Discouraged worker effects from social inequality: An empirical evidence

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ABSTRACT
To measure the discouraged effects from social inequality, this study adopted the TSCS and MUS data to observe the discouraged economic attitudes and discouraged worker effects by using a 2STS method. We integrated these two databases to explore the impact of inequality on attitudes with inequality-related variables. Our empirical results show the social inequality variables increase the economic discouraged attitudes, and people who felt upset for economy are more likely to become discouraged workers.

Key words: Social inequality, discouraged worker, two-sample-two-stage method, probit model

INTRODUCTION
The 2009 financial crisis led to recession in many economies. The US and European Union economies shrank by 3.1 and 4.3%, respectively, and the unemployment rate reached 14.19%. Despite this output contraction, people remained more concerned regarding equality of distribution than output level.

Social equality or inequality is frequently discussed. When people become frustrated with social inequality and feel as if matters are out of control, they may become aware of discouragement in various aspects. This can be observed from people’s economic attitudes or their employment status. In the Taiwan Social Change Survey (TSCS) conducted by Academia Sinica, people’s economic attitudes were scored on a 5-point scale (5 = strongly agree; 1 = strongly disagree), the results indicated that with the increasing concerns over social equality matters, the scores for agreement with “hard work pays off” decreased from 3.69 in 1990 to 3.54 in 2010. In addition to this, the number of people who indicated that family background is crucial, increased from 2.59 in 1990 to 2.78 in 2010. The perception of “it’s hard for me to become outstanding in the future” increased from 3.07 in 2005 to 3.29 in 2010, with an increase of strongly agree in particular. These perceptions of social inequality represents a sense of powerlessness in people’s minds, becomes an influence the formation of personal attitudes or values, and further affect their external performance. For instance, some unemployed people become discouraged workers and leave the labor force. According to statistics from the U.S. Bureau of Labor Statistics in 2015, the American economy had 330,000 discouraged workers in April 2000. By 2015, the number exceeded 590,000. In Taiwan, where the main labor force includes those aged 25–44 years, 5.64% of the nonlabor force were discouraged workers in 2004, this figure increased to 6.73% in 2011. Those with a college or higher degree accounted for 1.61% in 2004 and 1.88% in 2007 of discouraged workers. By 2011 the figure increased to 1.97%.

Discouraged workers are those who were formerly in the

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1 When a person experiences negative feelings regarding equality and inequality, they become frustrated. People’s anger toward society might also turn into discouragement.

2 A survey conducted on the perception of social inequality across mainland China by the Institute of Sociology, Chinese Academy of Social Sciences in 2005, observed that power, profession, and trade are the main factors that cause social inequality in China. Approximately 61.5% of respondents believed that inequality is caused by power, and 29.1% thought that inequality is caused by profession. Furthermore, 27.9% indicated that inequality is caused by trade, and 22.5% believed that inequality is caused by educational background.

3 The percentage of discouraged workers was obtained from the e-book Report on the Manpower Utilization Survey by the Directorate-General of Budget, Accounting and Statistics.
Discouraged workers do not appear overnight. These individuals have faced numerous challenges, leading to frustration and a decision to withdraw from the labor market. Recent studies have rarely discussed the causes of discouragement and their effects on discouraged workers. This study considered the effects of economic attitude toward social inequality and its impact on discouraged workers. Studies have identified an economic cycle effect in discouraged workers. However, the current study holds that the perception of social inequality does not necessarily have a cycle. Even when the economy expands to a degree, social inequality occurs. Moreover, the subjective perception of social inequality may be present throughout the society and affect everyone's decisions and lives.

Discouraged workers not only affect the operation of the labor market and the unemployment rate in a country in the short-term but may influence the entire country's productivity and economic development. Therefore, this study discussed the impact of social inequality on economic attitude and analyzed the effects on discouraged workers. The findings served to illuminate these phenomena.

This study used various social inequality indicators to explore their influence on discouraged workers in Taiwan. TSCS and Manpower Utilization Survey (MUS) data were employed, and a two-sample two-stage instrumental variable (TS2SIV) method was applied for data compilation, estimation, and prediction to evaluate the effects of discouragement. Both databases had cross-sectional data. The TSCS was selected because it provides personal economic attitude data every 5 years (1985, 1990, 1995, 2000, 2005, and 2010). The MUS consists of various detailed population-based labor market data for several years, including data on discouraged workers. By combining data of the same year from both databases, economic attitudes and discouraged workers were discussed concurrently. This study identified common personal features in the two databases for clustering of data for specific years. Social inequality topics proposed by other studies were included to serve as macro-empirical research variables to estimate the impact of social inequality.

