Issues associated with the use of National Health Insurance contributions in determining public policy program beneficiaries

Hosung Sohn and Namho Kwon

School of Public Service, Chung-Ang University, Seoul, South Korea; Department of Public Administration, Soongsil University, Seoul, South Korea

ABSTRACT

Scholars, practitioners, and policymakers agree that the eligibility criteria used for determining welfare benefit recipients must be efficient, equitable, and possess few measurement errors. This study analyzes Korea’s system of using contributions to the National Health Insurance as an eligibility criterion for determining welfare benefit recipients and evaluates whether the system has these aforementioned characteristics, using the case of the COVID-19 stimulus payment distributed in the city of Jeonju. The analysis shows that while the system is favorable from an efficiency perspective, it is less desirable in terms of the other two characteristics. Based on the findings, this study proposes using tax return and employment insurance data, as such databases can help solve the equity and measurement error issues associated with the use of the current system.

I. Introduction

Promoting economic growth and maintaining the overall level of social welfare are the primary goals of many public policies. Countries spend a significant amount of government budget on health, education, disability and retirement insurance, and other social welfare-related sectors to solve many policy problems, such as poverty. As such, many studies have focused mainly on two research streams: analyzing whether spending is effective in solving policy problems (e.g. Furceri & Zdzenicka, 2012; Haile & Niño-Zarazúa, 2018; van de Walle, 1998) and identifying public policies that are relatively more effective for achieving these goals (Guzman et al., 2013; Howlett et al., 2014; Mukherjee & Bali, 2019; Roland, 2014).

Relatively few studies have been conducted, however, on targeting issues. Social welfare expenditures are targeted at many social classes, such as low-income households, persons with disability, and unemployed groups. The effectiveness of such expenditures must be promoted because desirable outcomes may not be attained if the policy has not been targeted appropriately. Thus, studies aimed at answering
‘Who should benefit from such expenditure?’ and ‘Which tools (e.g. eligibility criteria) should be used to identify recipients of social welfare programs?’ are necessary.

The purpose of the present study is to provide a valid answer to the second question using the Korean setting: How should recipients of government welfare benefits be identified? In Korea, eligibility for many social welfare benefits is determined by households’ monthly contributions to National Health Insurance (NHI). The amount of the NHI contribution that each household pays is determined by various wealth-related factors, such as wages, income, and assets. The government uses the NHI contribution to decide on eligibility for many of the welfare benefits on the assumption that the contribution is a good proxy for individual wealth.

Scholars, practitioners, and policymakers agree that the eligibility criteria used for determining welfare benefit recipients must possess the characteristics of efficiency and equity (Bardhan, 1996; Birdsall & James, 1990; Hahn, 1988), as well as few measurement errors (Sen, 1995; Sharif, 2009; Skoufias et al., 1999). In this study, we analyze the case of Korea’s system, which uses the NHI contribution as an eligibility criterion for welfare benefit recipients, and then evaluate whether the system has the aforementioned characteristics. The analysis shows that while using the NHI contribution for eligibility is favorable from an efficiency perspective, it is less desirable in terms of the other two characteristics.

The first issue is related to the measurement errors (i.e. validity and reliability) inherent in the NHI contribution. The NHI contribution is not a valid proxy for individual wealth because it has limited ability to capture the asset proportion of individual wealth, such as financial and real estate assets. The NHI contribution is also not reliable. For one, the amount of the NHI contribution is updated only once a year, and as such, it does not reflect the wealth status of individuals at a certain point in time. For another, the NHI contribution does not capture regional variation in the wealth status of individuals across Korea. Accordingly, using the flat-rate NHI contribution across regions in Korea will be unreliable.

The second issue is related to equity. This issue is driven mainly by the fact that Korea uses a two-tiered system when determining the amount of NHI contribution to be paid by each household. The equations used to determine the amount of contribution are different between employees and self-employed people. The contributions of employees are determined solely by their wages, whereas those of self- or non-employed people are determined by various factors, including income and assets. Consequently, self- or non-employed people with high-value assets but without income are more likely to be ineligible for many types of social welfare policies even when they face liquidity constraints.

To mitigate these aforementioned issues, the government can use tax return databases that include information on consolidated income, real estate tax, year-end tax, and local tax. Moreover, we also suggest using employment insurance data, as these data allow policymakers to keep track of a person’s wage on a monthly basis.

