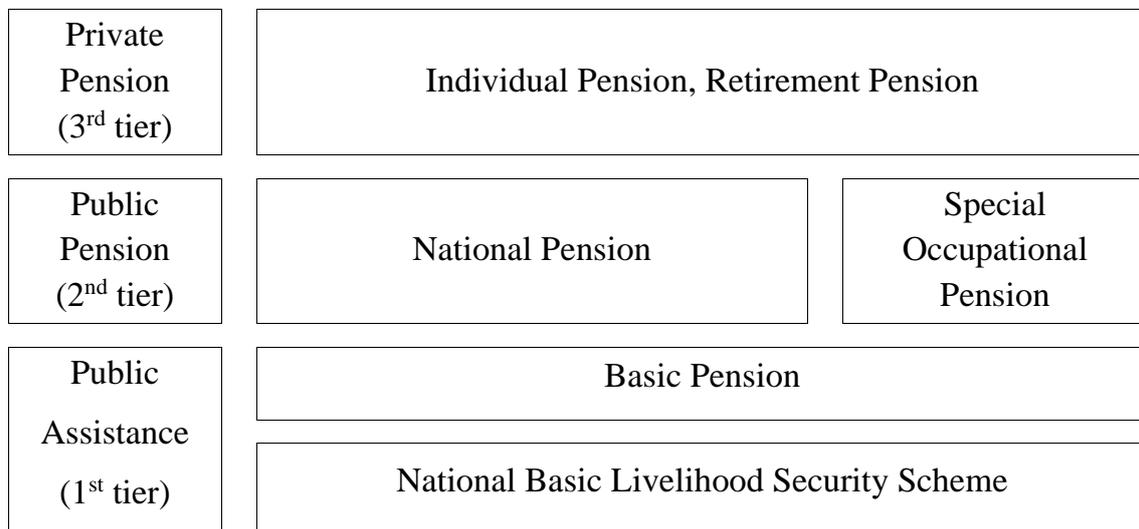
Based on this result, this study will derive policy implications for building better income support scheme for the low-income elderly in Korea.

## 2. Institutional Background

### 2.1. Overview of Income Support Scheme for the Elderly in Korea

The income support scheme for the elderly in Korea consists of three tiers: (1) public assistance, (2) public pension and (3) private pension (Lim, 2017). This scheme is summarized as following figure.

Figure 2: Old-age Income Support Scheme in Korea



\* Lim (2017)

First, the National Basic Livelihood Security (NBLs) and the Basic Pension Scheme (BP) consist of 1<sup>st</sup> tier. These are public assistance programs that is financed with taxes. NBLs was designed to protect the poor of all generations, but it has a significant role for the elderly because Korea has a high elderly poverty rate. On the other hand, BP was introduced only for the elderly. The bottom 70% of the elderly in terms of income and asset are eligible for it.

Second, the public pension scheme is located in 2<sup>nd</sup> tier. It is operated by public entities. It provides benefits based on subscriber's contribution. This

includes the National Pension (NP) which is universal program and the Special Occupational Pension (SOP) which only certain occupational workers subscribe to.

Third, the private pension scheme is located in 3<sup>rd</sup> tier. Private pension can compensate for the financial shortfall of public pension benefits, but the subscription rate in Korea is not very high (Kim, 2020). The retirement pension scheme is private pension operated by company. The company accumulates retirement benefits for employees in the financial company, and the employees can receive a benefit from the financial company when they reach the retirement age. In 2018, companies with retirement pension account for only 27.3% of total workplaces (Kim, 2020). Meanwhile, the individual pension scheme is a private pension provided by financial company. Subscription is entirely based on individual choice. As of 2020, The proportion of individual pension subscribers among the working-age population is low at 15.7% (Kim, 2020).

## **2.2. Public Pension Scheme**

### *2.2.1. The National Pension Scheme*

The public pension scheme in Korea consists of the National Pension (NP) and the Special Occupational Pension (SOP).

First, NP is universal pension scheme in Korea. People between the ages of 18 and 60 with income are forced to join NP (Lim, 2017). The benefits are divided into three categories: (1) the old-age benefit which is for those reached 65 or above, (2) the disability benefit which is for disabled subscriber, and (3) the survivor's benefit which is for other family member when the subscriber dies.

The age at which subscribers start to receive the old-age benefit depends on the year of birth. For example, those born after 1968 can receive their old-age

pension benefit from their age of 65. Initially, the government designed the scheme so that subscribers could receive the old-age pension when they reached the age of 60. However, as financial burden increased more than expected, the age was adjusted in 1998 in consideration of the birth year of the subscriber. The age at which the old-age pension is provided is shown in the table below.

Table 3: The Starting Age of Receiving Old-age Pension Benefit

Birth Year	The Starting Age
1952 and before	60
1953-1956	61
1957-1960	62
1961-1964	63
1965-1968	64
1969 and after	65

\* Source: Lim (2017)

The benefit amount is proportional to the subscription period and insurance premiums paid. The income replacement rate of NP is 42.1% as of 2020 (Ministry of Health and Welfare, 2020). This means that if someone has paid insurance fee for a total of 40 years, he can receive 42.1% of his average income during the entire subscription. The government initially designed the income replacement rate at 60%, but decided to lower it to 40% until 2028 to alleviate fiscal burden (Lim, 2017).

As of 2018, the number of NP subscribers was 22.3 million. This includes about 80.0% of the total economically active population in Korea (Ministry of Health and Welfare, 2020). It is expected to play a significant role as a universal public pension program in the future.

However, at the present time, NP is showing limitations in alleviating the elderly poverty. Since NP, which was launched in 1998, targeted those under the

age of 60 at the time of its introduction, many senior citizens above 60 were unable to join. In addition, the amount of benefit is also relatively small because subscription period before retirement was not long enough due to its short history (Lim, 2017).

The table below shows the number of NP recipients aged 65 or over and its proportion relative to total elderly population. As of 2004, only 11.0% of the elderly received benefit, but as of 2018, it increased to 41.6%. However, more than 50% of the elderly population is still in the blind spot of the NP scheme. The wide blind spots of NP centered on the elderly clearly show the limitations of NP.

Table 4: Number of National Pension Recipients Relative to the Aged 65+

Year	Number of Recipients	Proportion Relative to the Aged 65+
2004	458,419	11.0
2005	600,421	13.7
2006	751,897	16.4
2007	944,651	19.6
2008	1,103,007	22.0
2009	1,268,935	24.4
2010	1,428,414	26.7
2011	1,605,959	28.3
2012	1,835,624	31.2
2013	2,067,085	33.7
2014	2,238,805	34.3
2015	2,433,884	35.9
2016	2,620,621	37.5
2017	2,889,222	39.3
2018	3,186,380	41.6

\* Source: Ministry of Health and Welfare (2020)

### 2.2.2. *The Special Occupational Pension Scheme*

Second, SOP is a scheme that subscription is limited to specific

occupational groups. This is for civil servants, military personnel, and private school teachers. This was introduced to help the subscribers stabilize their livelihoods when they retire or die. The insurance premium is jointly paid by the state (as an employer) and the individual (as an employee) (Lim, 2017).

The number of SOP recipients relative to the total elderly population is shown in the table below. Since this scheme is for a specific occupational group, its proportion is not that high when compared to the total elderly population. As of 2018, the number of Public Employee Pension recipients was 506,000, which is accounting for 3.9% of the total elderly population. The number of Private School Pension recipients was 76,000, which is accounting for 0.5% of the total elderly population.

Table 5: Number of SOP Recipients relative to the aged 65+

Year	Public Employee Pension		Private School Pension	
	Number	Relative to aged 65+	Number	Relative to aged 65+
2004	195,310	2.0	20,017	0.2
2005	218,006	2.1	22,204	0.2
2006	236,274	2.3	24,706	0.3
2007	255,565	2.5	27,816	0.3
2008	279,766	2.6	31,324	0.4
2009	293,096	2.8	34,136	0.4
2010	311,429	2.9	37,381	0.4
2011	326,509	3.0	40,576	0.4
2012	348,493	3.2	44,357	0.4
2013	366,482	3.4	48,407	0.5
2014	395,630	3.4	53,040	0.5
2015	426,068	3.5	59,059	0.5
2016	452,942	3.6	63,782	0.6
2017	480,096	3.8	69,218	0.6
2018	506,550	3.9	75,914	0.5

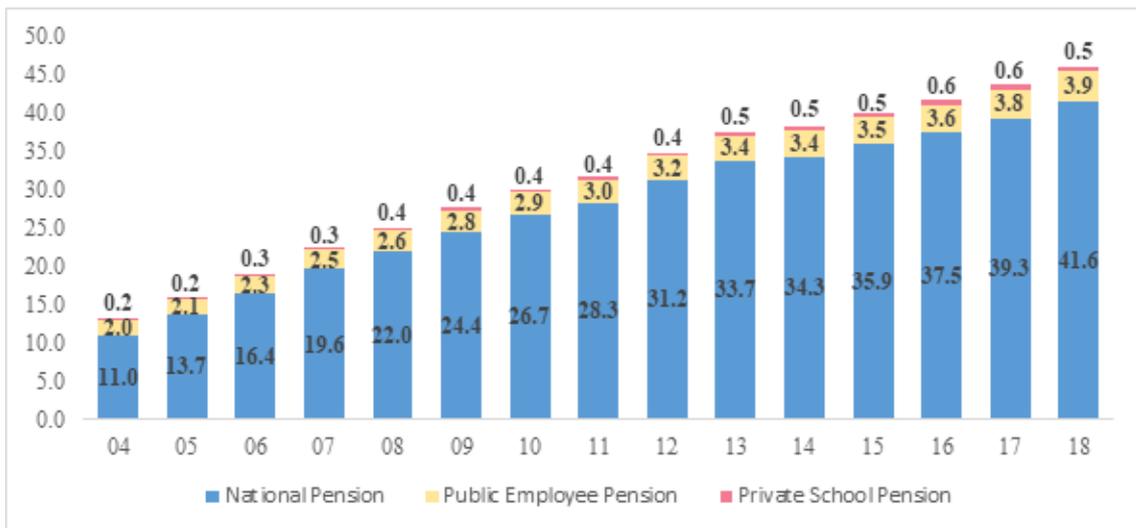
\* Source: Ministry of Health and Welfare (2020)

### 2.2.3. The Coverage of Public Pension Scheme

In order to understand the role of public pensions for the elderly in Korea, it is necessary to look at the number of recipients relative to total elderly population.

Below tables shows the number of recipients relative to total elderly population. As of 2018, the total number of public pension recipients was 3.5 million, which is about 46.1% of the total elderly population (Ministry of Health and Welfare, 2020). Although this figure has been steadily rising, more than half of the total elderly population is still in the blind spot of public pension scheme as of 2018.

Figure 3: Proportion of Public Pension Recipients to Total Elderly Population



\* Source: Ministry of Health and Welfare (2020)

## 2.3. Public Assistance Scheme

### 2.3.1. Basic Old-age Pension Scheme

The Basic Old-age Pension (BOP) scheme was introduced in 2008 to

provide stable income to the elderly aged 65 or over who did not join NP. It is called a pension, but can be understood as a de facto public assistance in that it is financed through taxes rather than contributions from subscribers (Lim, 2017).

Its target is not universal but relatively wide. In principal, about bottom 70% of the elderly in terms of income and asset was eligible for BOP. Eligibility is determined by considering the income and asset of the elderly. To be specific, if the elderly's recognized income is below the threshold income set by the government, he or she could receive the benefit. The government has set the income threshold so that the benefit can be provided to the bottom 70% of total elderly population. For example, the threshold in 2014 was KRW 870,000 for an elderly single-person household, KRW 1,392,000 for couple households. The table below shows the threshold income of BOP by year.

Table 6: Monthly Threshold for Receiving Basic Old-age Pension Benefit

(Unit: KRW 1,000)

Period	Single Households	Couple Households
2008	400	640
2009	680	1,088
2010	700	1,120
2011	740	1,184
2012	780	1,248
2013	830	1,328
2014	870	1,392

\* Source: Ministry of Health and Welfare (2020)

The amount of benefit varies according to the household type (single or couple households). As of June 2014, single elderly households were able to receive up to KRW 100,000 a month and couple elderly households could receive up to KRW 160,000 (Lim, 2017). The table below shows the maximum monthly amount of benefit from 2008 to 2014.

Table 7: Monthly Maximum Amount of Basic Old-age Pension Benefit  
(Unit: KRW 1,000)

Period	Single Households	Couple Households	
		1 recipient	2 recipients
07.2008-03.2009	84	84	134
04.2009-03.2010	88	88	141
04.2010-03.2011	90	90	144
04.2011-03.2012	91	91	146
04.2012-03.2013	95	95	151
04.2013-03.2014	97	97	155
04.2014-06.2014	100	100	160

\* Source: Ministry of Health and Welfare (2020)

However, criticism has been continuously raised about insufficient amount of benefit. The average monthly benefit per recipient was KRW 94,000 in 2014. It was only 16.3% of the minimum cost of living (KRW 600,000) for the single person household at the time (Lim, 2017). It is difficult for the elderly who do not receive the National Pension benefit to make a living with only the Basic Old-age Pension benefit. Reflecting these points, the Korean government replaced the Basic Old-age Pension with new scheme called the Basic Pension Scheme in 2014.

### 2.3.2. Basic Pension Scheme

In July 2014, the Basic Pension Scheme (BP) was introduced to replace the existing BOP. This was because BOP was insufficient to alleviate the high elderly poverty rate. The new scheme, as in the previous one, was provided to 70% of total elderly population considering their income and asset, but its benefit amount doubled than that of BOP.

In order to be eligible for BP, recognized income must be smaller than the income threshold amount set by the government. Recognized income is the sum of

the (1) evaluated monthly income and (2) the amount of asset converted into monthly income (Ministry of Health and Welfare, 2020).

The evaluated income is not a simple sum of all type of household income. In order to provide work incentive, the Korean government deducts a certain percentage of earned income when calculating evaluated income amount. As of 2019, the income evaluation amount is determined by the following formula

Figure 4: Formula for Calculating Evaluated Income Amount

$$\text{Evaluated Income} = 0.7 \times (\text{Earned Income} - \text{KRW } 940,000) + \text{Other Income}$$

\* Source: Ministry of Health and Welfare (2020)

Meanwhile, in order to calculate amount of asset converted into monthly income, Asset is categorized into general asset and financial asset. Each type of asset is converted into income after deducting a certain amount. The deduction for general asset varies by region<sup>2</sup>, and the deduction for financial assets is KRW 20 million. As of 2019, the asset is converted by the following formula (Ministry of Health and Welfare, 2020).