Empirical results of this study revealed that the higher the inequality, the higher the discouragement level of individuals is in the economy. Furthermore, the more discouraged the economic attitude, the easier it is to become a discouraged worker. Therefore, a society with a higher level of inequality may have more discouraged workers. This study's research contribution is its discussion of the influence of individuals and the labor market from various aspects of social and economic inequality and the combination of databases from the social and economic fields for consolidation of data analysis. This paper is

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4 Other studies have also revealed that chronically unemployed people's health is poorer, which may have been caused by the long-term distress they endured. However, Leonard (1998) reported that most chronically unemployed people change their job-seeking strategy. Therefore, the percentage of discouraged workers does not increase excessively.

5 For instance, Kuznets (1955) argued that income inequality first worsens and then improves as the economy evolves.
divided into the following sections: the Literature Review section discusses pertinent literature, Data and Methodology section describes the empirical method and the databases used, Empirical Results section consists of empirical analysis and discussions, and Conclusions section provides the conclusion and policy implications.

**LITERATURE REVIEW**

To accurately calculate the labor force participation rate and the unemployment rate, research has tended to exclude unemployed individuals who were unwilling to find a job, namely discouraged workers. This term first emerged in the research of Mincer (1966). Subsequently, research concerned with calculations of the labor force participation and unemployment rates began to consider these discouraged workers, who were increasingly considered an unneglectable group. Empirical analysis on discouraged workers tend to distinguish between men and women for observation and to obtain different results. Discouragement affects male laborers differently depending on age, particularly those who are older (Kodrycki, 2000; Rosemblum, 1974; Rones, 1983). Tella (1965) argued that senior male workers are more susceptible to the influence of cyclical unemployment and likely to become discouraged workers. Flaim (1972) observed that older male workers tend to be affected by structural unemployment and therefore become discouraged workers. Studies have also discussed the economic cycle effect on discouraged workers. Clark and Summers (1982), Goodman (1974), Hansen (1961), Long (1953, 1958), and Wachter (1972, 1977), indicated that the economic cycle phenomenon did not have a significant effect on discouraged workers. By contrast, Clark and Summers (1981), Mincer (1966), Perry (1977), and Tella (1964, 1965) reported that a significant discouraged worker phenomenon did exist. Benati (2001) also highlighted that discouraged workers was a considerable concern during economic recessions. Benati included those who return to school and those who become homemakers after leaving their jobs in the category of discouraged workers. Regardless of the definition, all statistics from the OECD (2014) indicated that a discouraged workforce has been influencing labor participation over the past 10 years. Some studies investigating the effect of chronic unemployment on discouraged workers have also revealed significant results. For instance, Kottis (1990) revealed considerable unemployment discouragement in Greece, particularly in women's data. Mitchell (2000) reported a positive effect on the basis of labor survey data from Australia and the United States, that is, chronic unemployment leads to people becoming discouraged workers. Emerson (2011) and Österholm (2010) used data from Sweden and the United States to discover that long-term unemployment led to discouraged workers, but the effect was clearer in men than in women. Moreover, Kakinaka and Miyamoto (2012) revealed that the discouraging effect of unemployment is more notable in middle-aged and older male workers. Ozerkek (2013) used World Bank data of 10 European countries (namely, Belgium, Denmark, Ireland, France, Italy, Luxembourg, the Netherlands, Portugal, Sweden, and the United Kingdom) to construct panel data for 1983–2009. Having estimated the effect of unemployment on discouraged workers, Ozerkek reported that only women were significantly affected by unemployment. This also suggests that female unemployment rates in these countries are underestimated. However, Almost no research has investigated the influence of social inequality on discouragement as well as its effect on discouraged workers. Consequently, in addition to addressing the gap in literature, this study also undertook an estimation of two samples in survey data from the social and economic fields. This study used the TS2SIV method for prediction of consolidation and estimation of data to evaluate the effects of discouragement. Findings from this study’s analysis on discouraged workers can serve as a reference for the government's labor policy reforms in the future.