The remainder of this paper is organized as follows. In Section II, we provide a theoretical background on the normative aspects of how social welfare recipients should be identified. Section III explains the institutional background of the NHI contribution system adopted in Korea and presents information on how the NHI
contribution is used to identify beneficiaries of the COVID-19 stimulus payment in the
city of Jeonju. In Section IV, we discuss the problems of the NHI contribution system in
terms of equity criteria, as well as measurement and precision issues. In Section V, we
propose policy recommendations and present our conclusions.

II. Theoretical background

Many governments make a significant amount of fiscal expenditure on social welfare
policies to promote the well-being of citizens (OECD, 2021). In general, social welfare
policies do not target the entire population. Rather, each social welfare policy is directed
at a specific group, such as low-income households, older individuals, and other sub-
groups. Because targeting an appropriate population is critical to the success of any social
welfare policy, such targeting must be conducted on sound theoretical bases (Heckman &
Garcia, 2017). The targeting issue is essentially a resource allocation problem, and
previous studies have proposed many types of decision criteria for such allocation,
such as equity or fairness, efficacy or effectiveness, cost-effectiveness, and so forth (e.g.
Guindo et al., 2012). Among the various criteria suggested in the literature, however, the
two most competing values that any criteria must pursue are efficiency and equity
(Wilenski, 1981).

Efficiency and equity are multi-faceted concepts. Efficiency, in general, refers to the
completion of a task with the minimum use of resources or time. To put this definition in
context, we can say that the method used for determining the recipients of welfare
benefits is efficient when the method can identify the recipients in a time- or resource-
saving way. By contrast, equity is related to the question of ‘who benefits’ and this ‘who’
must be a reasonable group for receiving welfare benefits. Thus, in the context of
targeting, the method must be able to identify the ‘right’ group for welfare benefits.

Equity is divided into two types. The first type is vertical equity, which states that
a person with relatively lower wealth should be identified as a welfare benefit recipient.
The second type is horizontal equity, which is the notion that if there are two people with
similar wealth, and person A is identified as a benefit recipient, then person B should also
be identified as a benefit recipient. We examined the appropriateness of the system that
uses the NHI contribution to identify welfare benefit recipients based on these three
criteria.

The use of the NHI contribution for identifying benefit recipients is predicated on the
fact that the amount of the contribution reflects a person’s wealth with high validity and
reliability (i.e. few measurement errors). In this study, we also examined whether the
NHI contribution may be subject to measurement errors.

III. National Health Insurance system

1. Institutional background

Korea adopted a National Health Insurance (KNHI) program as its public health care
plan in 1989. The KNHI is a mandatory plan that covers the basic health-related needs of
every Korean citizen. The KNHI is the only public health care insurance provider in
Korea. Korean citizens are automatically enrolled in the national insurance system as
soon as their birth is recognized. Insurance coverage is universal and operates in a two-tiered system that depends on employment status (i.e. employer- and locally-provided policyholders). Employer-provided policyholders are employees whose insurance premiums, as well as their family members’, are paid in part by their employers. For example, when a person is hired by a company, the person pays half of the premium and the employer pays the other half. If the person belongs to a household of four family members, the other three family members are insured by this person as dependents and do not pay additional premiums. By contrast, locally-provided policyholders are those who are not employed and those who are not family members of policy-holding employees. These two groups avail of the same insurer’s services but are managed differently.¹

When analyzing the NHI system, it is important to examine how the contribution amount is determined separately for employer- and locally-provided policyholders. Panel A of Table 1 shows the NHI contribution system for employer-provided policyholders.² The amount of contribution that employer-provided policyholders pay is determined solely by a person’s earned and other income. The contribution amount does not increase indefinitely with a person’s income. The maximum contribution amount is set at KRW 3,096,570 per month, or KRW 37,158,840 per year. In addition, while there is no deduction for a person’s earned income, KRW 34,000,000 per year is deducted from other income when calculating the contribution amount. The deduction amount is scheduled to