Figure 5: Formula for Calculating Asset Amount converted into Monthly Income

$$\begin{aligned} \text{The Amount of Asset Converted to Income} \\ = 0.04 \times [(\text{General Asset} - \text{Deductible Amount}) \\ + (\text{Financial Asset} - \text{KRW } 20,000,000) - \text{Debt}] \end{aligned}$$

\* Source: Ministry of Health and Welfare (2020)

The government has set the monthly income threshold so that the benefit

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<sup>2</sup> Deductions for general Asset are KRW 135 million in large cities, KRW 85 million in small and medium-sized cities, and KRW 72.5 million won in rural areas.

can be provided to the bottom 70% of total elderly households. For example, the monthly income threshold for single elderly household is KRW 1,370,000 and KRW 2,192,000 for couple households in 2019. If the recognized income is less than threshold amount, the household can receive the benefit. The table below shows the monthly income threshold for receiving BP by year.

Table 8: Monthly Income Threshold for Receiving BP

(Unit: KRW 1,000)

Year	Single Households	Couple Households
2014	870	1,392
2015	930	1,488
2016	1,000	1,600
2017	1,190	1,904
2018	1,310	2,096
2019	1,370	2,192

\* Source: Ministry of Health and Welfare (2020)

However, contrary to the government's aim of providing benefit to 70% of the total elderly population, the proportion who receiving the benefit does not reach 70% every year<sup>3</sup>. The proportion of elderly who receives the BP by year is as table below.

Table 9: Number of Basic Pension Recipients relative to the aged 65+

Year	N of 65+ (A)	N of Recipients (B)	B/A (%)
2008	5,069,273	2,897,649	57.2
2009	5,267,708	3,630,147	68.9
2010	5,506,352	3,727,940	67.7

<sup>3</sup> The Korean government cites the reasons for this 1) unconfirmed address, 2) receipt of Special Occupational Pension, and 3) non-applying for disclosure of their assets and income

Year	N of 65+ (A)	N of Recipients (B)	B/A (%)
2011	5,700,972	3,818,186	67.0
2012	5,980,060	3,933,095	65.8
2013	6,250,986	4,065,672	65.0
2014	6,520,607	4,353,482	66.8
2015	6,771,214	4,495,183	66.4
2016	6,995,652	4,581,406	65.6
2017	7,345,820	4,839,722	66.3
2018	7,638,574	5,094,713	67.1
2019	8,013,661	5,345,728	66.7

\* Source: Ministry of Health and Welfare (2020)

The maximum monthly amount of benefit for BP was KRW 200,000 in 2014. This is twice that of the previous Basic Old-age Pension. Since then, the benefit has increased continuously, and reached to KRW 300,000 in 2019. This KRW 300,000 is equivalent to about 29.2% of the minimum cost (KRW 1,026,000) of living for single-person households in 2019. The table below shows the maximum monthly amount of benefit by year.

Table 10: Monthly Maximum Amount of Basic Pension Benefit

(Unit: KRW 1000)

Period	Single Households	Couple Households	
		1 recipient	2 recipients
07.2014-03.2015	200	200	160
04.2015-03.2016	203	203	162
04.2016-03.2017	204	204	163
04.2017-03.2018	206	206	165
04.2018-08.2018	210	210	168

Period	Single Households	Couple Households	
		1 recipient	2 recipients
09.2018-03.2019	250	250	200
04.2019-03.2020 (Bottom 20%)	254 (300)	254 (300)	203 (240)

\* Source: Ministry of Health and Welfare (2020)

### 2.3.3. National Basic Livelihood Security Scheme

NBLS is a public assistance designed to protect the low-income households from the risk of poverty, and has been in force since 2000. Recipients of NBLS are classified as the poorest in Korean society. As of 2019, the number of recipients was about 18.8 million, accounting for about 3.6% of the total population in Korea (Ministry of Health and Welfare, 2020).

Unlike the BP, this scheme is not only for elderly households but for all generations. However, due to the high poverty rate of elderly, it serves as the most important income support scheme for the elderly. As of 2019, 35.3% of the total NBLS recipients are aged 65 or over. As the table below shows, the population aged 65 and over accounts for the largest proportion among the recipients of NBLS benefits .

Table 11: Recipients of the National Basic Livelihood Security Scheme in 2019

Age	0-5	6-11	12-19	20-39	40-64	65+	Total
N of recipients	31	101	223	179	625	631	1,792
Ratio to total recipients(%)	1.8	5.7	12.4	10.0	34.9	35.3	100.0
Ratio to those in that age(%)	1.4	3.6	5.5	1.3	3.0	7.9	100.0

\* Source: Ministry of Health and Welfare (2020)

The benefit is divided into seven categories. Among them, livelihood benefit, medical benefit, housing benefit, and education benefit are the ones with

the largest number of recipients and the largest amount of benefit provided<sup>4</sup>. A brief explanation of each benefit is as follows.

First, livelihood benefit is cash aids to support living expenses for low-income households. Recipients are provided in cash equal to the difference between the minimum livelihood cost set by government and the household's recognized income. Second, medical benefit is for covering medical expenses that low-income households paid. Third, the housing benefit is for supporting the rental cost or housing maintenance cost that low-income households paid. Fourth, education benefit is for subsidizing the admission fee, tuition, and school supplies for low-income household students (Ministry of Health and Welfare, 2020).

At the time of its introduction, all kind of benefits were integrated and provided for households with income below the minimum cost of living. In other words, the recipients either received all kinds of benefits or none (all or nothing scheme) (Lim, 2017).

However, since 2015, the Korean government changed this integrated scheme into separate scheme in order to provide a customized benefit tailored to each household (Lim, 2017). Now the government applies different criterion for each benefit. As a result, the number of recipients varied according to the type of benefit. The table below shows the number of recipients of each benefit as of 2019.

**Table 12: Number of Each NBLS Benefits in 2019**

	Livelihood	Medical	Housing	Educational	Total
N of Recipients	1,232,325	1,397,631	1,681,041	292,773	1,881,357*

\* The total number of recipients and households are values by removing the number of duplicates

\*\* Source: Ministry of Health and Welfare (2020)

<sup>4</sup> Except for these benefits, NBLS benefits include childbirth benefits to support childbirth expenses, funeral benefits to support funeral expenses, and work-incentive benefits to support work activities of beneficiaries.

In order to be eligible for NBLS benefits, it is necessary to satisfy both criteria for recognized income and obligatory provider.

First, satisfying the criterion for recognized income means that the amount of household income calculated considering their income and asset must be less than the threshold amount set by the government. The threshold amount varies depending on the type of benefit and the number of household members. It is strict in the order of livelihood benefit, medical benefit, housing benefit, and education benefit. The monthly income threshold for 2019 is shown in the table below.

Table 13: Income Threshold for Receiving Benefits in 2019

(Unit: KRW 1,000)

Household Members	Livelihood Benefits (30% of Median income)	Medical Benefits (40% of Median income)	Housing Benefits (44% of Median income)	Educational Benefits (50% of Median income)
1	512	683	751	853
2	872	1,163	1,279	1,453
3	1,128	1,504	1,654	1,880
4	1,384	1,845	2,030	2,307
5	1,640	2,187	2,405	2,734
6	1,896	2,528	2,781	3,160
7	2,152	2,870	3,157	3,587

\* Source: Ministry of Health and Welfare (2020)

Next, the criterion of obligatory provider means that the recipient of the NBLS must not have parents or children who can support him or her financially. If the obligatory provider does not have financial capacity, the scheme considers that the recipient does not have obligatory provider.

This criterion is based on the philosophy that the responsibility of protecting the poor is primarily placed on their own families and that the state

provides assistance only when protection within the family is not possible (Lim, 2017).

However, social consciousness regarding the support from children towards their parents continues to change. In addition, the risk of poverty among the low-income elderly who cannot receive this benefit due to this criterion continued to increase (Lim, 2017). As a result, the Korean government decided to loosen this condition gradually. As of 2019, this criterion is not applied to housing and education benefits, and will not be applied to livelihood benefit in 2022 (Ministry of Health and Welfare, 2020)

#### *2.3.4. Comparison of Income Threshold for Eligibility Between Basic Pension and National Basic Livelihood Security Scheme*

As discussed so far, the Basic Pension and the National Basic Livelihood Security Scheme are functioning as important public assistance programs for low-income elderly households in Korea. Both schemes have in common that they are provided in a selective rather than universal manner. Then, which one requires the stricter condition for eligibility? Below, this study compare the income threshold for eligibility of the two schemes.

First, a comparison was made in terms of scope of asset and income to decide the eligibility. Two schemes are similar in that they determine the eligibility in consideration of household income and asset, but the scope of income and asset considered is different. In the case of BP, only the income and asset of the elderly person and his/her spouse are considered. On the contrary, NBLs consider not only income and asset of the elderly and his/her spouse but also that of all household members living together. Therefore, in terms of the scope of income and assets, NBLs apply more stringent condition than the Basic Pension.

Table 14: The Scope of Income and Asset Considered for Deciding Eligibility

Basic Pension Scheme	National Basic Livelihood Scheme
The elderly and his/her spouse	All household members (Including the elderly and his/her spouse)

\* Source: Ministry of Health and Welfare (2020)

Next, the two schemes also have different ways to decide the income threshold for eligibility. First, BP considers income distribution of elderly households to include the bottom 70% of total elderly population for its target. On the other hand, NBLS consider income distribution of all generation households to decide the beneficiary. To be specific, NBLS set 30-50% of the median income of total households as the threshold amount.

Table 15: The Method for Deciding Income Threshold for Eligibility

	Basic Pension Scheme	NBLS Scheme
Income Distribution	Elderly households	All generation households (Including elderly households)
Criterion	Bottom 70% based on income & asset	30-50% of Median income

\* Source: Ministry of Health and Welfare (2020)

As the way to decide the income threshold is different between two schemes, it is difficult to make a uniform judgment which scheme requires more strict condition. However, it is expected that NBLS requires stricter condition than BP empirically.

As can be seen table below, the monthly income threshold of BP for a couple households was KRW 2,192,000 in 2019. On the other hand, that of NBLS for a two-person household was KRW 872,000 for livelihood benefit, KRW 1,163,000 for medical benefit, KRW 1,279,000 for housing benefit, KRW

1,453,000 for educational benefit. All of them are below than KRW 2,192,000, which is income threshold of BP.

Table 16: Income Threshold for Receiving Benefits in 2019

(Unit: KRW 1,000)

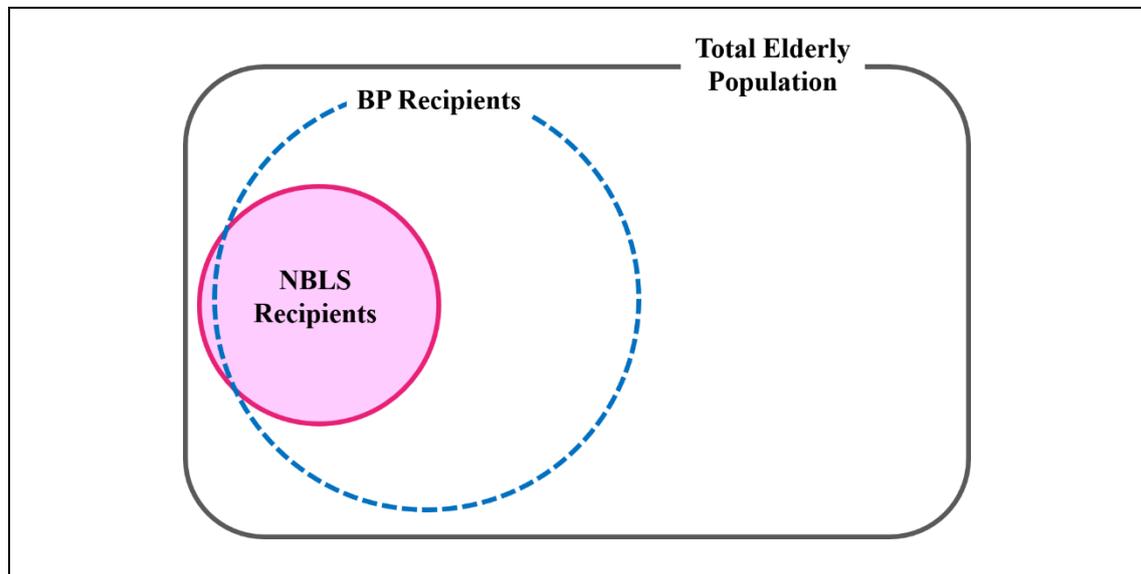
National Basic Livelihood Security*				Basic Pension**
Livelihood	Medical	Housing	Educational	
872	1,163	1,279	1,453	2,192

\* Based on two-person households / \*\* Based on couple households

\* Source: Ministry of Health and Welfare (2020)

In summary, NBLS considers wider scope of income and asset than BP and set stricter threshold amount than BP in order to decide eligibility. Therefore, As can be seen figure below, it can be expected that most of the elderly households receiving the NBLS benefit will meet the eligibility for receiving BP benefit.

Figure 6: Comparison of Recipients between NBLS and BP



\* Source: Author

### 3. Theoretical Review of the Literature

#### 3.1. Theoretical Perspectives

As explained earlier, the Basic Pension introduced in 2014 is expected to affect the (1) public transfer income, (2) private transfer income, and (3) earned income of the elderly. The following theoretical views are introduced in this regard.