**DATA AND METHODOLOGY**

This study used questions regarding economic attitude (or work attitude/work value) in a comprehensive survey in the TSCS to identify the degree of an individual’s economic discouragement. Data from the MUS was used to define a discouraged worker. From both databases, we considered the impact of social inequality on economic attitude as well as its effect on discouraged workers. Subsequently, we consolidated and analyzed both databases to evaluate their combined effect. This section first explains the combined analysis of data from two samples, of which the TSCS database was the major contributor. Individual characteristic data common in both databases served as the predictive variables of the instrumental variable estimation during the first stage. According to the methods of Angrist and Krueger (1992) , Arellano and Meghir (1992), the two databases were consolidated using instrumental variables. One of the databases had explanatory variables and instrumental variables, whereas the other one consisted of instrumental and explained variables. Some studies have used the TS2SIV method to estimate the intergenerational mobility of income (Björklund and Jäntti, 1997; Dearden et al., 1997; Dunn, 2007; Kan et al., 2015). The current study employed TS2SIV to connect and estimate an individual's social status and economic influence.

**TSCS**

This study used the TSCS database assembled by Academia Sinica for analysis of economic attitude. The database contains questionnaire data from surveys conducted every
5 years, including combination questionnaires and subject questionnaires. Subject questionnaires are divided into family, social hierarchy, mass communication, and religion. Most of the questions were reused in every cyclic survey. As a result, same questions from different survey years can be paired to achieve repeated cross-sectional data. Sampling was based on household registration data in Taiwan, first townships and then villages. The identified households were interviewed randomly. Economic attitude data (from questions appearing in the sections regarding work value, work attitude, work expectation, etc.) from the combination survey questions were used in this study. Data for the period from 1990 to 2015 (once every 5 years) were scrutinized, totaling 6 years of survey data. This study's main target was people of age range 26–65 years. The questions were related to an individual's economic attitude as a degree of discouragement toward social inequality. However, because the number of questions for each year may vary somewhat or change in terms of content, this study used only two questions that were repeatedly included over 1990–2015:

- Hard work pays off. Agree or disagree?
- Nowadays the rich are becoming richer. People like me may never catch up with them no matter how hard we work. Agree or disagree?

These two questions used a 5-point scale to express an individual's perception toward social mobility. If the first question was answered affirmatively, the respondent exhibited a positive attitude in terms of equality in social mobility, if not, a discouraged attitude was coded. If the second question was answered affirmatively, the participant held a discouraged attitude in terms of equality in social mobility, otherwise, a positive attitude was coded. This study undertook an estimation of these two questions individually and defined their variable names as “Discouraged_Hard” and “Discouraged_Rich,” respectively. Because these two questions had contrary meanings, they were revised to be identical in terms of value definition in the experimental analysis, that is, the bigger the value, the higher is the discouragement. In respect of “Discouraged_Hard,” the redefined statement (a higher value means more discouragement) was “hard work pays off.” A larger value for “Discouraged_Rich” suggests that the respondent agreed with “it will never be possible to catch up with the rich no matter how hard one works.” The direction of the degree of the discouragement revealed by the two redefined discouragement statements was identical. Nevertheless, these two questions represented different degrees in terms of economic discouragement. “Hard work pays off” refers to a person's attitude of agreement before they succeed. “It will never be possible to catch up with the rich no matter how hard one works” refers to anyone's feeling regardless of success. Consequently, we observed a different effect caused by estimation of these two questions. Table 1 displays descriptive statistics for each individual characteristic variable of each question. Figure 1 illustrates trends and changes in time for these two economic attitudes. Approximately half of the samples were male and up to 82.34% of respondents were married. A high percentage (up to 21.6%) of the respondents worked in the public sector. This was attributable to the database itself, which included mostly data from the public sector. Most of the samples were from Northern Taiwan (40%), followed by those from Central Taiwan (30%), Southern Taiwan (20%), and Eastern Taiwan and offshore islands (10%). In total, 22% of respondents worked in the manufacturing industry, 16% in the service industry, and 7% in professional employment, with 67% being in management positions. Figure 1 illustrates the increasingly high trend in economic discouragement for the two items. "Discouraged_Hard" was flat before 2005 but thereafter it increased significantly. "Discouraged_Rich" revealed an increasing trend at the same rate, except a remarkable increase in 2000.

