The Effects of Old-Age Public Transfer on the Well-Being of Older Adults: The Case of Social Pension in South Korea

Seungho Lee, MA,1 Inhoe Ku, PhD,1 and Byongdon Shon, PhD2

1Department of Social Welfare, Seoul National University, Seoul, South Korea. 2Department of Social Welfare, Pyeongtaek University, Pyeongtaek, South Korea.

Address correspondence to: Inhoe Ku, PhD, Department of Social Welfare, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, South Korea. E-mail: Inhoeku@snu.ac.kr.

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Abstract

Objectives: This study examines the effects of the social pension reform on the well-being of older adults in Korea. Our study provides an estimate of the impacts of social pension in an industrialized and urbanized context.

Methods: We use monthly panel data from the Household Income and Expenditure Survey of the Korea Statistical Office. We identify the effects of social pension by utilizing an exogenous variation in the benefit level generated by the reform in 2014. We apply a triple-differences approach to remove potential selection biases related to program participation.

Results: The higher benefit increases gross income. It does not decrease primary income and private transfer income. It increases consumption and reduces poverty significantly.

Discussion: Our findings contrast with those from the literature. The Korean literature fails to find positive effects on the well-being of older persons. The literature of other countries finds negative incentive effects. The discrepancy may result from differences in methodological approaches and social and cultural contexts and institutional characteristics of the social pension.

Keywords: Social pension, Policy analysis, Triple-differences estimation, Well-being of older adults

Introduction

Although many higher-income nations have achieved old-age income security, some lower-income countries are facing a high risk of income insecurity amid a rapidly aging population. With weak social insurance programs in place, those countries have come to rely on social pensions to respond to high and growing elderly poverty. Social pension is a form of public transfer to older persons, financed not by participants’ contribution but by tax revenue, which aims to guarantee a minimum income. Social pensions have become more prevalent among middle- and low-income countries in Latin America, Africa, and Southeast Asia (Robalino & Holzmann, 2009). In East Asia, China, Taiwan and South Korea have recently begun to offer non-contributory benefits to older adults (Choi & Kim, 2010; Ning, Gong, Zheng, & Zhuang, 2016).

There is debate about the effects of social pensions. Studies in lower-income countries show that social pension increases incomes and reduces poverty (Amuedo-Dorantes & Juarez, 2015; Gasparini et al., 2007; Jensen, 2003; Kakwani & Subbarao, 2007), improves nutrition and health status among household members (Case, 2004; Duflo, 2003) and promotes school enrollment (Edmonds, 2006). Still, other studies suggest negative incentive effects on labor supply (Ardington, Case, & Hosegood, 2009; de Carvalho Filho, 2008), private transfers from adult children or relatives to older persons (Jensen, 2003; Maitra & Ray, 2003), and intergenerational coresidence (Chen, 2017).
This study examines the effects of recent changes in social pension programs on the well-being of older adults in South Korea. The Korean government doubled the benefit level of its social pension in July 2014. This reform provided an excellent opportunity to examine the effects of the social pension by creating an exogenous change in the benefit level. In addition, we address concerns of selection bias in nonexperimental studies of the effects of social pension programs. A conventional way to estimate effects is to compare the outcomes of participants and nonparticipants. However, individuals’ observed and unobserved characteristics may affect program participation. It is very difficult to distinguish true program effects and selection effects. We develop a version of the triple-differences estimation approach to remove potential selection biases.

Our study broadens the literature in other ways. First, we examine the impacts of social pension on several important outcomes including income, earnings, private transfers, consumption, and poverty. Most previous studies have focused on one or a few outcomes, limiting complete understanding of the elderly well-being. In addition, much previous research has been conducted in Latin American and African countries. Although social pension has emerged as a promising policy option in East Asian countries, empirical studies are scarce except for those in rural China. The Korean experience particularly allows us to examine the impacts of social pension in a more industrialized and urbanized context.

Institutional Background

Among older adults, the relative poverty rate (below half of the median income) is 47.2 percent in Korea (Kim, Lee, & Shon, 2016). This extremely high poverty rate is largely due to underdevelopment of public pension programs. In 1988, Korea launched a public pension program called the National Pension Scheme (NPS) and expanded it to cover the entire working-age population in 1999. The program is a contributory insurance scheme that provides earnings-related benefits (see Moon, 2009 for a more detailed description of the NPS). In 2013, only 31.9 percent of those aged 65 or older benefited from contributory public pension schemes (Chung et al., 2014). Although the program participation is mandatory, furthermore, only 60 percent of the working-age population pay their insurance premium, risking their eligibility for pension benefits at old age.