##### *3.1.1. Impact of BP on Public Transfer Income*

###### 3.1.1.1. Impact on the Livelihood Benefit

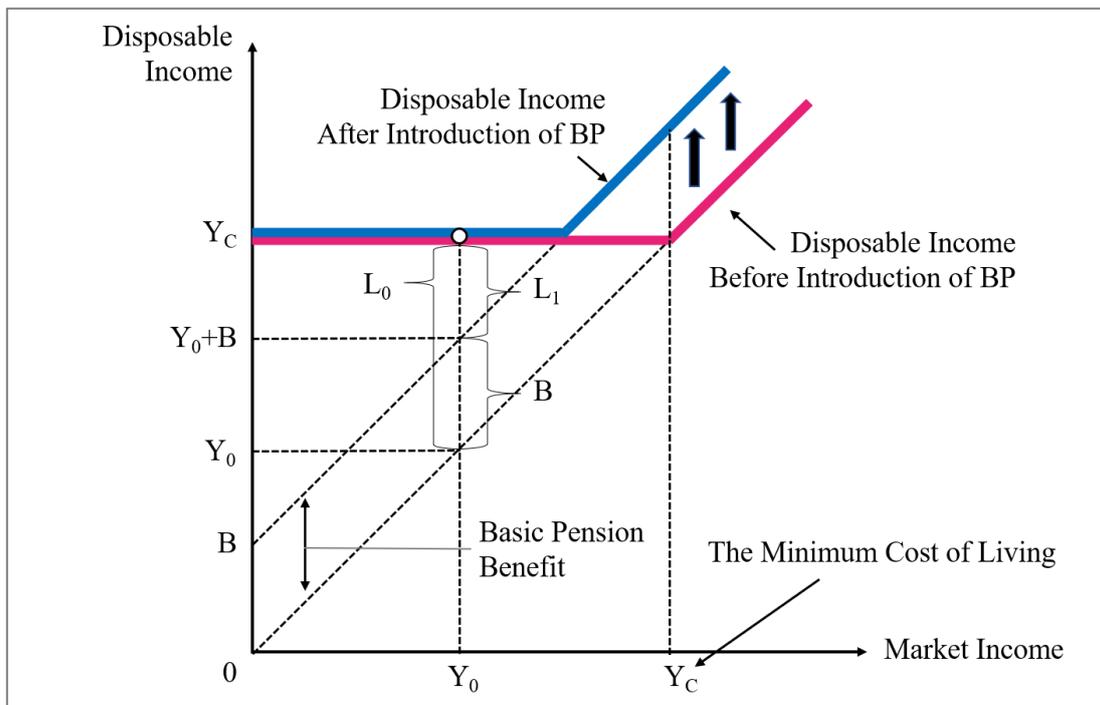
The receipt of BP can reduce other existing public benefit such as NBLs. This effect may vary depending on the type of benefit the elderly received (Lee et al, 2016).

First, in the case of households receiving livelihood benefits, BP can reduce existing livelihood benefit. The livelihood benefit amount is provided as much as the difference between the recognized income and minimum cost of living set by government (Ministry of Health and Welfare<sup>1</sup>, 2020). If recognized income increases due to the BP benefits, the amount of the livelihood benefit will decrease at the same time (Lee et al., 2016).

This can be understood by figure below. The market income of households eligible for livelihood benefit is less than  $Y_C$  (the minimum cost of living). Before introduction of BP, A household with a market income of  $Y_0$  receives  $L_0$  as a livelihood benefit and has a disposable income equal to  $Y_C (= Y_0 + L_0)$ . After introduction of BP, the household can receive  $B$  for BP. However, recognized income by government also increases to  $Y_0 + B$  from  $Y_0$ , which results in decrease in livelihood benefit from  $L_0$  to  $L_1$ , which is equal to  $L_0 - B$ . In summary, the

household's disposable income ( $Y_C = Y_0 + L_0$ ) does not change regardless of before and after the introduction of BP

Figure 7: Relation Between Basic Pension and Livelihood Benefit

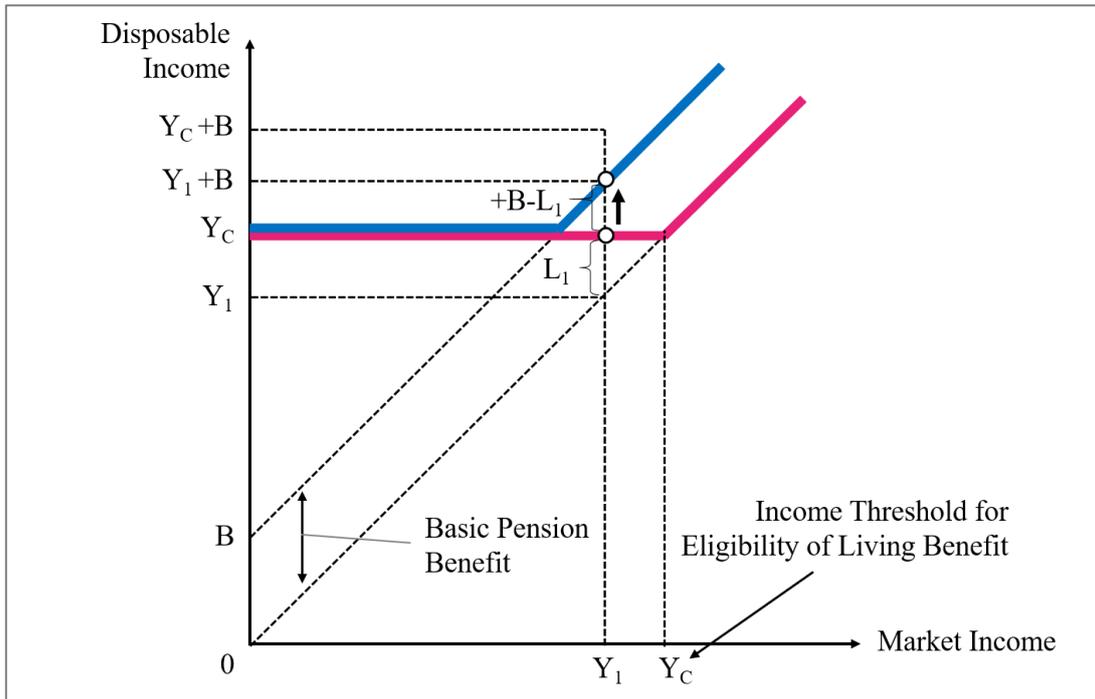


\* Source: Author

Meanwhile, for households whose market income is slightly less than the minimum cost of living, BP can increase their disposable income. However, they have no choice but to lose eligibility for the livelihood benefit. In this case, income increase effect of BP is partially offset by a decrease in the livelihood benefit.

This can be explained by figure below. Before introduction of BP, A household with a market income of  $Y_1$  receives the Livelihood benefit of  $L_1$  and has a disposable income of  $Y_C$ . After introduction of BP, he receives BP benefit of  $B$  and his disposable income increases to  $Y_1+B$  from  $Y_C$ . In this case, however, he is no longer eligible for the livelihood benefit because his recognized income ( $Y_1+B$ ) is above  $Y_C$ . His livelihood benefit became zero from  $L_1$ . He receives  $B$  as BP benefit, but his actual increase in disposable income is just  $B-L_1$  not  $B$ .

Figure 8: Relation Between Basic Pension and Livelihood Benefit



\* Source: Author

In summary, BP does not affect the disposable income of low-income elderly households receiving the livelihood benefit, or even if it does, the increase in income can be partially offset by a decrease in the livelihood benefit<sup>5</sup>.

### 3.1.1.2. Impact on Other NBLS Benefits

In the case of households receiving medical benefit, housing benefits, and Education benefit, however, the amount of these benefits does not decrease even if they receive BP benefit. This is because the amount of these benefits is determined without considering the households' recognized income as long as households meets the eligibility of individual benefit. For example, the amount of

<sup>5</sup> Households with market incomes above the minimum cost of living ( $Y_c$ ) can experience an increase in disposable income as much as BP benefit. However, this case is excluded from the theoretical discussion as they are not low-income households receiving the livelihood benefit.

medical benefit is determined only according to the level of medical service use, and housing benefit is determined according to the size of the rental fee paid by the household. Therefore, even if the elderly receives the BP, the amount of medical benefit, housing benefits and education benefit will not decrease as long as the eligibility for individual benefits are still met.

#### 3.1.1.3. Other Impacts on NBLs Benefits

As discussed above, in the case of households whose recognized income is close to income threshold of NBLs benefits, receipt of BP disqualifies them from NBLs benefits. This is because the recognized income after receiving BP may exceed income threshold for NBLs eligibility. This household has an incentive not to apply for BP to maintain his eligibility for NBLs even after the introduction of BP. In this case, even if the Basic Pension scheme is introduced, there is no change in their public transfer income due to not applying for this benefit.

#### 3.1.1.4. Summary

First, several low-income households may lose their eligibility for NBLs benefits due to receipt of the Basic Pension. There is an incentive for them not to apply for BP. In case of these households, their public transfer income will not change even after introduction of BP.

Second, in the case of households receiving only livelihood benefits, the living benefits is reduced by receipt of BP. Therefore, increase in disposable income through BP will be totally or partially offset by decrease in the livelihood benefit.

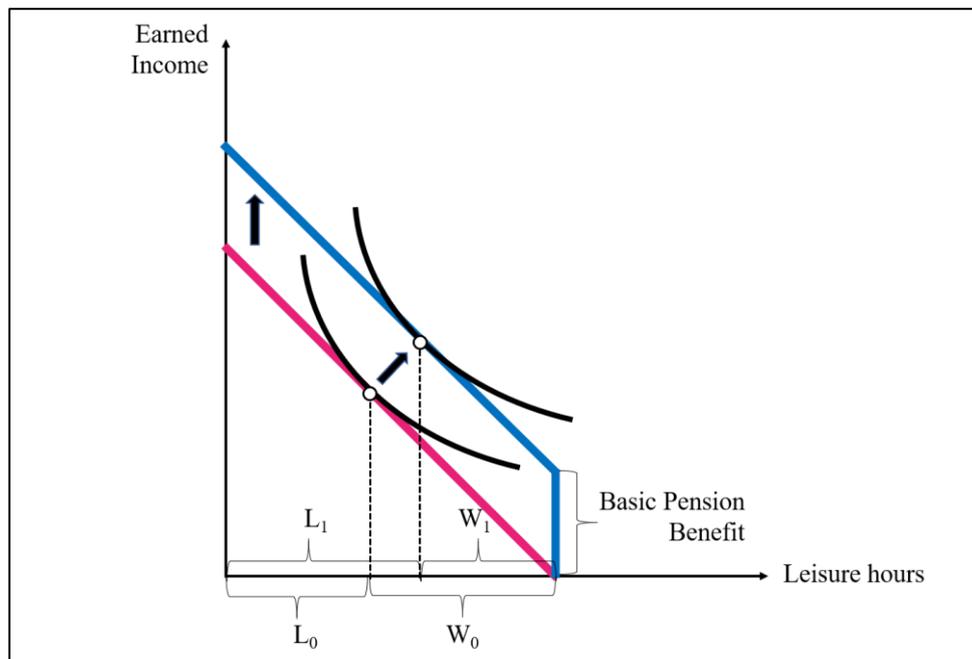
Third, in the case of households receiving other benefits such as housing, medical, and education benefits, their public transfer income will increase by the amount of BP. This is because these benefits do not decrease even if they receive BP.

### 3.1.2. Impact of BP on Earned Income

According to the 'Income and Leisure model', Individuals allocate their time to labor and leisure consumption. Individuals will choose optimal combination of income and leisure consumption to maximize their utility. Meanwhile, the working hours are automatically decided according to his decision about leisure consumption. To be specific, his working hours is determined by subtracting his leisure time from his total available time (Sung & Lee, 2018; Hur & Park, 2019).

Under this model, it is expected that the introduction of BP has the negative effect on working hours. This can be understood as following figure. Before the introduction of BP, this individual spends  $L_0$  for leisure and  $W_0$  for work. When BP is introduced, the person's budget line expands to the blue line from red line. His leisure consumption, which is normal good, increases from  $L_0$  to  $L_1$ . As a result, working hours are reduced from  $W_0$  to  $W_1$ .

Figure 9: Effects of Basic Pension Benefits on Working Hours



\* Source: Author

Furthermore, the introduction of BP can affect not only working hours but also the timing of retirement. The introduction of new social benefit program affects his lifetime income. He expects his lifetime income to increase thanks to newly introduced benefit. The elderly may decide early retirement not reducing working hours.

Most studies analyzing the relationship between the social security benefits and the retirement period of the elderly have suggested that introduction of new welfare scheme such as the public pension induce early retirement.

Boskin (1977), which analyzed Panel Study of Income Dynamics data in US from 1968 to 1972, found that the economic participation rate of the elderly aged 55 or over is continuously falling. He cited the expansion of social security benefits is the most significant factor for this.

Also, according to Quinn (1977) who analyze the Retirement History Survey data in US, the receipt of public pensions reduced labor market participation by about 17.5 percentage points for men and unmarried women aged 55-63.

Meanwhile, there is a study that pension reform promotes economic activity of the elderly. Börsch-Supan & Coile (2021) analyzed the relationship between the generosity of the social security scheme and the employment rate of the elderly in 12 countries including the UK from 1980 to 2016. According to them, reforms that reduce the generosity of social security benefits over the past few decades have contributed to higher employment rates among the elderly.

### *3.1.3. Impact of BP on Private Transfer Income*

The Intergenerational Transfer of Resources Model is developed for explaining the movement of resources within family. There are two kinds of approaches (Altonji et al., 1996).

The first is Altruism theory. The utilities of children are influenced by utilities of their parents. Thus, relatively wealthy grown-up children transfer their

income or assets for their relatively poor parents without receiving anything in return. This transfer alleviates inequality within family members (Becker, 1974). Under this theory, the introduction of BP can reduce grown-up children's incentive to transfer of their income to parents. This is because BP increases the income of their parents, which narrow the inequality between children and their parents.

The second is Exchange theory. The transfer of resources between parents and children is based on transaction in which services and money are exchanged (Cox, 1987). For example, Koh (2013) analyzed transfer of resources between women and their adult children using the Korean Longitudinal Survey Data of Woman and Families. She found that woman who has grandchildren is more likely to receive resources from children. She cited that this can be understood as the return of providing care for their grandchildren. Under this perspective, the introduction of BP does not affect the financial support from their children because it is only affected by services they provide to their children.

## **3.2. Review of Previous Studies**

As discussed above, the effect of the introduction of BP on the income differs depending on each theoretical perspective. This implies that this research question must be examined through empirical studies.

In this regard, this study reviews previous empirical studies related to the effect of BP on elderly income. Previous studies related to effects of BP can be divided into three categories, which are on (1) gross income, (2) earned income, and (3) private transfer income.

### *3.2.1. Impact of BP on Gross Income*

Looking at the empirical studies analyzing the effect of BP on gross income, the results are divided into two categories. The first is that BP increased

gross income of the elderly households and the other is that BP did not create a statistically significant change.