<table>
<thead>
<tr>
<th>Table 1. NHI contribution systems for employer- and locally-provided policyholders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td><strong>Panel A: Employer-provided policyholders</strong></td>
</tr>
<tr>
<td>Determined by</td>
</tr>
<tr>
<td>1. Earned income</td>
</tr>
<tr>
<td>2. Other income</td>
</tr>
<tr>
<td>Maximum monthly contribution</td>
</tr>
<tr>
<td>Other income (x)</td>
</tr>
<tr>
<td>Deduction for x (z)</td>
</tr>
<tr>
<td>Contribution rate (i)</td>
</tr>
</tbody>
</table>
| Formula | \[
\frac{\text{Yearly income} - z}{i} \times 12
\] | | |
| **Panel B: Locally-provided policyholders** | | | |
| Income Source (x) | | | |
| 1. Earned income | 1. Earned income | | |
| 2. Other income | 2. Other income | | |
| Evaluation rate | | | |
| 1. Pension: 0.3 | 1. Pension: 0.5 | | |
| 2. Earned: 0.3 | 2. Earned: 0.5 | | |
| Asset (y) | | | |
| Rating | 97 rating levels (KRW 1 million–1.14 billion) | Flat rate | |
| Minimum | KRW 13,100 for x < KRW 1 million | KRW 17,460 for x < KRW 3.35 million | |
| Deduction Rating | Varies by y | y = KRW 50 million won | |
| (KRW 1 to KRW 7.78 billion) | 60 rating levels | 60 rating levels | |
| Vehicle Source | Cars only | Cars only | |
| Years of use | 9 years or less | 9 years or less | |
| Displacement | | | |
| 1. A car with value of KRW 40 million and engine of 1,600 cc or smaller | A car with value of more than KRW 40 million | | |
| 2. A car with engine larger than 1,600 cc | | | |
be reduced to KRW 20,000,000 per year in July 2022. The contribution amount is determined as follows. Suppose first that employee A makes KRW 50,000,000 and KRW 60,000,000 in earned and other income per year, respectively. According to the formula in Table 1, employee A’s monthly contribution under the July 2018 system is as follows:

\[
[(50,000,000 + 60,000,000) - 34,000,000] \times 0.03335 \div 12 = 211,216
\]

The situation for locally-provided policyholders is completely different. Panel B of Table 1 shows how the amount of NHI contribution is determined for locally-provided policyholders. Compared with employer-provided policyholders, locally-provided policyholders pay an amount that is determined by three factors: income, assets, and vehicles. Moreover, the formula used for each factor is very different from that applied to employer-provided policyholders. The exact amount of income is included in the formula for employer-provided policyholders, whereas in that for locally-provided policyholders, the factors are given a rating based on the range of each factor. The amount of the NHI contribution for locally-provided policyholders is a function of the three factors, and the way that each factor is determined is a complicated function of various factors. The main reason for the complexity of the NHI contribution system for locally-provided policyholders is the difficulty in keeping track of the exact wealth level of such policyholders. Because many of these policyholders are not registered in the national employment insurance system, it is difficult to assess their wealth level precisely.

Another reason for the complexity of the NHI contribution system is authorities’ efforts to ensure equity among locally-provided policyholders. As can be expected, the asset component is a significant determinant of the NHI contribution amount, and because people possess different types of assets, comparisons are difficult to conduct. For example, suppose person A has land valued at KRW 200,000,000, whereas person B has a building with a value equal to KRW 100,000,000. Can person A be considered to be twice as rich as person B? As a matter of course, while the land has a value that is twice that of the building, it is difficult to assume that person A is two times richer than person B because, in general, a building is relatively easier to liquidate than land is. Moreover, it is easier to rent buildings.

Regardless of the complexity of the NHI contribution system for locally-provided policyholders, the most important takeaway is the difference in the determinants of the contribution amount between employer- and locally-provided policyholders. To recap, only the income level determines the contribution amount of employer-provided policyholders. By contrast, assets, vehicles, and income levels determine the contribution amount of locally-provided policyholders. In other words, regardless of the assets employer-provided policyholders possess, such wealth is not considered in determining their NHI contribution amount. This difference creates a significant issue when the NHI contribution amount is used to determine the wealth level of a person for the purpose of identifying eligible people for public financial aid programs, as discussed in detail in Section IV.

2. Use of the NHI contribution system in determining the income level of policy beneficiaries

The eligibility for many public financial aid programs in Korea is determined by income level. The Ministry of Health and Welfare announces the median income level based on the number of household members. For example, the median income
level in 2020 for four-member families was KRW 4,749,174 per month. The median income level is estimated by the Survey of Household Trends that Statistics Korea conducts every year using a representative sample of 7,200 households. These median income levels are used to determine the eligibility for many public financial aid programs in Korea.