MUS

This study identified MUS data from the same years as the TSCS (1990, 1995, 2000, 2005, 2010, and 2015) for an estimation of predictive values. Moreover, from the predictive data obtained from the TSCS, we estimated the economic attitude of the manpower data. Initially, the purpose of the manpower survey was to understand employment, unemployment, and labor utilization, among others, in Taiwan. Beginning in 1976, the survey was conducted among Taiwanese citizens who were 15 years old or older and were engaged in free economic activity. Those surveyed were mainly employees, the unemployed, and discouraged workers. Employees were surveyed on their monthly income, working hours, working period and times, and whether they desired to change their jobs or accept additional work. The unemployed were asked about the occupation and income they expect, the source of their living expenses during job-seeking, with or without a job opportunity, and the reason that they did not have a job to understand the reason that they were unemployed. For discouraged workers, the following information was collected: the situation of their work in the preceding year and the reason they stopped working, their willingness to work, and their expected wage. The current study combined data from 1990 to 2015 (every 5 years) into years of cross-sectional data, with variables including the individual's socioeconomic variables and wage. The general definition of discouraged worker depended on the answer chosen to the following question: "Did you have a job last week?" If the answer was, "I want to work but have not found a job; I can begin to work any time," it was narrowly defined as a discouraged worker by this study. This study also set a broad definition of discouraged worker according
Table 1: Description Statistics for TSCS.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.5104</td>
<td>0.4999</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>42.3058</td>
<td>10.9934</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.8234</td>
<td>0.3814</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education Years</td>
<td>8.4307</td>
<td>5.9029</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Public Sector</td>
<td>0.2160</td>
<td>0.4115</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wage (thousands)</td>
<td>28.9153</td>
<td>35.3407</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td>North district</td>
<td>0.4162</td>
<td>0.4930</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Middle district</td>
<td>0.2860</td>
<td>0.4519</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>South district</td>
<td>0.2279</td>
<td>0.4195</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.2201</td>
<td>0.4143</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Service industries</td>
<td>0.1690</td>
<td>0.3748</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Professional career</td>
<td>0.0702</td>
<td>0.2555</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Manager</td>
<td>0.1606</td>
<td>0.3672</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Observations = 9,982.

Figure 1: Discouraged economic attitudes in Taiwan.

to Benati (2001) by including those who attend school and are preparing to continue their education and those who are homemakers but excluding byworkers, those who are unemployed but looking for a job, and those jobseekers who are waiting for a result from potential employers.

Table 2 displays the result of descriptive statistics of MUS data, which highlights how much it differs from TSCS data. In addition to the inconsistency in number of samples, a higher percentage of MUS data were provided by professionals. Therefore, the level of education was also higher. Compared with samples taken in the TSCS, however, the average wage was lower. A likely reason for this difference was that the MUS collected data from more blue collar workers (excluding directors and professionals). The trend of discouraged workers decreased after 2005 (Figure 2). Regardless of a general or broad definition of discouraged worker, the trend was similar. However, the trend of discouraged workers was not identical to that of economic discouragement in TSCS. If we consider the Figure alone, it is not possible to determine whether a relationship exists between economic attitude and discouraged workers. Consequently, the question arises whether social inequality leads to discouraged workers. Using regression analysis to consider the possible effects of various characteristics might address the preceding question.
Table 2: Description Statistics for MUS.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.5089</td>
<td>0.4999</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>42.9251</td>
<td>11.4404</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.8033</td>
<td>0.3975</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education Years</td>
<td>10.3493</td>
<td>4.1239</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Public Sector</td>
<td>0.0779</td>
<td>0.2680</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wage(thousands)</td>
<td>21.2907</td>
<td>23.7110</td>
<td>0</td>
<td>900</td>
</tr>
<tr>
<td>North district</td>
<td>0.3458</td>
<td>0.4756</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Middle district</td>
<td>0.2667</td>
<td>0.4422</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>South district</td>
<td>0.2119</td>
<td>0.4087</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.1909</td>
<td>0.3930</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Service industries</td>
<td>0.1434</td>
<td>0.3504</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Professional career</td>
<td>0.1383</td>
<td>0.3453</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Manager</td>
<td>0.0358</td>
<td>0.1858</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Observations = 234,373.

Figure 2: Trend of discouraged workers in Taiwan.