Under the study (Lee et al, 2016) that compared the gross income of the elderly households before the introduction of BP (April-June 2014) and after (July-December 2014) through a difference in difference analysis using the Monthly Household Trend Survey Data, gross income of recipient households increased by KRW 96,000 monthly.

Lee (2015) analyzed income growth rate of elderly households by income decile using a Quarterly Household Trend Survey Data. According to the results, gross income of households in the 1st, 2nd, and 3rd income quintiles increased by 10-20% in 2015 compared to the same quarter of the previous year which was right before introduction of BP.

Lee & Moon (2014) constructed a treatment and control group using the Korea Welfare Panel Study Data using the propensity score matching method. They verified the effect of BP on the income of the elderly household through a simulation. As a result, it was found that the monthly income of the treatment group receiving BP was KRW 96,700 higher than that of the control group.

On the other hand, there is also a study result showing that BP did not have a significant effect on gross income. Park & Kim (2015) analyzed the effect of BP on income through regression discontinuity analysis with the Korea Welfare Panel Survey Data. According to them, there was no statistically significant change in gross income who received the BP around the age of 65, which is the starting age of receiving benefit.

### *3.2.2. Impact of BP on Earned Income*

Sung (2018) analyzed the effect of BP on the labor supply of the elderly with the National Retirement Security Panel Survey Data using the propensity score matching method. According to him, the treatment group receiving BP benefit had lower earned income than the control group, but this difference was

not statistically significant.

Hur & Park (2019) analyzed the effect of BP on the earned income of elderly households through a difference in difference analysis using the Household Trend Survey Data. They found that there was no statistically significant difference in the treatment and the control group in terms of its size and share relative to total income.

On the other hand, Kang & Kim (2014) analyzed the effects of public pensions on the work incentives of the elderly. They showed that receiving public pensions benefits increases the early retirement incentives of middle-aged and elderly people. However, this effect appears only when the size of benefit is above a certain level. This suggests that if the size of BP is not large enough, it may not have a statistically significant effect on the labor supply of the elderly.

### *3.2.3. Impact on Private Transfer Income*

Kim (2008) analyzed the relationship between public transfer income and private transfer income using the Korea Labor Panel Data. According to this study, public transfer income and private transfer income showed a clear negative correlation. The receipt of public assistance such as the NBS showed an almost 100% substitution relationship with the amount of private transfer income. In other words, an increase of KRW 10,000 in the amount of public assistance is accompanied by a decrease of same amount of income received from their children.

On the other hand, there are studies that show that the effect of public transfer income on private transfer income changes over time. Chun et al. (2011) analyzed using Household Trend Survey Data from 1990 to 2010. As a result, the elasticity of private transfer income to public transfer income was negative until the mid-1990s. However, after 2004, the value became positive.

Lee et al. (2016) estimated the effect of BP on private transfer income from July 2014 when BP was introduced. According to him, the private transfer income of elderly households did not decrease even after the introduction of BP.

Meanwhile, according to Yi (2018) who analyzed the relationship between public transfer income and private transfer income through Financial Panel Data, the effect may vary depending on the type of household. According to him, the crowd-out effect of public transfer income on private transfer income exists only for elderly single households.

### **3.3. Critical Summary of Review**

The precedent empirical studies provide a number of implications for understanding the effect of BP, but have several limitations at the same time.

First, most precedent empirical studies do not focus on institutional trade-off relation between BP and other public benefit such as NBLs. Most of them only focused on analyzing impact of BP on gross income or private transfer income. They overlooked that each benefits constituting public transfer income may change due to introduction of BP.

Second, most studies do not focus on low-income households. Most of them analyzed whole elderly households including low-, middle- and high- income households. However, the crowd-out effect of BP on other public transfer benefits can be examined properly by focusing on low-income households. This is because low-income households have a high share of public transfer income relative to their gross income.

Third, a number of precedent studies (Chun et al, 2013; Hur & Park, 2019; Lee, 2015; Lee et al, 2016; Seok, 2010; Tak, 2016) analyze Household Trend Survey data, but this data has a limitation in that its sample composition changes<sup>6</sup>. This data has the advantage of providing monthly and quarterly data, but also has

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<sup>6</sup> On the other hand, there are studies (Lee & Kwon, 2016; Lee & Moon, 2014; Lim, 2016; Nam, 2018; Park & Kim, 2015) using the Korean Welfare Panel Data, but there is a limitation in that these studies did not focus on low-income elderly households.

the disadvantage of changing its sample by one-third every year. Using this data, change in the sample composition may affect the results.

In this regard, this study will analyze the effect of BP by supplementing the limitations of previous empirical studies. First, this study will focus on low-income elderly households receiving public assistance benefit as the research target. Second, this study will analyze the effect of BP on each benefit constituting public transfer income. Lastly, this study will utilize panel study data (Korean Welfare Panel Study) to control the change in sample composition.

## 4. Research Design

### 4.1. Research Hypotheses

In this study, a total of five hypotheses will be tested.

The first and second hypotheses are related to examining the crowd-out effect of BP on other public transfer income. As discussed earlier, NBLS benefits and BP benefits are in a state of institutional conflict. If the elderly receives BP, his or her Livelihood benefit would decrease due to increase in their recognized income. In this regard, the following hypothesis can be established.

***Hypothesis 1. Receipt of the Basic pension reduced the Livelihood benefit of the elderly receiving NBLS benefits.***

If existing Livelihood benefit decreases, the elderly's total public transfer income may not increase despite receiving BP. This because the income increase effect of BP can be offset by decrease in existing Livelihood benefit. In this regard, the following hypothesis can be established.

***Hypothesis 2. Receipt of the Basic pension did not increase the total public transfer income of the elderly receiving NBLS benefits.***

The third hypothesis is associated with examining the crowd-out effect of BP on earned income. If the elderly expects their income to increase due BP, they can reduce working hours or may decide early retirement. In this regard, the following hypothesis can be established.

***Hypothesis 3. Receipt of the Basic pension reduced the earned income of the elderly receiving NBLS benefits.***

The fourth hypothesis is related to the dependence of the elderly on their

adult children. As explained earlier, the receipt of BP may reduce the financial support of adult children to their parents. In this respect, the following hypothesis can be constructed.

***Hypothesis 4. Receipt of the Basic pension reduced private transfer income of the elderly receiving NBLs benefits.***

The last hypothesis is related to the effect of BP on the gross income of elderly households. If the receipt of BP reduces other existing public transfer income, earned income and private transfer income, the total income of the elderly household may not increase even if they receive BP. In this respect, the following hypothesis can be established.

***Hypothesis 5. Receipt of the Basic pension did not increase the gross income of the elderly receiving NBLs benefits.***

## **4.2 Data**

This study utilizes Korea Welfare Panel Study Data. This is a longitudinal survey data that has been collected by Seoul National University and Korean Institute for Health and Social Affairs since 2006.

This panel data has about 7,000 household samples each year. This includes numerous information about households such as general characteristics, gross income, economic activities, benefits of public and private pensions, and financial and housing status.

This is appropriate for this study because it extracts 50% of the sample from low-income households which enable this study to analyze large number of households receiving NBLs. Also, this provides detailed information of various benefits which consist of public transfer income such as amount of BP and NBLs benefit for each household.

Since this study compares before and after the introduction of BP, data from the 9th survey conducted in June 2014 and the 11th survey conducted in June 2016 will be analyzed. The 9th survey contains information about the 2013 year, and the 11th survey contains information about the 2015 year.

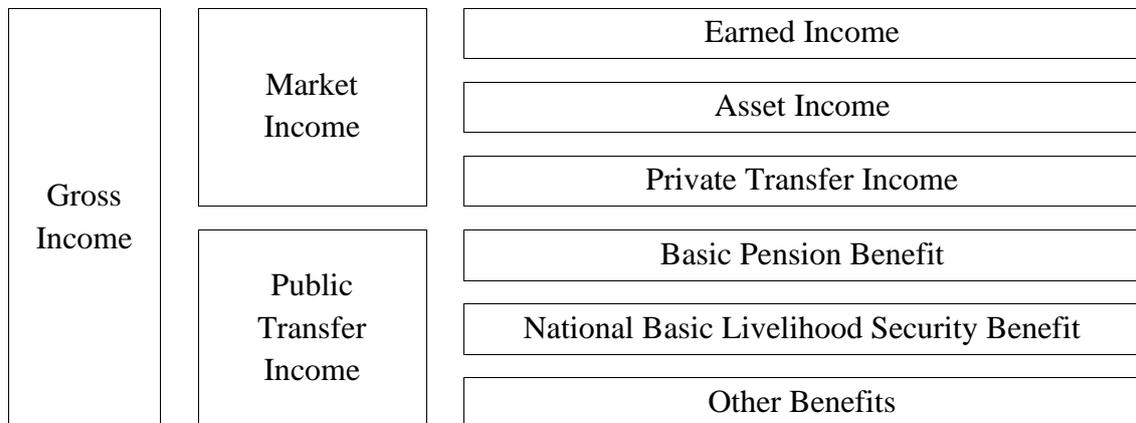
### 4.3. Variables

#### 4.3.1. Dependent Variables

The dependent variable is the average monthly income of households. The amount may vary according to the number of household members. Thus, the amount of income will be calculated in terms of equivalent income on a per person basis ( $1/\sqrt{n}$ ).

Meanwhile, gross income is composed of several sub-incomes as shown in the table below. If the analysis is performed only at the level of gross income, it is difficult to examine the changes in individual sub-incomes constituting gross income. Therefore, in this study, various incomes constituting gross income are also included in the dependent variable.

Figure 10: Composition of Gross Income



### 4.3.2. Independent Variables

Independent variable is whether the Basic Pension is introduced. This can be operationalized using three dummy variables: (1) Time, (2) Group, and (3) Time  $\times$  Group.

The time dummy is 0 in 2013 which was before introduction of BP, or 1 in 2015 which was after BP. The group dummy is 0 if the households belong to the control group, or 1 if they belong to treatment group. The ‘Time  $\times$  Group’ dummy is the interaction between Time and Group. This variable is defined as the product of the time and the group. This is summarized as table below.

Table 17: Independent Variables

Independent Variables	Value
Time	1: in 2015, 0: in 2013
Group	1: Treatment Group, 0: Control Group
Time $\times$ Group	The product of Time and Group value

### 4.3.3. Control Variables.

The control variables are classified into five categories: (1) household head characteristics, (2) family characteristics, (3) economic status, (4) residential area and (5) residential type. The operational definitions for each control variables are as follows.

#### 4.3.3.1. Household Head Characteristics

The household head has a great influence on the economic decision-making of that household (Lee et al., 2016). Variables used as control variables in this study are the household head's gender, final education, health condition and working status.

First, the gender has a great influence on household income. There is a gender gap in wage and sizes of public transfer income. In this study, the gender is converted into a dummy variable and used for analysis. To be specific, 1 is assigned if the head is male, and 0 if the head is female.

Second, the final education would have a significant impact on household income. The higher the education level, the higher the earned income can be expected. In this study, final education of household head is converted into a dummy variable for analysis. To be specific, 1 was assigned if the household head's final education is above high school graduation, and 0 was assigned otherwise.

Third, the health status of household head is important. It can have a significant impact on the household's earned income and public transfer income. This is because the head is generally in charge of earning income in household. In this study, the health status is converted into a dummy variable. Specifically, 1 was assigned if the head is healthy, and 0 otherwise.

Finally, the working status of head is considered. Whether or not the head works have a significant impact on household's earned income. Also, public transfer income, which is negatively associated with earned income can be affected by it. In this study, the working status of the head is converted into a dummy variable. Specifically, 1 is assigned if the head is an employee, and 0 otherwise.

#### 4.3.3.2. Family Characteristics

Family characteristics are closely related to household income (Lee et al., 2016; Sung & Lee, 2018). In this study, the number of family members, having disabled members or not, having children under aged 7 or not, and living with children or not were included as control variables.

First, the number of family members is included. In general, the larger family size implies the greater household income. In this study, the number of family members was reflected as a variable.

Second, whether having disabled members is considered. Having disabled

members increases public transfer income. Also, it is negatively associated with earned income. This is because the disabled may not participate in work and his carers may not have enough time to work due to caring disabled members. In this study, having the disabled or not is included as a dummy variable. 1 was assigned to having disabled member, and 0 was assigned otherwise.

Third, having children under aged 7 or not is considered. There are several welfare benefits for children under 7 years old, such as child allowance. Families with children receive more public transfer income from the state than those without them. In this study, having children under aged 7 or not is reflected as a dummy variable. 1 was assigned if there were children aged under 7, and 0 otherwise.

Fourth, whether living with children is considered. If the elderly lives with a child who participates in economic activities, the gross income is expected to increase. In this study, living with children is reflected as a dummy variable. 1 is assigned to the case of living with children, and 0 otherwise.

#### 4.3.3.3. Economic Status

A household's economic status could affect the size of household income (Lee et al., 2016; Sung and Lee, 2018). The control variables included in this study are the size of assets and debts.

First, asset size has a close influence on market income and public transfer income. As the size of assets increases, the size of asset income is expected to increase. On the contrary public transfer income, which is negatively associated with the volume of asset, is expected to decrease.

Second, the size of the debt is also important. If the size of the debt is large, the size of public transfer income is expected to increase. This is because most of benefit schemes determine the benefit amount utilizing net asset size excluding debt from asset.

#### 4.3.3.4. Residential Area

Residential area has significant impact on gross income (Lee et al., 2016; Sung & Lee, 2018). The amount of public transfer income provided by local governments may vary depending on the region, and there is a difference in wage according to the region.

In this study, a total of two dummy variables are used to reflect the residential area as a control variable. For the first dummy variable, 1 is assigned to households living in metropolitan areas, and 0 otherwise. For the second dummy variable, 1 was assigned to households living in small and medium-sized cities, and 0 was assigned otherwise. In case of living in rural area, both the first and second dummy variables are zero.

#### 4.3.3.5. Housing Occupational Type

Home ownership are closely related with household income (Lee et al., 2016). In general, it is predicted that households with home ownership will have higher income than those without it. Also, households with home ownership have lower possibility for receiving public transfer benefit than others without ownership.

In this study, a dummy variable was used to reflect the housing occupational type as a control variable. A dummy variable was assigned a value of 1 for households with home ownership they live in, and 0 otherwise.

The table below summarizes the control variables and their operational definitions discussed so far.