In 2008, the Korean government addressed the economic hardship of older adults by introducing the Basic Old-Age Pension scheme (BOAPS), a tax-financed social pension program for those aged 65 or older. The BOAPS was not a universal program. The program aimed to benefit 70 percent of the elderly population by excluding rich older adults. In 2014, the BOAPS limited benefits to those with incomes less than 870,000 Korea won (hereafter KRW) per month for singles and 1,390,000 KRW per month for couples. The beneficiary rate remained above 65 percent of the elderly population since 2009 (Korean Ministry of Health and Welfare, 2015). The monthly maximum pension payment was 84,000 KRW (about 84 USD) for a single and 139,000 KRW (139 USD) for a couple, equivalent to 5 percent of the average monthly income of the NPS participants.

In July 2014, the newly elected administration replaced the BOAPS with a new social pension program, called the Basic Pension scheme (BPS). Its original promise was to expand coverage to all older persons irrespective of income and to double the benefit level. However, as implemented, the BPS has only raised the benefit level while keeping resource-based eligibility rules intact. It provides a monthly maximum benefit of 168,000 KRW (about 168 USD) to single persons and 269,000 KRW (about 269 USD) to couples. Given the average benefit level of the NPS was about 300,000 KRW, the increased benefit of the BPS is not trivial.

Not all who are eligible receive the maximum benefit. Older adults with earnings or benefits from other public transfer programs receive reduced benefits. As before, however, the BPS generously disregards earnings of the beneficiaries so as to reduce potential disincentive effects on work efforts. Regular earnings up to 480,000 KRW per month and 30 percent of additional earnings are not counted as income. Rules are stricter for beneficiaries of other public transfer programs. Poor older persons who have no adult children capable of providing financial support, receive a benefit called the National Basic Livelihood Security (NBLS). The income threshold was about 600,000 KRW for a single and about 1,030,000 KRW for a couple in 2014, much lower than the threshold for the BPS. For beneficiaries, the full amount of the BPS benefit is subtracted from the NBLS benefit. For pensioners of the NPS who receive a monthly benefit of over 300,000 KRW, the BPS benefit decreases to 100,000 KRW.

Figure 1 shows the trend in income of elderly households before and after the reform. Gross income, including all types of pre-tax income, declined until 2008 and was stagnant thereafter. On the other hand, public transfer income, including benefits from the NPS, the BPS and the NBLS, steadily grew over the period. The implementation of the BPS after 2008 and the BOAPS after 2014 seem to drive the growth, as suggested by a slight upward trend between 2008 and 2010 and an upswing between the second and third quarter of 2014.

Table 1 describes the characteristics of beneficiaries before (as of December 2013) and after (as of December 2014) the reform. Older and female elderly people were overrepresented. Nearly half of the beneficiaries were couples. Most beneficiaries were financially deprived. More than two thirds had adjusted income, which only counts income of older adults, below half of the income threshold of the BPS for a single person (870,000 KRW). The vast majority received the full benefit. There were no noticeable differences in the overall characteristics between the beneficiaries in each year.
Theoretical Discussion

This study examines the effects of a social pension program on earnings, public and private transfer, income, poverty, and consumption. One important question is whether a higher benefit induces older adults or their family members to reduce work effort. Increased income and the potential for a greater benefit reduction, due to the benefit increase, may generate such disincentive effects. Research shows that a social pension program in South Africa reduced the labor supply of household members (Bertrand et al., 2003). Notwithstanding, we hypothesize that the increased benefit will not greatly affect labor earnings of elderly families in Korea. The BPS generously disregards earnings of older adults and income from other family members does not affect the eligibility status or benefit level.

The benefit increase could also change public and private transfer income mechanically or by changing individual behaviors. As previously mentioned, the public assistance (NBLS) benefit is reduced by the full amount of the BPS benefit. However, NBLS beneficiaries represent fewer than 6 percent of the elderly population. Beneficiaries of the contributory public pension (NPS) generally receive a low level of benefits. As a result, there are only a small number of the beneficiaries who are subject to a BPS benefit reduction as shown in Table 1. Thus, the effects of the higher BPS benefit on other public transfer income may not be large.

Private transfer income from adult children is a major income source for older persons in Korea (Kim, Lee, & Shon 2016). For older persons in the bottom quintile of the income distribution, private transfer income comprised 45 percent of the household income in 2013 (Chung et al., 2014). Thus, another important issue is whether and to what degree pension benefits influence private income transfer.