The median income level announced annually by the Ministry of Health and Welfare is often used as a benchmark of whether a person is eligible for public financial aid programs, and it is used by both aid applicants and public officials responsible for determining an applicant’s eligibility. Given the difficulty in assessing household income levels, a proxy variable is used extensively in practice. Specifically, the government uses the NHI contribution amount to determine an applicant’s eligibility under the assumption that the NHI contribution is a good proxy for applicants’ income level. The Ministry of Health and Welfare also provides a conversion table for various categories of median income level.

Table 2 shows the NHI premium conversion table for 80% of the median income level. This table is used to determine the eligibility for a public financial aid program with a cutoff value of 80% of the median income level. Many social service programs, such as Health Management Programs for Mothers and Infants, use the 80% of median income cutoff. For example, suppose an applicant from a household with four family members wants to apply for a public aid program. To be eligible, the applicant’s income level must be equal to 80% of the median income level or below. The applicant’s monthly NHI contribution must be less than or equal to KRW 126,909 if the applicant is an employer-provided policyholder. If the applicant is a locally-provided policyholder, their monthly NHI contribution must not exceed KRW 118,159. If the applicant holds both employer-provided and locally-provided insurance, then the applicant should add the two contributions and the sum must be less than or equal to KRW 128,407.3

As can be seen from the conversion table, the required level of contribution increases as the number of household members increases. This setting is driven by the assumption that when the number of household members increases, more of the income is spent on consumption. In other words, it assumes that the income level of KRW 2,000,000/month for two-person families is not the same as that of KRW 2,000,000/month for four-person families. The latter group should be considered a relatively low-income family, which is a reasonable approach.

### Table 2. NHI premium conversion table (80% of the median income level, as of 2020).

<table>
<thead>
<tr>
<th>Number of household members</th>
<th>Income level (KRW)</th>
<th>Employer-provided (KRW)</th>
<th>Locally-provided (KRW)</th>
<th>Mixed (KRW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,406,000</td>
<td>46,890</td>
<td>13,980</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>2,394,000</td>
<td>79,924</td>
<td>45,003</td>
<td>80,076</td>
</tr>
<tr>
<td>3</td>
<td>3,096,000</td>
<td>104,090</td>
<td>95,023</td>
<td>105,268</td>
</tr>
<tr>
<td>4</td>
<td>3,799,000</td>
<td>126,909</td>
<td>118,159</td>
<td>128,407</td>
</tr>
<tr>
<td>5</td>
<td>4,502,000</td>
<td>151,927</td>
<td>150,605</td>
<td>153,994</td>
</tr>
<tr>
<td>6</td>
<td>5,205,000</td>
<td>174,636</td>
<td>178,276</td>
<td>177,425</td>
</tr>
<tr>
<td>7</td>
<td>5,912,000</td>
<td>198,402</td>
<td>207,077</td>
<td>201,381</td>
</tr>
<tr>
<td>8</td>
<td>6,618,000</td>
<td>224,298</td>
<td>238,415</td>
<td>228,710</td>
</tr>
</tbody>
</table>

All numbers in KRW. The NHI premium above excludes the long-term care insurance premium for the elderly.
3. Using the NHI contribution to determine eligibility for COVID-19 stimulus payments: the case of the city of Jeonju

The COVID-19 epidemic in Korea began in February 2020. The COVID-19 pandemic has had a tremendous impact on the economy of all countries (e.g. Alasdair, 2020; Entress et al., 2020; Roberts, 2020; Wright & Merritt, 2020). Owing to the lockdown and restrictions, many small business owners were greatly affected. To mitigate the negative impacts of the COVID-19 pandemic, many countries have started providing stimulus payments to households.

The city of Jeonju in Korea offers a meaningful case study for analyzing the issues associated with using the NHI contribution system to determine eligibility for COVID-19 stimulus payments. Jeonju made payments to approximately 50,000 of its population in April 2020. Jeonju has a total population of about 600,000; thus, approximately 8.3% of the population was eligible for the stimulus payment. To determine eligibility, Jeonju decided to use a needs-based system, and the city referred to people’s income level to determine eligibility. Because the payment needed to be issued immediately to maximize its effect, however, there was no time for the city to investigate the income level of each person. Accordingly, the city used the NHI contribution amount as a proxy for individual income levels, given that every individual is insured by the NHI in Korea. Specifically, Jeonju used Table 3 to determine the eligibility for the stimulus payment. The NHI contribution cutoff in Table 3 is constructed based on the median income level announced by the Ministry of Health and Welfare. The exact eligibility requirement is more complicated because the city used other requirements, such as asset levels. Nonetheless, Jeonju did use the NHI contribution amount to determine eligibility for the stimulus payment.