Macroeconomic variables

This study assessed the influence of global social inequality variables on economic discouragement and discouraged workers in reference to the five inequality aspects: wage inequality, income inequality, real estate price inequality, educational inequality, and social mobility inequality. In measuring wage inequality, we considered whether gross domestic product (GDP) growth reflected in real wages. Therefore, the ratio of wage growth to GDP growth rate served as a global indicator measuring wage inequality. Regarding income inequality, we adopted a coefficient used to measure income inequality to represent the global indicator for measuring income distribution. In respect of real estate price inequality, we used the house price-income ratio in each city or county. However, as the data period was shorter (available only after 1998), this study used the house price index, which covered a longer period, to serve as an observation indicator. For educational inequality, we used the number of higher education institutions and the unemployment rate in each level of education to serve as an indicator. Finally, regarding social mobility inequality, we employed inheritance tax rate to serve as an indicator because the inheritance tax rate in
Taiwan is lower than in other countries. In 2009, the rate was revised downward to 10%. This obviously benefits the rich and engenders a sense of relative deprivation in the poor. Moreover, it does not facilitate social mobility.

Figure 3 illustrates a time trend of six macroeconomic variables. All variables increased progressively, whereas the ratio of wage growth to GDP growth rate decreased distinctly. Nevertheless, all the variables exhibited a turn or a slowdown. Among them, inheritance tax fell remarkable only after 2005. Therefore, the estimation result of inheritance tax can be expected to be contrary to other results. In other words, social mobility inequality caused by the inheritance tax might have been more obvious after 2005. This study adopted a longer observation period and the result may be contrary to predictions in other studies.

Understanding the degree to which these macroeconomic social factors affect the labor market is imperative. All possible individual characteristic variables must be controlled to ensure an accurate assessment. Our empirical results are provided in the Empirical Results section.

**TS2SIV**

The TSCS did not consider questions regarding discouraged workers, and the MUS did not consider work values or social equality. As such, in conducting a consolidation and estimation of the two databases, we adopted a TS2SIV model. Stages for estimation proceeded as follows. In Stage 1, we adopted an economic status prediction model for TSCS data. An ordered probit regression model was used for estimation:

\[ y_{1it} = \alpha_1 + \beta_1 X_{i1} + \gamma_1 Z_{i1} + \epsilon_{1it}, \]

where \( X_{i1} \) is an individual social economic variable, including sex, age, education, work location, employment status, and wage. \( Z_{i1} \) is a five-item macroeconomic variable for measuring social inequality, including the wage growth rate-to-GDP growth rate ratio, Gini coefficient (which relates to inequality of income), house accessibility (house price index), number of colleges, unemployment rate for each level of education, and inheritance tax. Let \( \epsilon_{1it} \sim N(0,1) \), and \( \text{Cov}(\epsilon_{1it}, \epsilon_{1jt}) = 0 \). \( y_{1it} \) is an ordered multiple categorical variable representing an individual’s economic attitude toward social inequality. The probability of each choice is as follows:

\[
\begin{align*}
  p(y_{1it} = 1) &= F(-\alpha_1 - \beta_1 X_{i1} - \gamma_1 Z_{i1}), \\
  p(y_{1it} = 2) &= F(c_1 - \alpha_1 - \beta_1 X_{i1} - \gamma_1 Z_{i1}) - F(-\alpha_1 - \beta_1 X_{i1} - \gamma_1 Z_{i1}).
\end{align*}
\]

\(^6\)The estimation in this study refers to the empirical model of Dunn(2007) and Kan et al.(2015).
Table 3: Linear Regression Results on Discouraged Economic Attitude