Scholars have formulated different hypotheses on this issue. One is that the public income transfers crowd out the private income transfers (Cox & Jimenez, 1989; Kim, 2010). Private income transfer may be primarily a means of helping deprived family members. If the transfers are so altruistically motivated, beneficiaries’ increased income could be offset by corresponding decreases in private transfers. Alternatively, public income transfers might not displace private income transfers (Schoeni, 1996). According to economic exchange theory, increases in beneficiaries’ income raise the implicit prices of their services (for example, care services for their grandchildren), which would result in increased income transfer (Cox & Rank, 1992). Finally, if private income transfer is based on filial piety (Shon, 1999), changes in beneficiaries’ income are unlikely to affect the supply of private transfer. Adult children’s moral obligation to parents do not depend on the parent’s economic status.

Policymakers are understandably interested in how effective the BPS benefit is in raising income and reducing poverty. The larger benefit should increase the income of older adults as long as it does not significantly reduce other income sources. And higher incomes reduce poverty risk. As some worry, however, the higher benefit may not significantly decrease elderly poverty if it reduces earnings or crowds out private income transfers among the low-income older adults.

The pure life cycle hypothesis predicts that older adults maintain their consumption after retirement by dissaving.
or selling their wealth (Modigliani, 1966). In reality, older adults may restrict consumption under the constraint of having low income and insufficient savings or wealth. We expect that higher income due to a benefit increase will encourage consumption by older adults. A few studies show that public pensions in lower-income countries increased consumption by older people (Chen, 2017; Zhao, Li, & Chen 2016). Conversely, there are reasons to postulate that the higher BPS benefit may not be associated with an increase in consumption. Many low-income older adults in Korea have been living in poverty since they were young. They cope with economic difficulties by being extremely frugal and having emergency savings for unexpected events such as serious medical conditions. Research in other countries also suggests that older cohorts consume less than what their income can afford (Börsch-Supan & Stahl, 1991).

Method

Data

We use monthly panel data from the Household Income and Expenditure Survey (HIES) administered by the Korea Statistical Office. The survey collects information on income and other related factors from about 8,700 households representative of the entire population across the country. In particular, the HIES contains the most reliable and detailed information on consumption from a self-recorded diary. The monthly data are very useful for pinpointing changes in income and consumption before and after the BPS benefit rose in July 2014. Our sample consists of households including an old person aged 65 or older, excluding outliers, less than 1 percent of the sample, which reported too high income or expenditure. The sample consists of 1,931 households and 2,641 older persons in 2014.

Statistical Analysis

We identify the effects of the reform by utilizing exogenous variation in the benefit level generated by the replacement of the BOAPS with the BPS in July 2014. The essence of the reform is a doubling of the benefit.

Studies on the effects of social pensions have often applied two approaches: difference-in-differences (DD) and regression discontinuity design methods (Amuedo-Dorantes & Juarez, 2015; Chen, 2017; Jensen, 2003). We follow the DD approach. We compare differences in outcomes before and after the reform between treatment and comparison groups. The resource-based eligibility rule of the BPS provides a basis for distinguishing the two groups. The treatment group consists of lower-income older people whom the reform was very likely to affect. The remaining higher-income older people belong to the comparison group. Outcomes following the reform are measured as monthly averages between July and December, and are compared to monthly average outcomes between April and June. Given that the benefit amount is adjusted for inflation annually in April, we analyze data since April.

The determination of treatment and comparison groups warrants careful consideration. An easy choice is to use beneficiary status after the benefit increase. Beneficiary status depends on the resource levels of older adults as mentioned earlier. However, those motivated to qualify for the now-higher benefit may manipulate resource levels. Then, we may overestimate the effects. To avoid this endogeneity bias, we use beneficiary status in June 2014 before the benefit increase to construct the treatment and comparison groups. Beneficiaries already enrolled before the reform automatically became eligible for the higher benefit. If we ignore effects on those who become new beneficiaries after the reform, we risk underestimating the effects of the program change. We address this in the supplementary analyses.

A key identifying assumption underlying the DD approach is that trends in outcomes would be the same in the two groups in the absence of the policy intervention. We would attribute a deviation from the common trend at the time of the policy intervention to its effect. In this study, however, the assumption of common trends is problematic. The change of outcomes may depend on the initial conditions of elderly households that influence their beneficiary status. If we eliminate differential trends between the two groups to identify the residual common trends, we can attribute a deviation from the residual common trend to the effect of the reform.