<table>
<thead>
<tr>
<th>Number of household members</th>
<th>Employer-provided</th>
<th>Locally-provided</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>88,344</td>
<td>63,778</td>
<td>––</td>
</tr>
<tr>
<td>2</td>
<td>150,025</td>
<td>147,928</td>
<td>151,927</td>
</tr>
<tr>
<td>3</td>
<td>195,200</td>
<td>203,127</td>
<td>198,402</td>
</tr>
<tr>
<td>4</td>
<td>237,652</td>
<td>254,909</td>
<td>242,715</td>
</tr>
<tr>
<td>5</td>
<td>286,647</td>
<td>308,952</td>
<td>298,124</td>
</tr>
<tr>
<td>6</td>
<td>326,561</td>
<td>349,099</td>
<td>343,406</td>
</tr>
<tr>
<td>7</td>
<td>402,261</td>
<td>426,790</td>
<td>437,059</td>
</tr>
<tr>
<td>8</td>
<td>437,059</td>
<td>462,265</td>
<td>471,545</td>
</tr>
<tr>
<td>9</td>
<td>471,545</td>
<td>495,914</td>
<td>519,517</td>
</tr>
<tr>
<td>10</td>
<td>519,517</td>
<td>544,044</td>
<td>602,065</td>
</tr>
</tbody>
</table>

All numbers in KRW. The NHI premium above excludes the long-term care insurance premium for the elderly.

IV. Issues associated with using the NHI contribution

Section IV discusses the advantages and disadvantages of using the NHI contribution to determine the wealth level of individuals using the Jeonju case.
1. **Advantages: efficiency**

The main reason that the government uses the NHI contribution as a proxy for a person’s wealth level rests on the idea of efficiency. As discussed in the previous section, the NHI contribution amount is a function of various factors, including earned income, other income, assets, and vehicles. As such, when a person earns more or has large assets, then their NHI contribution increases inevitably. The NHI also assesses a person’s wealth level every year based on the information provided by the National Tax System; therefore, the contribution amount reflects the change in a person’s wealth level. Every household in Korea is insured by the NHI system, and accordingly, every household is notified of the monthly NHI contribution amount. If a household does not pay the contribution, the NHI imposes a penalty, such as charging a late fee or suspending insurance services. For these reasons, every household knows the monthly contribution that they pay to the NHI. Thus, using the NHI contribution amount is an extremely efficient way of determining the income or wealth level of a household from an administrative cost perspective. It is also efficient from the aid applicant’s perspective: applicants for public financial aid programs do not have to spend so much time investigating and proving their income and asset levels.

2. **Disadvantage 1: measurement error in terms of validity**

While using the NHI contribution amount as a proxy for individual wealth is appropriate from an efficiency standpoint, other criteria need to be considered to guarantee legitimacy. The use of the NHI contribution amount is predicated on the fact that the amount is a good proxy for individual wealth and, therefore, must be associated with few measurement errors. If the NHI contribution amount is weakly correlated with individual wealth, it goes without saying that its use is susceptible to a measurement error issue, and the validity and reliability of the NHI contribution would be severely compromised.

We argue that the NHI contribution amount is not a good proxy for individual wealth, mainly for the following reasons. The correlation between NHI contribution and individual wealth is unlikely to be high, especially for employer-provided policyholders, whose contributions are evaluated without consideration of their assets. As discussed previously, only earned and other income are taken into consideration when determining the level of the NHI contribution for employer-provided policyholders. The two variables may have a high correlation if the correlation between income and assets is high. Many studies, however, documented the fact that the correlation between the two variables is weak. For example, in the United States, the estimated correlation between the two variables is only 0.5069 (DQYDJ, 2017).

3. **Disadvantage 2: measurement error in terms of reliability**

Using the NHI contribution amount to determine the level of individual wealth has three limitations with respect to the precision issue. The first is driven by the fact that the NHI evaluates an individual’s contribution amount once per year (i.e. around September, when the information on consolidated income tax return is released by the National Tax System). There is no issue regarding precision when the NHI contribution amount is
used to evaluate an individual’s wealth in October or November. However, when the NHI contribution amount is used to determine individual wealth in May or June of year \( t+1 \), for instance, the contribution amount is less likely to be correct because the amount is a good proxy only as of September of year \( t \). Because individual wealth fluctuates to a great extent on a monthly basis, especially for locally-provided policyholders, the use of NHI contribution amounts is susceptible to precision issues, particularly when the amount is utilized during the early and middle parts of year \( t+1 \).