<table>
<thead>
<tr>
<th>Variables</th>
<th>Discouraged_Hard</th>
<th>Discouraged_Rich</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.2040 (0.0239)</td>
<td>***0.0322 (0.0252)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.0104 (0.0012)</td>
<td>***0.0087 (0.0013)</td>
</tr>
<tr>
<td>Marital Status</td>
<td>0.0767 (0.0353)</td>
<td>**0.0246 (0.0366)</td>
</tr>
<tr>
<td>Education Years</td>
<td>0.0188 (0.0332)</td>
<td>***-0.0317 (0.0032)</td>
</tr>
<tr>
<td>Public Sector</td>
<td>-0.0016 (0.0326)</td>
<td>0.0550 (0.0334)</td>
</tr>
<tr>
<td>Wage (thousands)</td>
<td>0.0003 (0.0004)</td>
<td>-0.0010 (0.0004)</td>
</tr>
<tr>
<td>North district</td>
<td>0.1879 (0.0458)</td>
<td>***0.0148 (0.0519)</td>
</tr>
<tr>
<td>Middle district</td>
<td>0.1620 (0.0467)</td>
<td>***0.0356 (0.0528)</td>
</tr>
<tr>
<td>South district</td>
<td>0.1797 (0.0481)</td>
<td>***-0.0322 (0.0540)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.0477 (0.0291)</td>
<td>-0.0245 (0.0295)</td>
</tr>
<tr>
<td>Service industries</td>
<td>0.0093 (0.0349)</td>
<td>0.0065 (0.0355)</td>
</tr>
<tr>
<td>Professional career</td>
<td>0.0571 (0.0501)</td>
<td>-0.0596 (0.0517)</td>
</tr>
<tr>
<td>Manager</td>
<td>-0.0099 (0.0328)</td>
<td>-0.0138 (0.0337)</td>
</tr>
<tr>
<td>Wage growth / GDP growth</td>
<td>-0.1103 (0.0174)</td>
<td>***-0.2145 (0.0175)</td>
</tr>
<tr>
<td>Gini</td>
<td>2.2846 (1.0668)</td>
<td>**2.9583 (1.1356)</td>
</tr>
<tr>
<td>House Price Index</td>
<td>0.0112 (0.0032)</td>
<td>***0.0081 (0.0032)</td>
</tr>
<tr>
<td>College number</td>
<td>-0.0025 (0.0030)</td>
<td>0.0007 (0.0031)</td>
</tr>
<tr>
<td>Unemployment rate by education</td>
<td>0.0458 (0.0172)</td>
<td>***0.0844 (0.0176)</td>
</tr>
<tr>
<td>Inheritance Tax</td>
<td>0.0136 (0.0037)</td>
<td>***0.0114 (0.0038)</td>
</tr>
<tr>
<td>R²</td>
<td>0.7747</td>
<td>0.8442</td>
</tr>
<tr>
<td>Observations</td>
<td>9,982</td>
<td>9,982</td>
</tr>
</tbody>
</table>

*Standard errors are in parentheses. *** represents significance at the 1% level. ** represents significance at the 5% level. * represents significance at the 10% level.

\[
P(y_{1it} = 3) = F(c_2 - \alpha_1 - \beta_1 X_{it} - \gamma_1 Z_{it}) - F(c_1 - \alpha_1 - \beta_1 X_{it} - \gamma_1 Z_{it}),
\]
\[
P(y_{1it} = m) = 1 - F(c_m - \alpha_1 - \beta_1 X_{it} - \gamma_1 Z_{it}),
\]

We used a maximum likelihood estimator for the threshold parameters of \(\alpha_1, \beta_1, \gamma_1\) and \(m - 2\).

Stage 2 was a probit regression model:

\[
y_{2it} = \alpha_2 + \theta y_{1it}^\gamma + \beta_2 X_{it} + \epsilon_{it},
\]

where \(y_{1it}^\gamma\) is a predictive value of potential economic attitude obtained by substituting the estimated value in Stage 1:

\[
y_{1it} = \tilde{\alpha}_1 + \tilde{\beta}_1 X_{it} + \tilde{\gamma}_1 Z_{it}.
\]

To obtain a multifaceted observation, this study adopted a linear model and ordered probability model to predict they\(y_{1it}^\gamma\) and probability values, respectively, and estimate their respective influence on discouraged workers.

**EMPIRICAL RESULTS**

Table 3 lists the estimation results of the linear model of economic attitude in Stage 1 conducted using TSCS data. In respect of the statement "hard work pays off" (defined as Discouraged_Hard), the results suggest that the younger the man, the more obvious is the discouragement tendency. This effect increases with marriage and level of education. In terms of macroeconomic variables, the higher the ratio of wage growth to GDP growth rate, the lower the degree of discouragement. This result is consistent with the view of related literature. In other words, if GDP growth can be reflected in wage growth, wage equality would increase; if not, the degree of discouragement would rise. Furthermore, the larger the Gini coefficient (more income inequality), the higher the degree of discouragement regarding "hard work pays off." We also observed that the higher the house price index, the higher the degree of discouragement. Number of colleges did not have a significant influence on discouragement. However, the unemployment rate of each level of education exhibited a positive significant correlation with degree of discouragement. This suggests that educational inequality may cause economic discouragement. Finally, among all the macroeconomic indicators, inheritance tax was the only indicator to exhibit results in contrast to our initial expectation.