Following this logic, we modify the DD setup using a higher-order contrast to remove bias from the nonrandom assignment. In addition to group and time period, we add year as a third dimension on which the policy intervention varies. Although the benefit rose as of July in 2014, the benefit had remained unchanged over the year in 2013. Our main results are estimated from the triple-differences (DDD) models with the additional control of outcome trends for each group over the corresponding period in 2013. The models account for potentially differential time trends for each group over the corresponding period in 2013. The models account for potentially differential time trends between the groups, assuming that a potential difference is the same in the adjacent years (for a discussion of the triple-differences method, see Blundell & Dias, 2009). In fact, we found a similar trend of income differences (DDD) models with the additional control of outcome trends for each group over the corresponding period in 2013. The models account for potentially differential time trends between the groups, assuming that a potential difference is the same in the adjacent years (for a discussion of the triple-differences method, see Blundell & Dias, 2009).

We estimate the model:

$$Y_{itg} = \alpha + \gamma Ben_g + \tau Aft_t + \theta Yr_r + \delta_1 (Ben_g \cdot Aft_t) + \delta_2 (Ben_g \cdot Yr_r) + \delta_3 (Yr_r \cdot Aft_t) + \delta_4 (Ben_g \cdot Aft_t \cdot Yr_r) + X_{itg} \beta + \epsilon_{itg}$$

where $i$ indexes an individual household, $t$ indexes time, and $y$ indexes the year. $Ben$ indicates whether the elderly household belongs to the treatment group. $Aft$ indicates...
whether the time is after the benefit increase. \(Y_r\) indicates whether the year is when the benefit increase occurred. The coefficient of interest, \(\delta_4\), indicates the impact of the benefit increase by comparing changes before and after the reform between the groups, across the adjacent years. Covariates, \(X_{igty}'\), include employment status of household head, family size, housing tenure, living arrangement, and month dummies. Time-invariant covariates such as age, sex, and education of household head are removed from the model since we estimate household fixed effects models. \(Y\) indicates outcomes. We estimate linear regression models for the quantitative outcome variables and apply a linear probability model for the binary dependent variables.

**Results**

Table 2 describes the sample characteristics by year and group status. We present the characteristics as of June 2014 (and June 2013), immediately before the benefit increase. The beneficiary group indicates the treatment group, whereas the nonbeneficiary group indicates the comparison group. The share of beneficiary group is about two thirds in 2014 and 2013, reflecting that 70 percent of older persons were eligible for the social pension benefit. Compared to the national statistics of the beneficiaries in Table 1, the sample underrepresents older, female, and single elderly beneficiaries. Still, the beneficiary households show disadvantaged characteristics. Nearly half of the beneficiaries were aged 75 or older and the majority were female. About 70 percent belonged to households in the bottom three quintiles of the income distribution. Beneficiary households also showed a relatively low rate of owner-occupancy.

The differences between the two groups remained similar in the 2 years. There are only a few exceptions. In 2014, the share of those aged 75 or older increased slightly among the beneficiary households, compared to 2013. The share of single elderly households also rose somewhat. The changes may reflect an aging process in Korean society.

### Results From Simple Difference-in-Difference-in-Differences Estimation

Next, we examine the effects of the increased benefit by comparing the difference-in-differences by beneficiary status before and after the time of the increase (July) in 2014 to the corresponding difference-in-differences in 2013. We can attribute the triple differences to the effects of the benefit increase in July 2014.

Table 3 presents the observed triple differences in nine outcomes. We first examine gross income and its three components. We divide gross income into primary income, public transfer income, and private transfer income. Primary income is labor earnings along with income from property. We also examine total expenditure and consumption and nonconsumption expenditure. Consumption expenditure is the cost of purchasing goods and services to meet households’ needs. Nonconsumption expenditure includes taxes, interest payments, and private transfers to others. Using the Minimum Cost of Living, an absolute measure of poverty line set annually by the Korean government, we finally investigate poverty rates and poverty gap. We measure poverty gap as an average difference between the poverty line and gross income across households.