Table 18: Control Variables

Variables		Operational Definition
Householder	Gender	1: Male, 0: Female
	Final education	1: Above high school, 0: The rest
	Health Condition	1: Healthy, 0: The rest
	Working Status	1: Worker, 0: The rest
Family	Size	The number of household member
	Having the disabled	1: Having, 0: Not
	Having child (aged 7-)	1: Having, 0: Not
	Living with children	1: Living with children, 0: Not
Economic Status	Asset	Money value of Asset
	Debt	Money value of Debt
Residential Area	Metropolitan city	1: Living in metropolitan city, 0: Not
	Small City	1: Living in small city, 0: Not
Housing occupational type		1: Home ownership, 0: Not

#### 4.4. Research Objectives: Treatment and Control Group

The objectives are households receiving NBLIS benefits. The treatment groups are households whose oldest member has a birth year between 1941 and 1950. This group is eligible for BP benefit in 2015 because their oldest member is aged 65 or above in 2015.

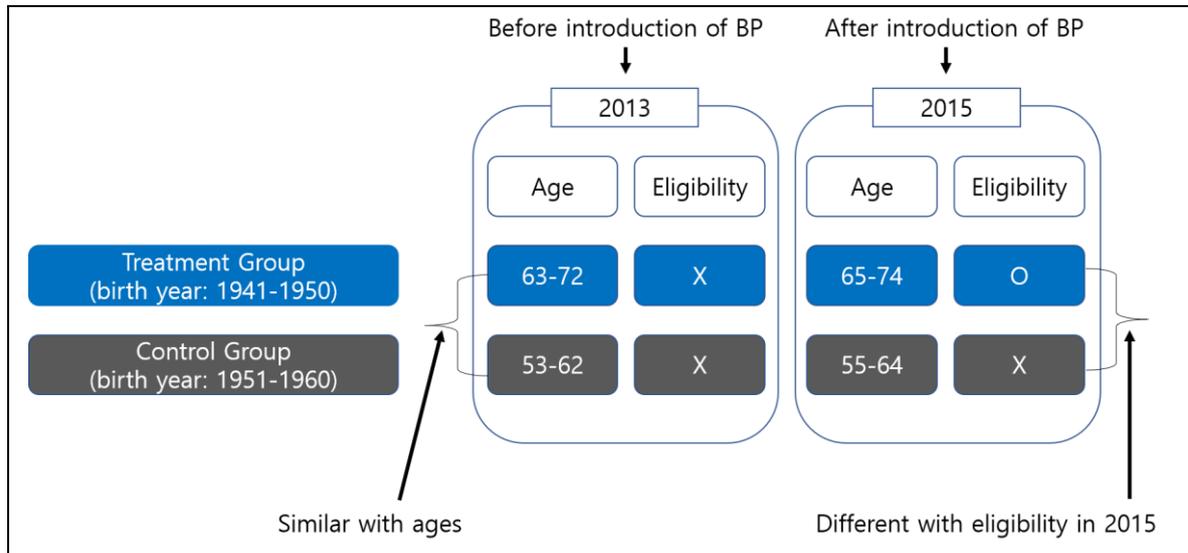
Next, the control group was composed of households whose birth year of the oldest household member was between 1951 and 1960.

Table 19: Definition of Treatment and Control groups

Group	Definition
Treatment	Households whose oldest person was born from 1941 to 1950
Control	Households whose oldest person was born from 1951 to 1960

The Treatment and the Control group were composed so that there was no big difference<sup>7</sup> between both groups in terms of age. However, there was a significant difference between both groups in terms of eligibility of BP in 2015. Unlike the treatment group, the control group is not eligible for BP in 2015 as they did not reach to 65 in 2015. Using this criterion, 205 elderly households were selected for the treatment group and 157 households were selected for the control group. This can be summarized as figure below.

Figure 10: Characteristics of Treatment and Control Group



<sup>7</sup> This study differentiated the age of the treatment and the control group in order to make a difference in eligibility for Basic Pension in 2015. However, the age difference between the two groups can make a difference in the health and economic activity status of the elderly, which can affect the income size of elderly households. In this regard, multiple regression analysis was used to control the age difference between two groups.

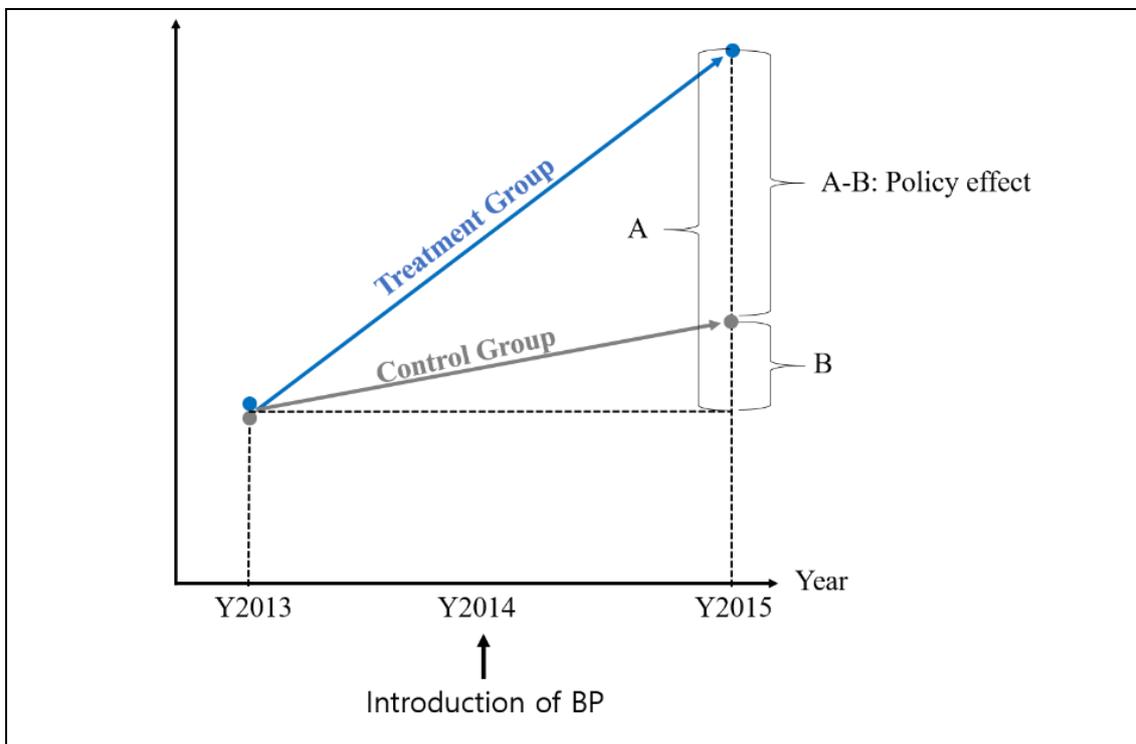
## 4.5. Research Method

### 4.5.1. Simple Difference-in-Difference Analysis

First, this study will conduct a simple difference in difference analysis comparing the income changes of the treatment and the control group before and after the introduction of BP.

In the figure below, 'A' is the difference in income between before and after introduction of BP in treatment group, but it should not be understood as policy effect because the control group also change during that time. 'B', which is the difference in income during the time in control group, should be also considered together. In other words, 'A-B', the difference in difference between two groups should be understood as a real policy effect.

Figure 11: Simple Difference-in-Difference Analysis



#### 4.5.2. Multivariate Difference-in-Difference Regression Analysis

Simple DID analysis has a limitation in that it cannot control variables that affect the dependent variable except for independent variable (Son & Lee, 2018). Therefore, this study conducts multiple regression analysis to control various variables. The regression model can be summarized as an equation as follows.

Table 20: Equation in Regression Model

$$I(h, t) = \alpha + \beta_1 \cdot Time + \beta_2 \cdot Group + \beta_3(Time \times Group) + \beta_4 \cdot Ctrls + \varepsilon$$

- $I(h, t)$  : Monthly Income of Household  $h$  for period  $t$
- $Time$  : 1 for Y2015, 0 for Y2013
- $Group$  : 1 for Treatment group, 0 for Control group
- $Ctrls$  : Control variables

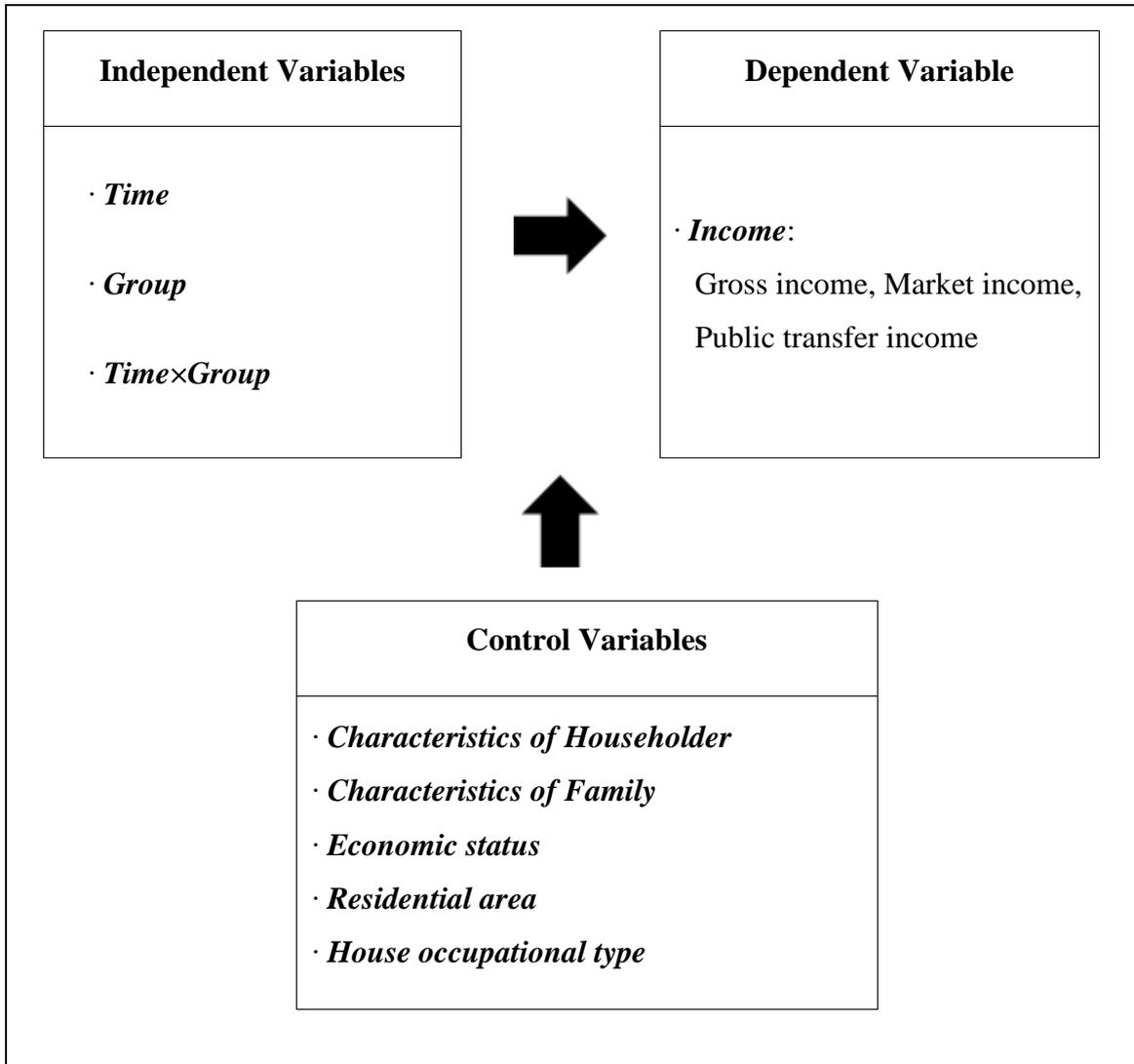
As can be seen table below, the most important coefficient value is  $\beta_3$ , which means the pure effect of the introduction of BP. By examining the size and statistical significance of it, it is possible to understand the effect of the introduction of BP on income.

Table 21: Policy Effect of Multivariate Regression Model

	t=0 (Y2013)	t=1 (Y2015)	Difference
Treatment	$\alpha + \beta_2 + \beta_4 + \varepsilon$	$\alpha + \beta_1 + \beta_2 + \beta_3 + \beta_4 + \varepsilon$	$\beta_1 + \beta_3$
Control	$\alpha + \beta_4 + \varepsilon$	$\alpha + \beta_1 + \beta_4 + \varepsilon$	$\beta_1$
Difference	$\beta_2$	$\beta_2 + \beta_3$	<b><math>\beta_3</math></b>

To summary, the multiple regression difference in difference analysis model discussed so far is expressed as following figure.

Figure 12: Research Model



## 5. Analysis

### 5.1. Descriptive Statistics

The treatment and the control group should be similar in all other aspects except for independent variable. To examine this, the characteristics of the householders, family, the economic status, the residential area and the type of residence were compared for the treatment and control groups.

#### 5.1.1. *Characteristics of Household Head*

Variables included in the characteristics of household head are the gender, final education, health status, working ability, and working status.

First, looking at the gender of household head, the proportion of female in each group is slightly different. The figure of the treatment group is 50.3% in 2013 which was higher than that of the control group (45.7%). The figure in each group did not change significantly in 2015.

Second, there was no significant difference between the two groups in terms of the final education. In both groups, more than 90% of household heads had a high school diploma or less.

Third, the two groups showed a difference in the health status of the household head. As of 2013, when looking at the proportion of healthy household head, the treatment group was 38.7%, which was lower than the control group (45.7%). This difference between two groups has maintained in 2015. This is because the average age of treatment group was higher than that of the control group. In general, health condition is negatively associated with age especially for senior groups.

Fourth, there was a difference between the two groups in terms of whether the household heads worked. As of 2013, the proportion of worker in the treatment

group was 16.1%, which was lower than that of the control group (32.3%). This difference has maintained in 2015. The decrease in the employment rate and economic activity participation rate seems to be related with the fact that the average age of the treatment group was older than that of the control group.

Fifth, there was no clear difference between the two groups in terms of the working ability. In both groups, about 70% of household heads were surveyed to have the ability to work, and this figure did not change significantly in 2015. The above analysis results are summarized in a table as follows.