Table 3 displays data for the second statement: “Nowadays rich men become richer. People like me may never catch up with them no matter how hard we work” (defined as Discouraged_Rich). The results indicated that as age increases, the discouragement tendency becomes more obvious possibly because as individuals' grow older, they become more conscious of the reality of life: they may not be able to become rich in particular low-income people (an individual's wage is negatively correlated with discouragement). Regarding the influence of...
macroeconomic variables, similar results to the estimations of Discouraged_Hard were observed. The higher the ratio of wage growth to GDP growth rate, the lower is the degree of discouragement. The larger the Gini coefficient (unequal income distribution), the higher is the degree of discouragement for "may never catch up with the rich." Thus, the higher the house price index, the higher is the degree of discouragement. The unemployment rate of each level of education also revealed a positive significant correlation with the degree of discouragement. The result for inheritance tax was still contrary to expectation. We assumed that this was due to the limitation of samples being collected only once every 5 years. The influence of inheritance tax on individuals was possibly also not as direct as wage growth and house price. The influence of lowering inheritance tax was possibly not as strong on social mobility inequality as identified by other studies, raising the inheritance tax might have had a bigger influence on the middle class.

We substituted MUS data into the estimation results to predict an economic discouragement value. Then, we substituted it into the estimation formula of discouraged workers (that is, Eq. (2): $y_{2it} = a_2 + \theta y_{1it} \alpha + \beta X_{i1} \alpha + \epsilon_{1it}$). We used a probit regression model to estimate the influence of discouraged workers:

$$y_{2it} = -2.5698 + 0.0689 y_{1it,Hard} + 0.0372 y_{1it,Rich} \alpha \text{ (Observations: 234,373)}$$

$$0.0559 (0.0235) \quad (0.0271)$$

The estimation results revealed that the two degrees of economic discouragement had a positive significant impact on formation of discouraged workers, with both reaching the significant level of 1%. We proceeded further to estimate a broadly defined discouraged worker:

$$y_{2it} = 1.1487 - 2.2676 y_{1it,Hard} + 1.3802 y_{1it,Rich} \alpha \text{ (Observations: 234,373)}$$

$$0.0229 (0.0129) \quad (0.0137)$$

When adding housewives and student samples, by contrast, a higher degree of discouragement over "hard work pays off" was negatively related to the formation of discouraged workers. This could be attributed to people with a higher degree of discouragement being less likely to return to school or become homemakers. Nevertheless, the influence of "may never catch up with the rich" on forming discouraged workers was identical. When limiting samples to nonemployees (including unemployed people), the result was explained thus:

$$y_{2it} = -2.9009 + 1.2594 y_{1it,Hard} - 0.7931 y_{1it,Rich} \alpha \text{ (Observations: 75,663)}$$

$$(0.0742) (0.0360) \quad (0.0395)$$

The result under a broad definition was explained thus:

$$y_{2it} = 1.9535 - 1.3020 y_{1it,Hard} + 0.5266 y_{1it,Rich} \alpha \text{ (Observations: 75,663)}$$

$$0.0377 (0.0206) \quad (0.0228)$$

For the nonemployees, those who felt frustrated regarding "hard work pays off" were more likely to become discouraged workers, and those who believed "may never catch up with the rich" mostly chose to continue their studies or become homemakers. In terms of degree of discouragement, those who had worked hard but failed to succeed exhibited a higher degree of discouragement, which could lead to them leaving their jobs despite still being employable.

Table 4 presents the estimation result of ordered probit regression for economic attitudes in Stage 1 conducted using TSCS data. For both Discouraged_Hard and Discouraged_Rich, the estimation result was similar to that of the linear model, except for Gini (macroeconomic variable), which did significantly affect Discouraged_Hard. The result for inheritance tax remained contrary to expectations, similar to the results in Table 3.

We substituted MUS into Table 4 to obtain an estimation result that could predict the degree of an individual’s economic discouragement through MUS data. Then, according to the cutoff point obtained from the estimation of the ordered probit regression, we set a degree of economic discouragement (1–5) and substituted it into the estimation formula of discouraged workers: $y_{2it} = a_2 + \theta y_{1it} \alpha + \beta X_{i1} \alpha + \epsilon_{1it}$ . The probit regression model was used to estimate the influence of discouraged workers. The result is as follows:

$$y_{2it} = -2.0664 + 0.0891 y_{1it,Hard} - 0.1551 y_{1it,Rich} \alpha \text{ (Observations: 234,373)}$$

$$(0.0613) (0.0160) \quad (0.0186)$$

The result under a broad definition is as follows:

$$y_{2it} = 0.4606 - 0.8730 y_{1it,Hard} + 0.2690 y_{1it,Rich} \alpha \text{ (Observations: 234,373)}$$

$$(0.0225) (0.0066) \quad (0.0071)$$

Those who felt distressed about "hard work pays off" were more likely to become discouraged workers, and those who believed that they "may never catch up with the rich"
The result under a broad definition was as follows:

\[
y_{2it} = 2.2093 - 0.4417y_{1it}^{Hard} + 0.2199y_{1it}^{Rich} \quad \text{(Observations: 75,663)}
\]

\[
(0.0354) \quad (0.0104) \quad (0.0106)
\]