Beneficiary households earned a monthly average gross income of 1,448,000 KRW before the benefit increase. After the increase, the incomes increased by 123,000 KRW, leading to 1,571,000 KRW. Over the same period, nonbeneficiary households increased their average income by 25,000 KRW. If we assume a common trend in gross income between the two groups over the period, we might attribute

### Table 2. The Characteristics of the Sample

|                      | 2013 (%, mean) | 2014 (%, mean) |
|----------------------|----------------|----------------|
|                      | BEN  | Non-BEN | BEN  | Non-BEN |
| Older persons        |      |         |      |         |
| Aged 65–74           | 52.8 | 71.3    | 50.3 | 71.5    |
| Aged 75–84           | 41.5 | 25.7    | 42.3 | 26.1    |
| Aged 85 or older     | 5.7  | 3.1     | 7.2  | 2.4     |
| Female               | 54.1 | 35.4    | 55.2 | 35.2    |
| The household         |      |         |      |         |
| Aged 44 or below     | 8.2  | 7.6     | 6.8  | 6.4     |
| Aged 45–54           | 8.4  | 3.5     | 8.2  | 3.2     |
| Aged 55–64           | 5.1  | 7.2     | 5.9  | 7.2     |
| Aged 65 or older     | 78.4 | 81.7    | 79.2 | 83.2    |
| Female               | 43.4 | 26.4    | 46.4 | 27.3    |
| Less than high school | 89.7 | 76.8    | 90.1 | 72.4    |
| graduation           |      |         |      |         |
| Living arrangement   |      |         |      |         |
| Single older person  | 32.3 | 20.2    | 36.0 | 20.0    |
| Older couple only    | 33.8 | 45.2    | 32.2 | 49.5    |
| Single older person  | 24.7 | 24.7    | 22.8 | 21.8    |
| with children         |      |         |      |         |
| Older couple with    | 9.2  | 9.9     | 8.9  | 8.7     |
| children              |      |         |      |         |
| N of older persons   |      |         |      |         |
| One                   | 64.4 | 63.8    | 65.4 | 60.2    |
| Two                   | 35.2 | 36.0    | 34.1 | 39.5    |
| Three or over         | 0.4  | 0.2     | 0.5  | 0.3     |
| Family size           | 2.1  | 2.3     | 2.0  | 2.2     |
| Income quintiles      |      |         |      |         |
| 1st                   | 25.1 | 11.5    | 25.8 | 10.1    |
| 2nd                   | 26.2 | 9.3     | 26.1 | 9.3     |
| 3rd                   | 21.3 | 18.8    | 21.0 | 19.2    |
| 4th                   | 16.2 | 28.4    | 15.9 | 29.1    |
| 5th                   | 11.2 | 32.1    | 11.1 | 32.3    |
| Urban resident        | 68.7 | 78.6    | 67.2 | 79.9    |
| Housing tenure        | 72.8 | 89.9    | 71.8 | 88.9    |
| N of the household    | 1,289| 655     | 1,275| 656     |

Note: BEN = beneficiary group, Non-BEN = nonbeneficiary group.
Source: Household Income and Expenditure Survey
Table 3. The Results of Simple Triple Difference Estimation