Table 22: The Household Head Characteristics

	2013(%, mean)		2015(%, mean)	
	Treat	Ctrl	Treat	Ctrl
<b>Household Head</b>				
Female	50.3	45.7	50.4	45.8
high school graduation or less	95.5	92.9	96.9	94.1
Healthy	38.7	45.7	40.0	47.5
Worker	16.1	32.3	11.8	20.3
Ability to work	76.4	73.2	72.8	72.0

### 5.1.2. Characteristics of Family

Variables classified as family characteristics are family size, whether having the disabled, whether having child aged under 7, and whether living with children.

First, looking at the family size, that of treatment group (1.75) was smaller than that (1.97) of the control group in 2013. This difference between two groups has maintained in 2015. The average number of household members in both groups decreased, but that (1.59) of treatment group was still smaller than that (1.69) in the control group.

Second, the ratio that including the disabled in treatment group was 44.7% in 2013, which was lower than 57.5% in the control group. This difference between two groups has maintained in 2015.

Third, there was no significant difference between the two groups in terms of having child aged under 7. In both groups, most households did not have infants.

Fourth, the ratio that living together with their children in treatment group was 13.1% in 2013, which was lower than that of the control group (39.4%). These figures did not change significantly in 2015 in both groups.

The above analysis results are summarized as following table.

Table 23: Family Characteristics

	2013(%, mean)		2015(%, mean)	
	Treat	Ctrl	Treat	Ctrl
<b>Family</b>				
Size	1.75	1.97	1.59	1.69
Having Disabled member	44.7	57.5	45.1	59.3
Having Child(under aged 7)	0.0	0.0	0.0	0.0
Living with children	13.1	39.4	11.3	31.4

### 5.1.3. Economic Status

Variables classified as economic status are income quintile, asset and debt .

First, in terms of income quintile, it was found that most households in both the treatment group and the control group located in the 1st and 2nd income quintile. As of 2013, in the case of the treatment group, about 98% of all households belonged to the 1st and 2nd quintile of income. In the case of the control group, about 93% of all households belonged to the 1st and 2nd quintile of

income. These figures did not change significantly in 2015<sup>8</sup>.

Second, there was no significant difference between the treatment group and the control group in terms of asset size. In 2013, the average size of assets in treatment group was KRW 22.1 million, which was not significantly different from KRW 22.29 million of the control group.

Third, in terms of debt size, that of the treatment group was slightly smaller than that of the control group. In 2013, the average amount of debt in treatment group was KRW 8.75, which was smaller than KRW 10.55 million of the control group. In 2015, debt size in treatment group decreased to KRW 6.83 million, but there was no significant change in the control group.

The above analysis results are summarized as following table.

Table 24: Economic Status

	2013(% , mean)		2015(% , mean)	
	Treat	Ctrl	Treat	Ctrl
<b>Economic Status</b>				
Income quintiles				
1 <sup>st</sup>	88.4	69.3	88.1	76.3
2 <sup>nd</sup>	10.1	23.6	10.9	16.9
3 <sup>rd</sup>	1.5	6.3	1.0	4.2
4 <sup>th</sup>	0.0	0.8	0.0	2.5
5 <sup>th</sup>	0.0	0.0	0.0	0.0
Asset (Unit: 10,000 KRW)	2,210	2,229	2,287	2,203
Debt (Unit: 10,000 KRW)	875	1,055	683	1,040

<sup>8</sup> This is because both the treatment group and the control group consist of recipients of the Basic Livelihood Security Benefit, the poorest class in Korean society.

#### 5.1.4. Residential Area and Housing Occupational Type

Finally, the residential area and housing occupational type in both groups are analyzed.

First, looking at the residential area, it was found that most of the treatment group and the control group lived in city area. As of 2013, 98.5% of the treatment group and 96.9% of the control group lived in cities, and these figures did not change significantly in 2015.

Next, looking at the housing occupational type, the ratio with home ownership was higher in the treatment group than that in the control group. As of 2013, this ratio in treatment group was 19.1%, which was higher than that of the control group, 11.0%, and this gap did not change significantly in 2015.

Table 25: Residential Area and Housing Occupational Type

	2013(%, mean)		2015(%, mean)	
	Treat	Ctrl	Treat	Ctrl
<b>Residential Area (City)</b>	98.5	96.9	98.1	96.4
<b>Home Ownership</b>	19.1	11.0	19.8	11.7

#### 5.1.5. Summary

As discussed so far, the treatment and control group were similar in most aspects. Both groups were low-income households belonging to the first- or second-income quintiles, and they are similar in the size of assets and debts. Also, there was no significant difference in residential area and occupational type.

However, substantial differences were also found in terms of the proportion of workers, health status and the proportion of households living with child. These variables will be included as control variables in multiple regression analysis.

## 5.2. Result From Simple Difference-in-Difference Analysis

The effect of BP on the income can be analyzed by comparing the changes between before and after the introduction of BP in the treatment and control group (Son & Lee, 2018). Since the effect is expected to be different depending on the type of income which constitutes gross income, the changes are analyzed separately in terms of each type of income such as public transfer income, market income, and gross income.

### 5.2.1. Public Transfer Income (Hypothesis 1 and 2)

Public transfer income refers to the income which households receives from the government (Lee et al., 2016). Although there are various types, here, the analysis was conducted by classifying public transfer income into Basic Pension benefit, National Basic Livelihood Security benefit, and other benefits. The results are shown in the table below.

According to the results, the increase of public transfer income in the treatment group was KRW 29,000 higher than that in the control group, but this difference was not a statistically significant ( $p = 0.549$ ).

This is because the treatment group's NBLS benefit and other public benefits decreased. To be specific, increase in the treatment group was KRW 56,000 smaller for NBLS benefit ( $p < 0.001$ ) and KRW 19,000 smaller for other public benefits ( $p < 0.001$ ) compared to that in control group. This result suggests that the income increase effect of BP can be offset by a decrease in other existing public benefits.

Table 26: Simple DID Analysis Result on Public Transfer Income

(Unit: KRW 10,000)

		2013	2015	D/DD
Public transfer income	Treat	49.5	59.6	<b>10.1</b> (p < 0.001)
	Control	53.9	61.1	7.2 (p = 0.123)
	D/DD	-4.4 (p = 0.112)	-1.6 (p = 0.628)	<b>2.9</b> (p = 0.549)
1. Basic pension	Treat	0.0	9.6	<b>9.6</b> (p < 0.001)
	Control	0.0	0.0	0.0 (-)
	D/DD	0.0 (-)	<b>9.6</b> (p < 0.001)	<b>9.6</b> (p < 0.001)
2. NBLs	Treat	31.4	29.0	-2.4 (p = 0.080)
	Control	34.7	38.1	3.4 (p = 0.125)
	D/DD	-3.3 (p = 0.057)	<b>-9.1</b> (p < 0.001)	<b>-5.8</b> (p < 0.001)
3. Others	Treat	18.1	21.0	<b>2.9</b> (p = 0.027)
	Control	19.2	23.1	3.9 (p = 0.315)
	D/DD	-1.1 (p = 0.121)	-2.1 (p = 0.052)	<b>-1.0</b> (p = 0.044)

### 5.2.2. Market Income (Hypothesis 3 and 4)

Market income consists of earned income, asset income, and private transfer income (Lee et al, 2016). Through analysis of changes in market income, it was examined whether the introduction of BP actually crowded out earned income and private transfer income. The analysis results are shown in the table below.

In 2015, market income of both groups decreased compared to 2013. However, decreased amount in the treatment group was KRW 32,000 smaller than that in the control group, and this difference was statistically significant ( $p = 0.004$ ). This result shows that unlike the theoretical expectation, the crowd-out effect of BP on earned income was not found in this simple DID analysis results<sup>9</sup>.

Meanwhile, looking at the change in private transfer income, no statistically significant difference was found between the treatment group and the control group ( $p = 0.614$ ). In other words, the crowd-out effect of BP on private transfer income was also not found.

Table 27: Simple DID Analysis Result on Market Income

(Unit: KRW 10,000)

		2013	2015	D/DD
Market Income	Treat	23.0	22.4	-0.6 ( $p = 0.829$ )
	Control	40.1	36.2	-3.9 ( $p = 0.517$ )
	D/DD	<b>-17.1</b> ( $p < 0.001$ )	<b>-13.9</b> ( $p = 0.002$ )	<b>3.2</b> ( $p = 0.004$ )
1. Earned	Treat	12.4	10.8	-1.6 ( $p = 0.560$ )
	Control	30.4	26.4	-4.0 ( $p = 0.480$ )
	D/DD	<b>-18.1</b> ( $p < 0.001$ )	<b>-15.7</b> ( $p < 0.001$ )	<b>2.4</b> ( $p = 0.001$ )
2. Asset	Treat	0.1	0.2	0.2 ( $p = 0.206$ )
	Control	0.1	0.2	0.1 ( $p = 0.519$ )
	D/DD	0.0 ( $p = 0.634$ )	0.0 ( $p = 0.962$ )	0.0 ( $p = 0.194$ )

<sup>9</sup> Rather, the Basic Pension was found to have the increase effect on earned income under this simple DID analysis.

		2013	2015	D/DD
3. Private Transfer	Treat	10.6	11.4	0.8 (p = 0.494)
	Control	9.6	9.6	0.0 (p = 0.997)
	D/DD	1.0 (p = 0.519)	1.8 (p = 0.264)	<b>0.8</b> (p = 0.614)

### 5.2.3. Gross Income (Hypothesis 5)

Looking at gross income, it was found that BP has the increase effect on gross income of elderly households (p = 0.001). However, this is not because public transfer income has increased after introduction of BP (p = 0.0549)<sup>10</sup>, but because market income has increased (0.004)<sup>11</sup>.

Table 28: Simple DID Analysis Result on Gross Income

(Unit: KRW 10,000)

		2013	2015	D/DD
Gross income	Treat	72.5	81.9	<b>9.5</b> (p = 0.001)
	Control	94.0	97.4	3.4 (p = 0.578)
	D/DD	<b>-21.6</b> (p < 0.001)	<b>-15.5</b> (p < 0.001)	<b>6.1</b> (p = 0.001)
1. Public transfer income	Treat	49.5	59.6	<b>10.1</b> (p < 0.001)
	Control	53.9	61.1	7.2 (p = 0.123)
	D/DD	-4.4 (p = 0.112)	-1.6 (p = 0.628)	<b>2.9</b> (p = 0.549)

<sup>10</sup> This was because the income increase effect of BP was offset by the decrease in NBLs benefits.

<sup>11</sup> This was because the decrease in earned income of the treatment group was smaller than that of the control group.

		2013	2015	D/DD
2. Market Income	Treat	23.0	22.4	<b>-0.6</b> (p < 0.001)
	Control	40.1	36.2	<b>-3.9</b> (p < 0.001)
	D/DD	<b>-17.1</b> (p < 0.001)	<b>-13.9</b> (p = 0.002)	<b>3.2</b> (p = 0.004)

However, based on this result, it is difficult to conclude BP increases the income of elderly households. This is because simple DID analysis cannot control changes in other variables that can affect dependent variables. A more complicated approach will be conducted through multiple regression.

### 5.3. Result From Multivariate Regression Analysis

#### 5.3.1. Public Transfer Income (Hypothesis 1 and 2)

Whether BP reduces NBLs benefits can be analyzed through regression analysis on public transfer income. The results are shown in the table below.

First, below table showed the results of regression analysis on the total amount of public transfer income. The independent variable implying the introduction of BP is 'Time × Group'. The regression coefficient of that variable was 4.49, which means that the introduction of the basic pension scheme increased the average monthly public transfer income by about KRW 44,900. However, since the p-value of the regression coefficient was greater than 0.1, it is difficult to say that this effect is statistically significant. In other words, the introduction of BP did not have a statistically significant effect on the public transfer income of households receiving NBLs benefit.

Next, below table also showed the results of how much BP benefit was provided to the elderly households. The coefficient of the 'Time × Group' variable

was 9.74, and it was statistically significant. This means that with the introduction of BP the treatment group in elderly household could receive an average monthly Basic Pension benefit of KRW 97,400.

Third, the effect of the introduction of BP on the NBLS benefits was also examined. The coefficient of the ‘Time × Group’ variable was negative 4.66, and it was statistically significant. This means that with the introduction of BP, the average monthly amount of NBLS benefit decreased by KRW 46,000. This result empirically supports the negative relationship between BP and NBLS benefits.

To sum up, the introduction of BP in 2014 has the increase effect on the amount of BP received by elderly households, but at the same time, it reduces the NBLS benefit. Due to this negative relationship between these two benefits, the introduction of BP did not have a statistically significant effect on the public transfer income of low-income elderly households.

Table 29: Regression Result on Public Transfer Income

(Unit: KRW 10,000)

	Public Transfer Income							
	Public Transfer Income		1. BP		2. NBLS		3. Others	
	B	SE.	B	SE	B	SE	B	SE
Time	5.68*	3.11	-0.24	0.59	2.09	1.76	3.83	2.62
Group	-5.48*	2.89	6.32***	0.55	-4.95***	1.64	-6.85***	2.43
<b>Time×Group</b>	<b>4.49</b>	<b>3.94</b>	<b>9.74***</b>	<b>0.75</b>	<b>-4.66**</b>	<b>2.23</b>	<b>-0.59</b>	<b>3.31</b>
Male	2.42	2.12	0.14	0.40	-0.36	1.20	2.64	1.78
Above high school	10.76**	4.56	1.27	0.87	5.56**	2.59	3.92	3.84
Healthy	0.05	1.99	-0.33	0.38	-0.04	1.13	0.42	1.67
Participation in work	-14.49***	2.71	-0.29	0.51	-11.06***	1.53	-3.14	2.27
Size	4.43***	1.43	-0.69**	0.27	2.33***	0.81	2.79**	1.20
Having the disabled	14.49***	2.07	-0.25	0.39	3.89***	1.17	10.85** *	1.74
Having child	-19.96	26.13	-1.03	4.96	-8.86	14.8 0	-10.06	21.97

	Public Transfer Income							
			1. BP		2. NBLs		3. Others	
	B	SE.	B	SE	B	SE	B	SE
Living with children	-8.54**	3.43	-0.30	0.65	-4.72**	1.94	-3.52	2.88
Asset	0.00	0.00	0.00	0.00	0.00**	0.00	0.00**	0.00
Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Metropolitan city area	1.76	2.90	-0.47	0.55	-0.56	1.65	2.79	2.44
City area	-0.17	2.97	-0.54	0.56	-3.67**	1.68	4.04	2.49
Rural area	5.94	6.98	1.68	1.33	-8.69	3.95	12.96**	5.87
Home ownership	-5.02	3.14	0.77	0.60	-4.07**	1.78	-1.72	2.64
R <sup>2</sup>	0.210		0.691		0.237		0.158	

\*: p < 0.10, \*\*: p 0.05, \*\*\*: p < 0.01

### 5.3.2. Market Income (Hypothesis 3 and 4)

One of the main research questions of this study is whether the receipt of BP reduces work incentive of the elderly and financial support from their children. To find this, the effect of the introduction of BP on the market income of low-income elderly households is examined using multiple regression analysis. The analysis results are shown in the table below.