The second reliability issue is driven by the fact that the government uses the same conversion table regardless of the place of residence of a person applying for public financial aid programs. The price level varies greatly across regions in Korea. Thus, price levels must be considered when determining individual wealth levels. That is, a person with annual income equal to KRW 30,000,000 living in a place with high price levels cannot be considered similar in terms of individual wealth to a person with a similar income but living in a place with low price levels.

This issue becomes more serious when a certain city ranks individual wealth using the NHI contribution. For example, Jeonju used a conversion table to determine eligibility for the COVID-19 stimulus payment. Figure 1 shows the densities of the NHI contribution amounts at the national and Jeonju levels. The two densities do not overlap significantly. In the case of no overlap, the use of NHI contributions at the national level to determine the relative rank of individuals living in the city of Jeonju would be less likely to be precise.

Figure 2, which gives the cumulative densities of the NHI contribution separately at the national and Jeonju levels, illustrates this fact more saliently. We focused on the NHI contribution amount within the range of KRW 20,000 and 100,000 because people in this range are more likely to be benefit recipients. Suppose the city of Jeonju plans to provide stimulus payment to the bottom 50% of the population. To determine the NHI

![Density of NHI contributions.](image)

Figure 1. Density of NHI contributions.
contribution cutoff, Jeonju could use the NHI contribution at the national level, which is about KRW 60,000. If Jeonju uses a cutoff of KRW 60,000, it ends up providing the stimulus payment to more than 55% of the population.

The last reliability issue is induced by the two-tiered NHI system. As can be seen from all the conversion tables that the government uses to determine eligibility for various public financial aid programs, the difference in the NHI contribution amount between an employer- and locally-provided policyholder is almost negligible (see Table 4). For example, for four-member households, the difference in the NHI premium between the two groups was only KRW 319. The conversion table assumes that for four-member households, employer-provided policyholders who pay a monthly NHI premium of KRW 160,546 belong to the 50th percentile of the income distribution. Meanwhile, locally-provided policyholders who pay a monthly NHI premium of KRW 160,865 belong to the 50th percentile of the income distribution.

### Table 4. Differences in NHI premium between employer- and locally-provided policyholders.

<table>
<thead>
<tr>
<th>Number of household members</th>
<th>Median income level</th>
<th>Policyholder type</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Employer-provided</td>
<td>Locally-provided</td>
</tr>
<tr>
<td>2</td>
<td>2,992,000</td>
<td>100,050</td>
<td>85,837</td>
</tr>
<tr>
<td>3</td>
<td>3,871,000</td>
<td>129,924</td>
<td>121,735</td>
</tr>
<tr>
<td>4</td>
<td>4,749,000</td>
<td>160,546</td>
<td>160,865</td>
</tr>
<tr>
<td>5</td>
<td>5,628,000</td>
<td>189,063</td>
<td>195,462</td>
</tr>
<tr>
<td>6</td>
<td>6,506,000</td>
<td>220,167</td>
<td>233,499</td>
</tr>
<tr>
<td>7</td>
<td>7,390,000</td>
<td>248,116</td>
<td>267,395</td>
</tr>
<tr>
<td>8</td>
<td>8,273,000</td>
<td>276,843</td>
<td>298,842</td>
</tr>
<tr>
<td>9</td>
<td>9,156,000</td>
<td>311,116</td>
<td>333,411</td>
</tr>
<tr>
<td>10</td>
<td>10,040,000</td>
<td>343,406</td>
<td>368,522</td>
</tr>
</tbody>
</table>

All numbers in KRW. The median income level as of 2020. The NHI premium above excludes the long-term care insurance premium for the elderly.
distribution. In other words, it assumes that the relative rank-determining level of the NHI premium is similar between employer- and locally-provided policyholders.