|       | 4–6m Gross income | 7–12m Gross income | D/DD Gross income | 4–6m Private income | 7–12m Private income | D/DD Private income | 4–6m Private transfer income | 7–12m Private transfer income | D/DD Private transfer income | 4–6m Non-Cons. Exp. | 7–12m Non-Cons. Exp. | D/DD Non-Cons. Exp. | 4–6m Exp. | 7–12m Exp. | D/DD Exp. | 4–6m NBEN | 7–12m NBEN | D/DD NBEN | 4–6m NBEN | 7–12m NBEN | D/DD NBEN | 4–6m BEN | 7–12m BEN | D/DD BEN | 4–6m BEN | 7–12m BEN | D/DD BEN |
|-------|-------------------|-------------------|------------------|---------------------|---------------------|---------------------|-----------------------|---------------------------|------------------------|----------------|----------------|----------------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|
| 2014  | BEN 1,448 1,571 123 | BEN 2014 215 209 6 | BEN 2014 215 209 6 | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | D/DD 41 43 2 | D/DD 41 43 2 |
| 2013  | BEN 1,474 1,492 18 | BEN 2013 205 211 6 | BEN 2013 205 211 6 | NBEN 2,437 2,442 5 | NBEN 2013 160 179 19 | NBEN 2013 160 179 19 | D/DD 45 32 13 | D/DD 45 32 13 |
|       | D/DD 963 986 98 | D/DD 2013 41 43 2 | D/DD 2013 41 43 2 | D/DD 963 950 13 | D/DD 2013 45 32 13 | D/DD 2013 45 32 13 | D/DD 963 950 13 | D/DD 963 950 13 |
|       | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | D/DD 41 43 2 | D/DD 41 43 2 |
|       | D/DD 963 986 98 | D/DD 2013 41 43 2 | D/DD 2013 41 43 2 | D/DD 963 950 13 | D/DD 2013 45 32 13 | D/DD 2013 45 32 13 | D/DD 963 950 13 | D/DD 963 950 13 |
|       | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | D/DD 41 43 2 | D/DD 41 43 2 |
|       | D/DD 963 986 98 | D/DD 2013 41 43 2 | D/DD 2013 41 43 2 | D/DD 963 950 13 | D/DD 2013 45 32 13 | D/DD 2013 45 32 13 | D/DD 963 950 13 | D/DD 963 950 13 |
|       | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | D/DD 41 43 2 | D/DD 41 43 2 |
|       | D/DD 963 986 98 | D/DD 2013 41 43 2 | D/DD 2013 41 43 2 | D/DD 963 950 13 | D/DD 2013 45 32 13 | D/DD 2013 45 32 13 | D/DD 963 950 13 | D/DD 963 950 13 |
|       | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | NBEN 2,411 2,436 25 | NBEN 2014 174 166 8 | NBEN 2014 174 166 8 | D/DD 41 43 2 | D/DD 41 43 2 |
|       | D/DD 963 986 98 | D/DD 2013 41 43 2 | D/DD 2013 41 43 2 | D/DD 963 950 13 | D/DD 2013 45 32 13 | D/DD 2013 45 32 13 | D/DD 963 950 13 | D/DD 963 950 13 |

Note: D, DD, and DDD mean difference, double, and triple differences, respectively. All monetary values are expressed in constant 2014 Korea thousand Won. BEN = beneficiary group, NBEN = nonbeneficiary group, Cons. = Consumption, Exp. = Expenditure.
the difference of 98,000 KRW to the effect of the benefit increase. Given the different initial conditions, though, we cannot assume a common income trend between the two groups.

When we look at the income changes over the corresponding period in 2013, we find that the increase in gross income was higher by 13,000 KRW among beneficiary households. The difference may reflect the differential income trend between the two groups in the absence of the benefit change. Thus, we may regard the triple difference of 85,000 KRW, accounting for differential trends, as an unbiased estimate of the effect of the benefit increase. Following the same logic, the second, third, and fourth panels provide the simple triple differences of 4,000 KRW for primary income, 63,000 KRW for public transfer income, and 15,000 KRW for private transfer income.

Second, Table 3 also provides the simple triple-difference estimates for total expenditure and consumption and nonconsumption expenditure. In 2014, the difference in total expenditure between the two groups increased by 46,000 KRW after the benefit increase. In 2013, however, there was a relative decrease of 47,000 KRW among beneficiary households over the same time period. Thus, the triple difference estimate shows total expenditure augmented by 93,000 KRW due to the benefit increase. This suggests that the beneficiary mostly used the added gross income of 85,000 KRW due to the benefit increase for additional expenditure. They spent a larger share of this increased expenditure for purchasing consumer goods and services.

Third, Table 3 presents changes in poverty status and poverty gap due to the benefit increase. In 2014, the poverty rate of beneficiary households dropped by 9.0 percentage points from 47.9 percent before the benefit increase to 38.9 percent after the increase. On the other hand, nonbeneficiary households showed a small decline of 1.2 percentage points. Thus, the difference-in-differences is 7.8 percentage points. In 2013, nonbeneficiaries showed a larger drop in poverty rates over the corresponding period. Thus, the final triple difference is 9.3 percentage points. For the average poverty gap, the triple difference is 41,000 KRW. This suggests that 48 percent of the increased gross income (85,000 KRW) helped reduce the poverty gap. The benefit increase of the BPS considerably reduced the poverty rate and poverty gap. Yet, there is still a need for additional, effective anti-poverty policy interventions.

Results From Multivariate Estimation

The simple triple-differences estimation controls for differential trends in outcomes between the treatment and comparison groups, but it does not consider other characteristics potentially correlated with the outcomes. We conducted multivariate analyses to control for observed characteristics. We estimate fixed-effect models to further control for time-constant unobserved household characteristics. Results from multivariate analyses are similar to those from the simple triple differences estimation. Results for a few outcomes show differences though.