Table 30: Regression Result on Market Income

(Unit: KRW 10,000)

	Market Income							
			1. Earned		2. Financial		3. Transfer	
	B	SE.	B	SE	B	SE	B	SE
Time	3.35	3.73	2.77	3.48	0.06	0.13	0.51	1.70
Group	-7.16**	3.46	-8.43***	3.22	-0.12	0.12	1.39	1.58
<b>Time×Group</b>	<b>-1.75</b>	<b>4.72</b>	<b>-1.94</b>	<b>4.40</b>	<b>0.00</b>	<b>0.16</b>	<b>0.19</b>	<b>2.15</b>
Male	-1.02	2.54	1.30	2.37	0.00	0.09	-2.32**	1.16

	Market Income							
			1. Earned		2. Financial		3. Transfer	
	B	SE.	B	SE	B	SE	B	SE
Above high school degree	0.61	5.47	-0.21	5.10	0.00	0.19	0.83	2.50
Healthy	1.63	2.39	3.13	2.22	0.01	0.08	-1.51	1.09
Participation in work	33.16***	3.24	35.31***	3.02	-0.11	0.11	-2.04	1.48
Size	6.35***	1.72	5.62***	1.60	-0.16	0.06***	0.88	0.78
Having the disabled	-12.67***	2.48	-12.77***	2.31	-0.03	0.09	0.13	1.13
Having child(aged 7-)	-1.04	31.32	-53.90*	29.18	-1.64	1.09	54.51***	14.30
Living with children	14.86***	4.11	14.03	3.83	-0.24	0.14	1.08	1.88
Asset	0.00***	0.00	0.00	0.00	0.00	0.00***	0.00	0.00
Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Metropolitan city area	4.87	3.48	4.87	3.24	0.30	0.12*	-0.30	1.59
City area	7.78	3.55	8.18	3.31	0.50	0.12**	-0.90	1.62
Rural area	6.86	8.37	2.53	7.80	0.38	0.29	3.95	3.82
Home ownership	-12.37***	3.76	-12.70	3.50	-0.71	0.13***	1.03	1.72
R <sup>2</sup>	0.429		0.450		0.496		0.064	

\*: p < 0.10, \*\*: p < 0.05, \*\*\*: p < 0.01

First, the above table showed the results of regression analysis on the total amount of market income. The size of coefficient of the ‘Time × Group’ variable was negative 1.75, implying that the introduction of BP and the amount market income had a negative relationship. However, the p-value is above 0.1. It means that this effect was not statistically significant.

Next, the above table showed the effect of BP on the earned income of elderly households. As can be seen from the fact that the coefficient of the ‘Time × Group’ variable was negative 1.94, the introduction of BP reduced earned income slightly. However, this was not statistically significant because the p-value

is above 0.1. In other words, it was difficult to conclude that the introduction of BP caused a decrease in work incentives of the elderly.

Finally, the above table showed the result of regression analysis on the private transfer income within family. The coefficient of the 'Time × Group' variable was 0.19, which means that the introduction of BP slightly increased private transfer income. However, the p-value is above 0.1, which means that this effect was not statistically significant.

In summary, the introduction of BP did not have a statistically significant effect on the market income of low-income elderly households. Contrary to the predictions of theories, there were no empirical evidence such as a decrease in the working incentives of the elderly and a decrease in the private transfer income from children despite the introduction of BP.

### 5.3.3. *Gross Income (Hypothesis 5)*

Based on the analysis discussed above, this study synthesized the effect of the introduction of BP on the gross income of low-income elderly households. The analysis results are shown in the table below.

As can be seen from the fact that the coefficient of the 'Time × Group' variable is 2.74, the introduction of BP slightly increased the gross income of elderly households. However, the p-value is above 0.1, not statistically significant.

This is because no significant changes were found in both public transfer income and market income, which constitute gross income. Although elderly households received BP benefit, the public transfer income of them did not increase significantly as the amount of public assistance benefits decreased at the same time. Also, the market income of elderly households also did not respond sensitively to the introduction of BP.

Table 31: Regression Result on Gross Income

(Unit: KRW 10,000)

	Gross Income		1. Public		2. Market	
	B	SE.	B	SE	B	SE
Time	9.03**	4.01	5.68*	3.11	3.35	3.73
Group	-12.64***	3.72	-5.48*	2.89	-7.16**	3.46
<b>Time×Group</b>	<b>2.74</b>	<b>5.07</b>	<b>4.49</b>	<b>3.94</b>	<b>-1.75</b>	<b>4.72</b>
Male	1.41	2.73	2.42	2.12	-1.02	2.54
Above high school degree	11.37	5.88	10.76**	4.56	0.61	5.47
Healthy	1.67	2.57	0.05	1.99	1.63	2.39
Participation in work	18.67***	3.49	-14.49***	2.71	33.16***	3.24
Size	10.77***	1.85	4.43***	1.43	6.35***	1.72
Having the disabled	1.82	2.67	14.49***	2.07	-12.67***	2.48
Having child(aged 7-)	-20.99	33.66	-19.96	26.13	-1.04	31.32
Living with children	6.32	4.41	-8.54**	3.43	14.86***	4.11
Asset	0.00***	0.00	0.00	0.00	0.00***	0.00
Debt	0.00	0.00	0.00	0.00	0.00	0.00
Metropolitan city area	6.63*	3.74	1.76	2.90	4.87	3.48
City area	7.61**	3.82	-0.17	2.97	7.78***	3.55
Rural area	12.80	8.99	5.94	6.98	6.86	8.37
Home ownership	-17.39***	4.04	-5.02	3.14	-12.37***	3.76
R <sup>2</sup>	0.357		0.210		0.429	

\*: p &lt; 0.10, \*\*: p &lt; 0.05, \*\*\*: p &lt; 0.01

## **6. Conclusion**

### **6.1. Summary**

The purpose of this study is to examine how the introduction of the Basic Pension scheme affects the income of elderly households receiving public assistance benefit. Since the Basic Pension scheme was introduced in 2014, the 9th data (year 2013) and 11th data (year 2015) of the Korean Welfare Panel Survey were analyzed to compare the differences between before and after the introduction of this scheme.

The research target is low-income households receiving the National Basic Livelihood Security benefits. Among them, the treatment group is the households whose birth year of the eldest member is 1941-1950, and the control group is the household whose birth year of the eldest member is 1951-1960. The treatment group and the control group showed no significant differences except for eligibility for the Basic Pension in 2015.

In order to verify the effect of the introduction of the Basic Pension on income, a simple difference in difference analysis was first conducted, and then multiple regression analysis was utilized to control other variables affecting the dependent variable.

First, looking at the results of the simple difference in difference analysis, it was found that the introduction of the Basic Pension scheme had the increase effect on income of the treatment group. However, a negative relationship was observed between the Basic Pension and the National Basic Livelihood Security benefit. As a result, the increase in gross income was smaller than the amount of the Basic Pension benefit.

Next, multiple regression analysis was conducted to analyze the effect of the introduction of the Basic Pension while controlling various variables. Contrary

to the results of simple difference in difference analysis, the introduction of the Basic Pension did not make a statistically significant change in gross income. This is because, despite the implementation of the Basic Pension, no significant increase was observed in both public transfer income and market income. Contrary to the prediction of the theory, no crowd-out effect such as a decrease in earned income or a decrease in financial support from children was found.

In summary, the Basic Pension scheme introduced in South Korea in 2014 did not make a statistically significant change in the income of low-income elderly households receiving public assistance.

## **6.2. Evaluation**

In terms of market income, this result can be understood in that the maximum amount of the Basic Pension in 2015 was KRW 200,000, which was only 33% of the minimum cost of living for an elderly single household (KRW 620,000) at that time. The amount of KRW 200,000 per month might be too small to change the earned income and private transfer income of elderly households.

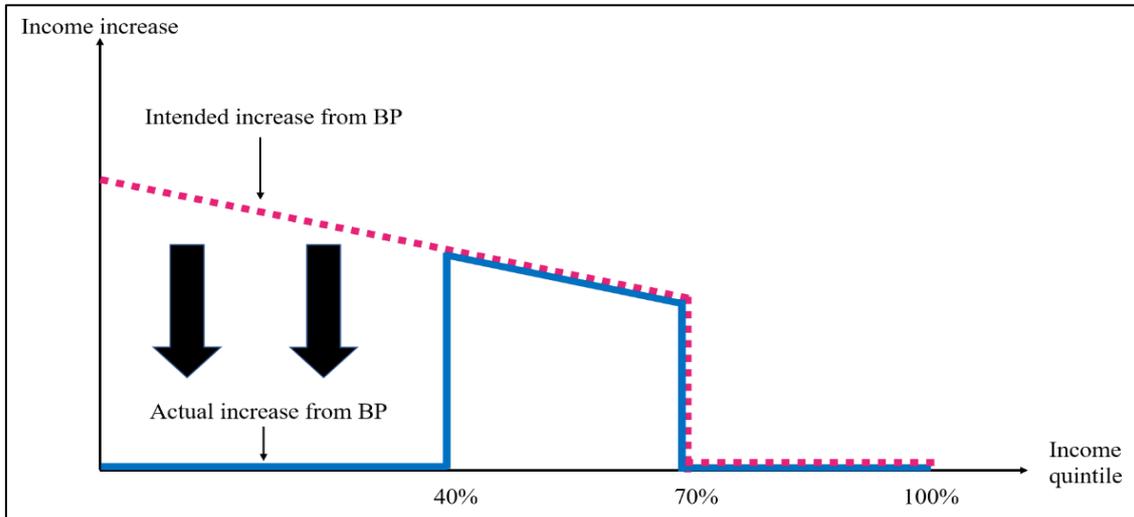
However, the fact that the Basic Pension did not statistically affect the public transfer income of low-income elderly can be controversial. This is because the Basic Pension was introduced for the purpose of supporting low-income elderly households who are not protected by the National Pension scheme.

The Basic Pension is a selective scheme provided to the bottom 70% of the elderly based on their income and wealth. Under Korean Government expectation, only the top 30% should be excluded from benefits. However, households in the 1<sup>st</sup> and 2<sup>nd</sup> income quintiles who depend on public assistance (NBLs) benefit are also excluded from that benefit due to decrease effect of BP on NBLs benefit.

In that sense, the Basic Pension in Korea operates as a so-called “given and subtracted” welfare benefit. As shown in the figure below, it is predicted that only middle-class elderly households in the bottom 40-70% of income can benefit from

this Basic Pension scheme.

Figure 13: Intended vs Actual income increase from BP for the Elderly



### 6.3. Policy Implication

The Basic Pension scheme was introduced in 2014. It was eight years after the National Basic Livelihood Security Scheme was introduced. The problem is that the Korean government introduced it without consideration about how to harmonize it with other existing programs. As a result, not only the top 30% but also the bottom 40% of elderly households were excluded from the actual recipients of the Basic Pension Scheme.

The actual exclusion of the bottom 40% from Basic Pension could create another problem. The Korean government has increased the amount of Basic Pension benefit. Considering this, the Basic Pension can serve to widen the income gap between the middle- and the low-income elderly, rather than support the low-income elderly.

Then how could the Korean government address this issue? There can be two approaches to this. The first is to resolve the institutional conflict between the

Basic Pension and the National Basic Livelihood Security scheme. The government can exclude Basic Pension benefit from the recognized income for public assistance. This change enables low-income households not to experience a decrease in their public assistance benefit even if they receive the Basic Pension benefit.

Another approach is to raise the Basic Livelihood Security benefit in line with the increase in the Basic Pension benefit. For example, if the Basic Pension is raised by KRW 100,000, the public assistance benefit is also increased by KRW 100,000 at the same time. This approach is to support the low-income households through public assistance benefits instead of the Basic Pension.

#### **6.4. Contributions, Limitations and Tasks Ahead**

This study has contributions in that it is the first study to analyze the effect of the Basic Pension focusing on elderly households receiving National Basic Livelihood Security benefits among elderly households. The Basic Pension scheme was introduced for the purpose of alleviating elderly poverty and supporting low-income elderly households who are located in blind spots of public pensions. However, it was found that there was no statistically significant effect on their income. In other words, this study is meaningful in that it points out that the effects of the introduction of the Basic Pension can be different depending on the characteristics of the household.

However, this study also has some limitations. First, there were several differences were found between the treatment and the control groups in terms of family characteristics, working and health status. This is mainly due to the average age of treatment group is older that of control group. A more rigorous analysis will be possible if the research target is constructed in different way to increase the similarity between the treatment and the control group.

Second, it has a limitation of the time of data. In this study, to verify the effect of the introduction of the Basic Pension scheme, only data from 2013 just

before the introduction of the Basic Pension, and 2015 right after the introduction of the Basic Pension was used. However, the effect of the introduction of this Basic Pension scheme may not occur in the short term. It may appear in the long term over time. Therefore, in other studies in the future, a more convincing analysis will be possible if data from 2016 and later are utilized for research.

## **Appendix: Financial Projection of Basic Pension Expenditure (2022-2060)**

### **1. Backgrounds**

In this appendix, this study estimates the future expenditure for Basic Pension considering future trends in elderly population in Korea. Also, additional burden which can be generated by possible change of current Basic Pension scheme is also estimated.

### **2. Historical Trend of Basic Pension Expenditure**

The burden of the Basic Pension expenditure is shared by the central and local governments together. As of 2019, the amount paid by the central and local governments for the Basic Pension is about KRW 3.2 trillion. The table below shows the Basic Pension expenditures by year.