We show that such assumption is incorrect by analyzing the cumulative density distribution of the NHI premium separately by the two policyholders. Figure 3 shows the density of the NHI premium at the national level for the two policyholders. As can be seen from the figure, the two cumulative density functions do not overlap at all the support of the NHI premium. To be more specific, we see that the two functions overlap starting from the 100,000 won. But below 100,000 won, the two densities diverge, indicating that the two groups are not comparable under the similar NHI premium. For example, when the 100,000 won is used for an eligibility cutoff, the difference \((\mu_1 - \mu_2)\) in the relative rank of the two groups is very similar (i.e. around 0.02). Note, however, that when the 70,000 won is used for the cutoff, then the rank of an employer-provided policyholder is very different from that of a locally-provided policyholder. The difference \((\lambda_1 - \lambda_2)\) in the relative rank is about 0.18.

Figure 3 is constructed using NHI premium data at the national level, which are available from the bottom 25th percentile. It also shows that using a similar NHI premium level is inappropriate, even at the city level, based on the Jeonju data. Figure 4 displays the cumulative density function of the two groups at Jeonju’s city level. The figure reveals a pattern similar to the national level. The two cumulative density functions converge starting from KRW 100,000 but diverge significantly below the KRW 100,000 cutoff. For instance, the difference in the relative frequency at KRW 70,000 was approximately 0.13.

Many of the conversion tables assume that the relative ranking of policyholders paying a similar NHI premium would be similar. The aforementioned two figures imply that such an assumption is inappropriate, especially below the KRW 100,000 cutoff. For example, suppose the government intends to provide public financial aid programs

![Figure 3. Cumulative relative frequency distribution of NHI premiums (national level).](image-url)
only to the bottom 50% of the distribution and uses KRW 70,000 as the cutoff. As Figures 3 and 4 indicate, the government would end up providing the service to the bottom 55% of locally-provided policyholders and the bottom 37% of employer-provided policyholders.

As such, using the NHI contribution amount gives rise to three precision issues. While the first issue cannot be solved unless the government uses methods other than the NHI contribution, the second one can be solved by disclosing the conversion table separately by city. Moreover, extensive reforms must be made to the NHI system, such as in the formula used for calculating the NHI premium, to solve the third precision issue.

4. Disadvantage 3: vertical and horizontal equity issues

Using the NHI contribution amount for evaluating a person’s wealth is problematic because of the vertical equity issue. Vertical equity emphasizes the notion of a progressive tax system. Applying this principle to the case at hand, we can argue that those with fewer financial resources should be eligible for public financial aid programs. This principle is likely to be compromised if the NHI contribution amount is used to determine the eligibility of public financial aid programs mainly because the NHI system is operated under a twofold insurance system.

As mentioned previously, the way the NHI contribution amount is determined is significantly different between the two policyholder types. While the contribution amount assessed for locally-provided policyholders is a function of income, assets, and vehicles, only the income variable is included in the NHI contribution-determining function of employer-provided policyholders. This two-tiered system creates an issue with respect to fulfilling the vertical equity principle. For example, suppose that person A is insured as a locally-provided policyholder. Person A does not have income or...
vehicles but possesses land valued at KRW 200,000,000. Under the NHI contribution amount calculation, person A is required to contribute KRW 40,000 per month; the same contribution amount is paid by employer-provided policyholder person B, who earns about KRW 14,400,000 per year.

The aforementioned case shows why using the NHI contribution is problematic from the perspective of vertical equity. Suppose person B owns a house valued at KRW 200,000,000. The house value is not taken into consideration in the assessment of person B’s NHI contribution amount because person B is insured as an employer-provided policyholder. If we compare person A and person B’s wealth status, it is obvious that person B is more rich. If we just use the NHI contribution amount to compare these two people, however, we end up identifying them as people with similar wealth.

The NHI contribution is also problematic in terms of horizontal equity. For example, suppose person A is insured as a locally-provided policyholder and pays a monthly NHI contribution of KRW 200,000 according to their assets. Meanwhile, person B, an employer-provided policyholder, earns an annual income of KRW 30,000,000, possesses a building with a value equivalent to the asset that person A owns, and pays a monthly NHI contribution of KRW 83,375. The land value is not taken into consideration when assessing the NHI contribution of person B because person B is an employer-provided policyholder.

While the NHI contribution amount is not the same between the two, their level in terms of wealth is largely the same. Thus, persons A and B must be treated equally for the sake of horizontal equity, but the NHI system regards persons A and B as having different wealth levels because of their respective contribution amounts. Consequently, person B would be more likely to be eligible for many of the public financial aid programs even though their wealth level is similar.