Table 4. The Results of Multiple Regression Estimation (Income)

| Variables | Gross income | Primary income | Public transfer income | Private transfer income |
|-----------|--------------|----------------|------------------------|------------------------|
|           | $b$          | Robust SE      | $b$                    | Robust SE              | $b$                    | Robust SE |
| Ben × Yr × Aft | 85.166**     | 31.639         | -16.664                | 30.460                 | 92.404***             | 8.807      |
| Ben × Aft  | 2.721        | 21.828         | 18.463                 | 20.555                 | -7.712                | 6.179      |
| Yr × Aft   | -1.523       | 26.931         | -1.517                 | 26.062                 | 21.532**              | 8.090      |
| Working    | 432.278***   | 29.406         | 493.909***             | 30.915                 | -17.188**             | 5.832      |
| Family size| 297.943***   | 82.974         | 393.504***             | 84.621                 | 39.550**              | 14.502     |
| Housing tenure | 375.927***  | 110.862        | -129.039*              | 74.327                 | 40.927                | 41.323     |
| Coreidence | 556.029***   | 135.370        | 405.949**              | 139.278                | -28.954               | 19.432     |
| Month 4    | -21.194*     | 9.655          | -11.919                | 9.139                  | -5.578**              | 2.179      |
| 5          | -21.011**    | 8.203          | -15.514*               | 7.717                  | -2.589                | 1.690      |
| 7          | -1.393       | 18.619         | -13.547                | 17.526                 | 2.000                 | 5.542      |
| 8          | -7.779       | 19.136         | -28.597                | 17.744                 | 3.921                 | 5.763      |
| 9          | 37.529+      | 19.486         | 7.322                  | 18.292                 | 10.252*               | 5.867      |
| 10         | 13.029       | 19.927         | 0.217                  | 18.619                 | 4.933                 | 5.906      |
| 11         | 14.540       | 19.946         | -4.092                 | 18.673                 | 5.424                 | 6.004      |
| 12         | 42.542*      | 21.690         | 12.858                 | 20.427                 | 9.431                 | 6.122      |
| Intercept  | 697.160***   | 152.812        | -26.373                | 152.944                | 362.579***            | 27.256     |

within R² | 0.086 | 0.099 | 0.124 | 0.046 |
F          | 24.57*** | 21.67*** | 160.51*** | 3.34*** |
N          | 30,934  | 30,934  | 30,934  | 30,934  |

Note: The sample consists of 30,934 household-month observations from April to December of 2013 and 2014, excluding those with missing data. All monetary values are expressed in constant 2014 Korea thousand Won. *p<.10, *p<.05, **p<.01, ***p<.001.
| Variables              | Total Exp. | Consumption Exp. | Nonconsumption Exp. | Poverty rate | Poverty gap |
|------------------------|------------|------------------|---------------------|--------------|-------------|
|                        | b          | Robust SE        | b                   | Robust SE    | b           | Robust SE |
| Ben × Yr × Aft         | 94.785     | 53.924           | 74.691*             | 31.830       | 20.094      | 42.940    |
| Ben × Aft              | −67.101*   | 28.880           | −28.698             | 24.078       | −38.403**   | 13.468    |
| Yr × Aft               | −65.235    | 51.178           | −46.740*            | 28.294       | −18.495     | 42.23     |
| Working                | −12.536    | 24.600           | −24.705             | 19.100       | 12.169      | 12.77     |
| Family size            | 257.888*** | 65.496           | 230.884***          | 43.536       | 27.004      | 42.604    |
| Housing tenure         | 453.447*** | 139.823          | 405.555***          | 107.487      | 47.893      | 91.838    |
| Coresidence            | 176.352*   | 105.517          | 122.400*            | 63.889       | 53.952      | 76.416    |
| Month 4                | −49.496**  | 19.134           | −9.808              | 10.435       | −39.688*    | 16.009    |
| Working                | 46.632*    | 19.553           | 63.267***           | 10.985       | −16.634     | 15.950    |
| Coresidence            | 59.997*    | 30.403           | 77.853***           | 23.816       | −17.856     | 16.78     |
| Month 5                | 263.093*** | 30.170           | 129.086***          | 22.735       | 134.007     | 17.838    |
| Working                | 75.726*    | 30.153           | 89.022***           | 23.721       | −13.296     | 16.319    |
| Coresidence            | 131.897*** | 29.774           | 147.308***          | 23.242       | −15.411     | 16.381    |
| Month 7                | 160.867*** | 32.265           | 105.791***          | 23.988       | 55.076**    | 19.801    |
| Intercept              | 750.705*** | 125.308          | 513.128***          | 81.800       | 237.576**   | 80.690    |