Table 32: Yearly Expenditure for Basic Pension

(Unit: KRW 100,000,000)

Year	Total	Central Gov't	Local Gov't
2014	69,001	51,771	17,230
2015	100,090	75,634	24,456
2016	102,896	78,497	24,399
2017	105,461	80,762	24,699
2018	118,222	91,028	27,194
2019	147,202	114,745	32,457
2020	164,707	131,765	32,942*
2021	187,043	149,634	37,409*

\* Expenditure of Local government in 2020 and 2021 are estimates

\*\* Source: Ministry of Health and Welfare (2020)

### 3. Future Projection of Basic Pension Expenditure (2022-2060)

#### 3.1. Future Estimate for Population aged 65 or over

In order to estimate future expenditure, it is necessary to first look at the estimate of the population aged 65 and over. As shown in the table below, the proportion of the population aged 65 or over, which was only 14.9% in 2019, is expected to increase to 43.9% in 2060.

Table 33: Future Elderly Population Estimate

Year	65+ Population		65+ NBLs Recipients <sup>12</sup>	
	Number(1,000)	Percent	Number(1,000)	Percent
2019	7,685	14.9	607	1.2
2020	8,125	15.7	642	1.2
2025	10,511	20.3	830	1.6
2030	12,980	25.0	1,025	2.0
2040	17,244	33.9	1,361	2.7
2050	19,007	39.8	1,502	3.1
2060	18,815	43.9	1,486	3.5

\* Source: Statistics Korea (2019) / Median estimate scenario

#### 3.2. Additional Burden from change in Basic Pension Scheme

Basic pension expenditure is affected not only by changes in the proportion of the elderly population but also by changes in the Basic Pension scheme. For example, the Korean government can eliminate the institutional conflict between Basic Pension and National Basic Livelihood Security Scheme to support low-

<sup>12</sup> The NBLs recipient population aged 65 or over is estimated using the 2019 ratio (7.9% of the total elderly population)

income seniors receiving public assistance. If this change is made, the government's financial burden will further increase due to two following reasons.

First, the government should pay more livelihood benefit than it currently does. This is because the scheme will be changed so that the livelihood benefit of low-income seniors does not decrease even if they receive the Basic Pension.

Second, the Basic Pension expenditure will also increase. This is because there is no incentive for the elderly receiving public assistance not to apply for the Basic Pension.

Below, this study summarize three possible scenarios due to this scheme change and estimate the Basic Pension expenditures based on each scenario.

Table 34: Three Scenarios for Projection

- Scenario 1: Only considering increase in proportion of elderly population
- Scenario 2: Considering additional burden due to increase in livelihood benefit expenditure occurred by elimination of institutional conflicts between the Basic Pension and the National Basic Livelihood Security Scheme
- Scenario 3: Reflecting additional burden due to increase in Basic Pension expenditure occurred when all NBLs recipients (100%) applying for a Basic Pension benefit<sup>13</sup>

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<sup>13</sup> As of 2020, 11% of low-income seniors receiving public assistance did not apply for the Basic Pension. This can be understood that they were concerned about losing their eligibility for public assistance if their recognized income increases when receiving the Basic Pension benefit.

### 3.3. Projection Results<sup>14</sup>

#### 3.3.1. Scenario 1

The Basic Pension expenditure, which stood at KRW 1.64 trillion in 2020, is expected to increase to KRW 6.04 trillion in 2060 due to the deepening of the ageing population. The ratio of expenditure to nominal GDP<sup>15</sup> peaked at 1.06% in 2030 and then gradually decreased again, and it is expected to be 0.70% in 2060.

Table 35: Future Spending based on Scenario 1

Year	Expenditure (KRW billion)	Share of GDP (%)
2019	14,720	0.77
2020	16,471	0.86
2025	23,476	1.01
2030	29,641	1.06
2040	42,249	1.04
2050	52,138	0.88
2060	60,450	0.70

#### 3.3.2. Scenario 2

The Korean government can improve the schemes so that the amount of livelihood benefit does not decrease even if the elderly receives Basic Pension

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<sup>14</sup> For the financial estimation, the following assumption was also considered. First, the Basic Pension amount is assumed to increase by 0.5% every year reflecting the inflation rate. Second, its target is assumed not to change from the bottom 70% of income and asset.

<sup>15</sup> For the nominal GDP growth rate, an average annual growth rate of 3.8% for the past 10 years (2010-2020) was applied.

benefit. If such improvement is introduced, an additional financial burden can be generated. According to the estimation, the total amount is expected to increase to 6.28 trillion won in 2060. Additional burden is about 4.0-4.9% of the expenditure based on scenario 1. Calculating the ratio of expenditure to nominal GDP, it peaked at 1.11% in 2030 and then gradually decreased again. It is expected to be 0.73% in 2060. This can be summarized as following table.

Table 36: Future Spending based on Scenario 2

Year	Expenditure (KRW billion)	Compare with Scenario 1	Share of GDP (%)
2019	15,412	+692 (4.7%)	0.80
2020	17,205	+735 (4.5%)	0.89
2025	24,617	+1,142 (4.9%)	1.06
2030	31,086	+1,445 (4.9%)	1.11
2040	44,265	+2,016 (4.8%)	1.08
2050	54,477	+2,339 (4.5%)	0.92
2060	62,884	+2,433 (4.0%)	0.73

### 2.3.3. Scenario 3

If the amount of livelihood benefit does not decrease even after receiving the Basic Pension benefit, the ratio of low-income elderly households applying for the Basic Pension may increase. Scenario 3 assumes that all elderly households receiving public assistance apply for the Basic Pension.

Considering this effect, an additional burden of 5.1-6.1% of cost based on scenario 1 is expected to occur. The total expenditure is expected to increase to

6.35 trillion won in 2060. The ratio of expenditure to nominal GDP peaked at 1.12% in 2030 and then gradually decreased again, and it is expected to be 0.73% in 2060.

Table 37: Future Spending based on Scenario 3

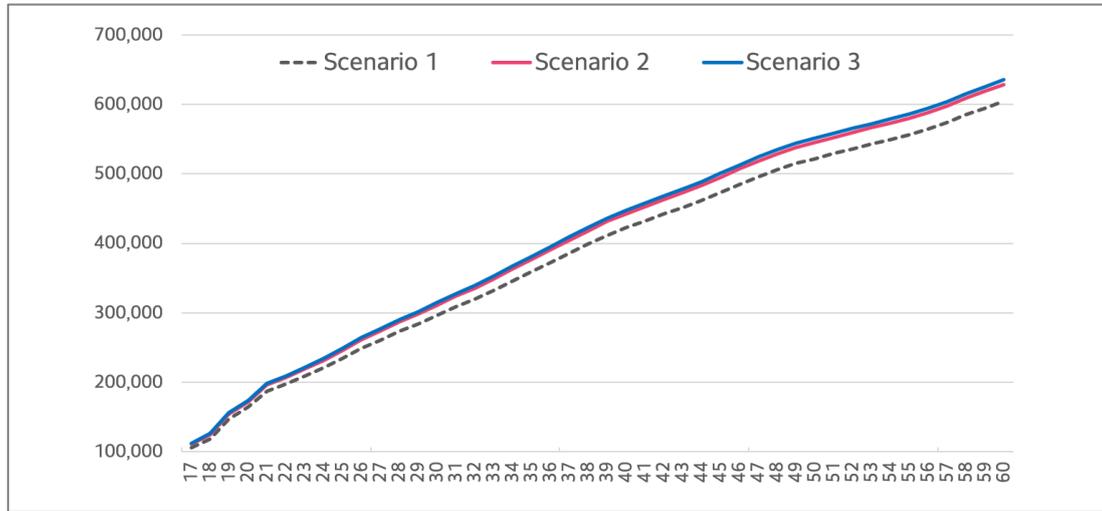
Year	Expenditure (KRW billion)	Compare with Scenario 1	Share of GDP (%)
2019	15,591	+871 (5.9%)	0.81
2020	17,395	+925 (5.6%)	0.90
2025	24,913	+1,437 (6.1%)	1.07
2030	31,460	+1,819 (6.1%)	1.12
2040	44,786	+2,537 (6.0%)	1.10
2050	55,082	+2,943 (5.7%)	0.93
2060	63,513	+3,063 (5.1%)	0.73

The financial burden for each scenario discussed above is summarized as following two figures.

First, figure below shows the trends of total amount of expenditure for Basic Pension. Due to the deepening of the ageing population, the financial burden of the Basic Pension is expected to increase from KRW 1.64 trillion in 2020 to KRW 6.04 trillion in 2060. Based on this, if the additional financial burden due to scheme change is taken into account, the amount of expenditure is expected to increase to a maximum KRW 6.28 - 6.35 trillion in 2060.

Figure 14: Financial Projection of Basic Pension Expenditure

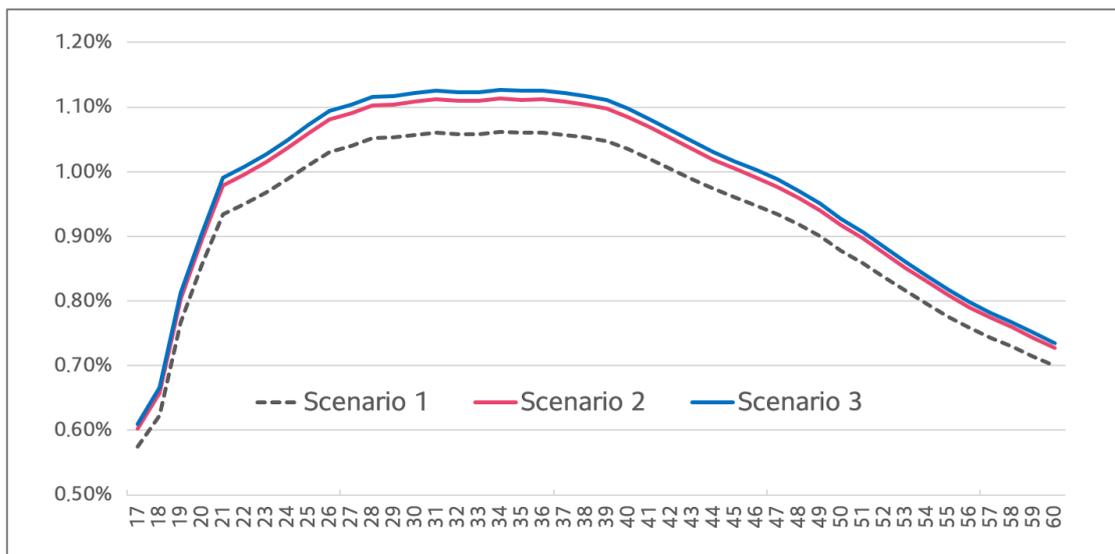
(Unit: KRW 100,000,000 )



Second the figure below shows the burden relative to nominal GDP. As can be seen figure below, this burden relative to GDP is expected to increase until 2030's. However, it is expected to stay stable at around 1%, then turn downwards after 2040.

Figure 15: Projection of Basic Pension Expenditure Relative to Nominal GDP

(Unit: % )



#### **4. Conclusion**

In Korea, the burden of the Basic Pension expenditure is expected to increase sharply due to the rapid population ageing. In addition, the Korean government can improve the welfare schemes so that the amount of living benefit does not decrease even if low-income elderly households receive the Basic Pension benefit. In this case, an additional cost will be generated. It is estimated to be about 4-6% of the total expenditure by year.

However, if the economic growth rate does not decrease significantly from that of the past decade, the financial burden relative to nominal GDP is expected to stay stable at around 1% after 2030's.

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## 기초연금이 공적부조를 수령하는 저소득 노인가구의 소득에 미친 영향

2014년에 도입된 기초연금제도는 급속한 고령화와 높은 노인빈곤을 문제에 대응하기 위한 한국정부의 정책적 노력이다. 기초연금은 소득과 자산을 기준으로 하위 70%에 해당하는 노인에게 지급된다. 정부는 기초연금을 통해 고령자의 소득 안정성이 크게 향상될 것으로 기대하고 있으며, 그러한 기대를 바탕으로 급여액도 도입 이후부터 지속적으로 인상시켜오고 있다.

그러나 정부의 기대와 달리 2014년 도입된 기초연금은 노인, 특히 기초생활보장급여를 받는 저소득 노인의 생활수준 향상에 기여하지 못할 수 있다. 기초연금의 수령이 다른 소득, 즉, 공적 이전소득, 사적 이전소득, 그리고 근로소득을 구축(crowd-out)할 수 있기 때문이다.

이에 본 연구는 2014년 도입된 기초연금이 실제로 기초생활보장 급여를 수령하는 저소득 노인의 생활수준 향상에 기여했는지 실증적으로 검증하는 것을 목적으로 하였다. 분석을 위해 한국복지패널의 2013년과 2015년 자료를 활용하였으며 이중차이 회귀분석을 통해 기초연금 도입 이전과 이후의 노인가구 소득을 비교하였다.

회귀분석 결과에 따르면 기초연금의 도입에도 불구하고 기초생활보장급여를 수령하는 노인가구의 총소득은 통계적으로 유의미하게 증가하지 않았다. 기초연금을 수령하더라도 기존에 수령해오던 생계급여액이 동시에 감소하게 되면서 총소득 증가폭이 상쇄되었기 때문이다. 한편 기초연금이 노인의 근로소득과 자녀로부터 받는 사적이전소득에 미치는 구축 효과는 관측되지 않았다.

이 결과는 정부의 예상과 달리 소득과 자산 기준 상위 30% 뿐만 아니라 공적 부조에 의존하는 하위 30%의 노인 또한 기초연금 혜택을 받지 못할 수 있음을 뜻한다. 기초연금과 기초생활보장제도의 제도적 상충관계로 인해 기초연금은 사실상 중산층 (하위 40-70%)에게만 유리한 방식으로 운영되고 있다.

급속한 고령화 시대에 노후소득을 안정적으로 보장하기 위해서는 다양한 복지프로그램들이 서로의 단점을 보완해가며 조화롭게 운영되어야 한다. 그러나 노후소득 보장제도의 두 축인 기초연금과 기초생활보장제도는 제도적 상충관계로 인해 그 역할을 충분히 다하지 못하고 있다.

이에 대한 개선방안으로는 기초생활보장급여 지급을 위한 소득인정액 산정시 노인가구의 기초연금 수령액을 제외하거나 혹은 기초생활보장급여액을 기초연금과 연동시켜 인상시키는 방식을 고려해 볼 수 있다.