V. Policy recommendations

We provide policy recommendations that could mitigate many of the issues inherent in the NHI contribution system. In sum, we argue that, rather than using the NHI contribution amount, policymakers must use national tax and local tax return information, as well as employment insurance data, to determine individuals’ wealth status. Using such information is helpful in solving many of the issues we illustrated above.

The first issue associated with using the NHI contribution system is measurement error. The NHI contribution is not likely to have a high correlation with wealth, mainly because the asset level is not taken into consideration when determining the level of NHI contribution for employer-provided policyholders. We argue that the government should use individuals’ tax return information to account for their asset level. Using this information allows the government to determine individual asset levels precisely because every citizen who has some form of asset must file this tax return.

As noted previously, using the NHI contribution system induces three reliability issues, which are driven by three factors. We argue that these issues can be solved effectively if we use employment insurance and local property tax return data. Employment insurance data keep track of everyone who is insured in the national employment insurance system. The data are updated monthly, which would enable the government to assess individuals’ wealth level in any month, which would be much more
reliable than the NHI contribution, which is updated yearly. Note, however, that not all working individuals are insured in the national employment insurance system. For example, while the share of insured workers among regular workers is 87.2%, the share is 44.9% for non-regular workers (Statistics Korea, 2019). Therefore, we do not recommend the sole use of employment insurance data unless the share approaches 100%. Rather, we recommend using this information supplementarily. We also argue that the second and third reliability issues can be solved jointly if the government uses local property tax return data. Using such data allows the correct assessment of a person’s asset level precisely because each local government has access to local property tax return data.

Lastly, the vertical and horizontal equity issues are salient when using the NHI contribution amount, mainly because the formula that determines the contribution amount is different between employer- and locally-provided policyholders. The main issue associated with the two-tiered system is that the asset level is not taken into consideration when determining the NHI premium of employer-provided policyholders. Again, we argue that such equity issues can be solved effectively if the government uses various tax return data, including property tax return information. This would address equity issues because, first, individual asset levels would be considered for everyone, and second, everyone is assessed equally when determining the tax amount.

Overall, we showed that using the tax return and employment insurance databases can help solve many of the issues associated with the NHI contribution amount. Note, however, that such policy alternative is not without issues. First, even if the tax return data are favorable for estimating individuals’ wealth status precisely, weighting issues remain. That is, the authorities must decide how to weigh one’s assets relative to earnings. Suppose person A has KRW 100,000,000 worth of land. What is the value of this land if converted to earnings? Is owning such land the same as person B earning KRW 100,000,000 annually? Clearly, it is unwise to assume that the two have the same wealth for many reasons, such as liquidity issues. Moreover, suppose that person B has a building with a value equal to KRW 100,000,000. Can we assume that persons A and B are similar in terms of asset level? Answering these questions is easier said than done but nevertheless necessary before these policy alternatives can be implemented. Second, access issues must also be solved. The government must create a tax and employment insurance data access system such that every local government and public institution can search for tax return data or employment insurance data when necessary. Without such a system in place, the use of these datasets is infeasible. Finally, the importance of privacy issues must be emphasized. If the government were to use tax and employment insurance data, extreme care must be taken to establish a data privacy system.

Notes

1. Every person must pay the insurance premium regardless of age under the KNHI system, unlike the national pension system in Korea, in which contributions are no longer paid after the age of 60 years.
2. Table 1 shows the NHI contribution system as of July 2018 and July 2022. The contribution system is scheduled to change starting from July 2022.
3. There are certain eligibility requirements that must be met for a person to be insured as a dependent by a family member. For example, a person cannot be claimed as a dependent if they earn more than KRW 34,000,000 annually or have a business income of more than
KRW 5,000,000 annually. If a person does not satisfy these requirements, they cannot be claimed as a dependent. If this person is not hired and operates their own business, they have to pay the insurance premium as a locally-provided policyholder. Hence, a household with two or more family members may have both employer- and locally-provided policyholders.

4. NHI premium data at the national level are unavailable for the bottom 25th percentile.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Hosung Sohn is an Associate Professor in the School of Public Service at Chung-Ang University. His research area is public finance, demography, and program evaluation using experimental and quasi-experimental research designs.

Namho Kwon is an Assistant professor at the Department of Public Administration at Soongsil University, South Korea. His research interests include policy evaluation, technological innovation, and regulatory policy.

ORCID

Hosung Sohn http://orcid.org/0000-0002-7031-4430
Namho Kwon http://orcid.org/0000-0003-3843-5758

References