Note: The sample consists of 30,934 household-month observations from April to December of 2013 and 2014, excluding those with missing data. All monetary values are expressed in constant 2014 Korea thousand Won. Exp. = Expenditure, *p<.10, *p<.05, **p<.01, ***p<.001.
Table 4 shows multivariate estimates of the effects of the benefit increase on income. The program change increased gross income by 85,000 KRW and public transfer income by 92,000 KRW. The benefit increase was not significantly associated with changes in primary income and private transfer income as the coefficients are close to zero. Compared to results from the simple estimation, the increase in public transfer is larger. The effect on primary income becomes negative in sign, albeit statistically insignificant. The argument that public transfers crowd out earnings or private transfer income is not empirically supported. These results differ from the findings from studies of other countries that social pension programs crowd out other income sources (Amuedo-Dorantes & Juarez, 2015; Bertrand et al., 2003; Jensen, 2003).

Table 5 presents estimates of the effects on expenditure among elderly households. The benefit increase is associated with an average increased total expenditure of 95,000 KRW and increased consumption of 75,000 KRW. The beneficiary households spent almost all increased gross income (85,000 KRW) on consumer goods and services. Additional analyses show that they significantly increased consumption for housing and utilities (results are available on request).

Table 5 also provide estimates of effects on poverty. The estimates are similar to those of the simple triple-differences. The benefit increase was associated with a decrease in the poverty rate by 9.3 percentage points and the poverty gap by 47,000 KRW. Even though many beneficiaries are still poor, we can say that the benefit increase substantially reduced the poverty of older adults.

Finally, we have checked the sensitivity of our results to a different classification of treatment and comparison groups or to a different selection of the sample in the supplementary analyses. When we define group status based on actual receipt of the BPS benefit in each month, the associated increase in income and the decrease in poverty become larger. When we restrict the sample to households headed by an older person, the increase in expenditure becomes smaller and insignificant. Overall, the results are qualitatively similar to those presented in Tables 4 and 5 (results are available on request).

Conclusion

This study provides estimates of the effects of specific social pension reform on the well-being of older adults in Korea. Our study, based on data with comprehensive information about both income and consumption, provides a more complete picture of the impacts on several interrelated outcomes. Results show that a higher program benefit increased gross income and public transfer income. It did not decrease market incomes and private transfer incomes, despite the concerns of some critics. It reduced poverty and increased consumption. These findings are generally consistent with our theoretical expectation. The finding of no effect on private transfer income suggests that filial piety better explain private transfer by adult children than altruism or exchange theory does. The finding of improved consumption is less consistent with the life cycle hypothesis and implies that consumption among older adults was responsive to increased income.

Our study conducted triple-differences estimation, using a policy variation provided by a natural experiment. The findings contrast with those from the literature in Korea. The literature generally shows that the effects of the BOAPS or the BPS were trivial and not significant (Lee & Kwon, 2016; Park & Kim, 2015; Shin & Do, 2015). Methodological deficiencies may explain the failure to find significant effects. One study could not utilize the exogenous variation of policy change due to data limitations (Shin & Do, 2015). Other studies, which did consider exogenous policy changes, applied a rather crude difference-in-difference method and failed to control for differential trends between treatment and comparison groups (Lee & Kwon, 2016; Park & Kim, 2015).

Our findings that there were no effects of the benefit increase on market income and private transfer income differ from those reported in studies of social pensions in other countries. Many studies suggest negative incentive effects on labor supply (Arthington, Case, & Hosegood, 2009; de Carvalho Filho, 2008), private transfers (Jensen, 2003; Maitra & Ray, 2003), and intergenerational coresidence (Chen, 2017). Our contrasting results may arise from different social or cultural contexts or from the institutional characteristics of the social pension schemes. Korea is a very industrialized and urbanized society, and the behaviors of older persons and their children may be less sensitive to the influence of a social pension than would those of individuals in less industrialized and rural societies. In addition, the Korean social pension program provides a modest amount of benefit payments with a generous disregard of earnings and other sources of income. This unique institutional design may explain the lack of negative incentive effects.

We cannot exclude the possibility, given the modest amount of the social pension benefit, that additional benefit increases might result in different findings. We also add that our findings should be viewed as an assessment of the short-term effects of changes in the social pension program. We only examined changes over 6 months following the social pension reform. A further investigation of long-term consequences is warranted to fully understand the effects of this evolving social pension program.

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