The result revealed that those who felt distressed regarding “hard work pays off” were more likely to become discouraged workers, and those who believed that they “may never catch up with the rich” tended to return to school or become homemakers.

The results in Tables 3 and 4 showed that the number of colleges did not have a significant effect. Moreover, the result for inheritance tax was also in contrast to expectations in other studies. In sum, most of the social inequality variables led to an increase in economic discouragement. Economic discouragement also had an impact on the formation of discouraged workers. In other words, the results of the two-stage estimation indicate that social inequality had an indirect impact on the formation of discouraged workers. The higher the degree of social inequality, the higher the number of discouraged workers. Furthermore, the increase in inheritance tax may not have had much influence on the few with substantial resources (they might have transferred their assets preemptively). Instead, the middle class is mostly affected by social inequality.

CONCLUSION

Discouraged workers are a nonlabor element in the labor market. In addition to affecting the country’s labor market and causing the underestimation of the unemployment rate in the short-term, these individuals may cause some social problems and even affect the country’s overall productivity and economic development in the long-term. Discouraged workers do not emerge overnight. Their difficult experiences led to frustration and the decision to abandon the labor market. Research on discouraged workers has been relatively limited, particularly discussions on how this group is formed. Therefore, this study observed the effects of discouraged workers from the perspective of social inequality. Social inequality has an impact on an individual’s perception and attitude, it has wide-ranging effects on people’s decisions and lives. Social inequality includes wage, income distribution, education, house price, and social mobility. To address the limitations in other studies, this study conducted TS2SIV estimation for the effect on discouraged workers. According to the empirical results of this study, a higher degree of social inequality leads to a higher degree of individual economic discouragement and more discouraged workers. We explored social inequality from five aspects: the wage growth rate-to-GDP growth rate ratio, Gini coefficient, number of colleges, unemployment rate of each education level, house price index, and inheritance tax. The estimation results indicated that number of colleges did not significantly affect discouragement and that the result for inheritance tax was contrary to expectations. Apart from these two, the other four macroeconomic variables (related to social inequality) had significant effects on economic discouragement. That is, feelings of discouragement regarding the statement “hard work pays off” and the belief that they “may never catch up with the rich” were derived from wage inequality, wage distribution inequality, educational inequality, and house price inequality. We used a TS2SIV estimation method to achieve a predictive value of economic discouragement. We then proceeded to estimate discouraged workers from MUS data. Our findings indicated that the discouragement caused by social inequality affect an individual’s decisions in the labor market. People who felt distressed regarding “hard work pays off” and agreed that they “may never catch up with the rich” were more likely to become discouraged workers.

We proposed two main reasons for our results. The first is related to a sense of deprivation. Lipset (1959) and Barro (1999) suggested that a positive correlation between national development and income of the middle class. Currently, however, market resources are highly concentrated, and the benefits of economic growth are not shared by all. This has resulted in the rich becoming richer and the poor becoming poorer. People are increasingly questioning social justice, which might lead to economic discouragement. The second reason relates to the diminishing of the middle class and the difficulties the lower class faces to improve their lives. Moreover, an oversupply of homogeneous laborers, polarization of social class distribution, and impediment of social mobility lead to economic discouragement. A special report in Time in 2012 proposed that future economic development will be dependent on those who do not actively participate in the labor market: discouraged workers. Many countries have aggressively implemented measures to assist chronic unemployed people, including assistance to the unemployed and educational training. They have also encouraged businesses to train and employ unemployed people to reduce various social problems caused by discouraged workers.7

7For instance, the United Kingdom established a long-term unemployment policy orientation titled “work first approach” in 2006. Germany offers unemployment benefits according to the “Labor Facilitation” section in the 2009 version of Social Code. In the wake of the financial crisis in 2008, which triggered large-scale unemployment, Denmark has focused its employment policy on “combat[ing] long-term unemployment.”
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