

## ***The Impact of Self-Employment on the National Economy***

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*In this paper, we suggest proper policy directions through an analysis on the impact of changes in self-employment on the national economy. In other words, we intend to identify the current status of self-employment jobs and present policy directions for supporting self-employed workers. In order to grasp the dynamic relationship of variables, we used a VAR model to measure the impact of self-employment job fluctuations and macroeconomic variables on each other. The analysis results demonstrate that an exogenous shock to the ratio of self-employed workers does not show a significant impact on the nominal growth ratio. However, when the analysis was done separately on an exogenous shock to the ratio of self-employed workers with employees and without employees, an increase in the ratio of self-employed workers with employees showed a positive impact on nominal growth. On the other hand, an increase in the ratio of self-employed workers without employees showed a negative impact on nominal growth. In future studies, it will be necessary to do additional analysis on quarterly data to estimate the short-term impact of macroeconomic variables on changes in the ratio of self-employed workers.*

**Keywords :** *Exogenous Shock, VAR Model, Macroeconomy, Self-Employed Workers*

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## *I. Introduction*

The structure of the national economy is closely related to how much the income and expenditure of the middle class circulates smoothly. The ratio of the income and expenditure by labor force is almost constant when the broader group that constitutes the middle class in the national economy consists of the employees and the self-employed workers. It has been shown that the income and expenditure of self-employed workers has a high volatility and affects the national economy. The percentage of self-employed is 11.5% in Japan, 11.2% in Germany and 6.6% in the United States. The percentage of self-employed workers in Korea is 27.4%, which is very high among OECD countries (OECD, 2015). The ratio of self-employed workers in Korea is very high even when considering the path dependency of industrial settlement in each country. The high ratio of self-employed workers in the national economy means that the infrastructure of the national economy can easily be affected by an external shock. Furthermore, the structure of self-employment jobs in Korea repeats the vicious cycle of “lack of preparation-business sluggishness-increase in debt-closure-reentry to self-employment jobs-oversupply.” According to the Statistics Korea Economically Active Population Survey (KOSTAT, 2016a), the number of self-employed workers was 5.57 million as of 2016.<sup>1)</sup> The difficulties that small self-employed workers are suffering from are the result of the domestic recession but the fact that self-employed workers make up a large part of our society’s middle class is causing the domestic recession to further deepen. It is a reality that self-employed workers, who have started a private business by investing a considerable amount of loan money to survive during a domestic market downturn, are deeply affected by the domestic recession

1) The amount of “self-employed workers” and “unpaid family workers” in the self-employment job sector is 5.57 million according to the KOSTAT survey.

before they can collect the investment principal. The ratio of self-employed workers in the national economy is increasing due to job lessness growth and the retirement of the baby boomers (born in 1955~1963). Still, there are many cases where the baby boomers have jumped into self-employment ill-prepared with only personal capital alone, becoming the near poor. The economic activities of self-employed workers are stimulating the national and regional economies. It is very urgent to take measures to prevent the middle-class self-employed workers from becoming the poor. In these economic conditions, it is necessary to identify the impact of the social problems caused by the fall of the self-employed workers may have on the national economy and to find a solution.

In this paper, we intend to suggest appropriate policy directions after doing an analysis of the impact that changes in self-employment have on the national economy. In other words, we intend to identify the current status of self-employment jobs and present policy directions for supporting self-employed workers.

This paper provides implications as follows. First, we use the self-employment job statistics to conduct comparisons between the status of self-employment jobs in Korea and OECD member countries. This study examines the signs of the fall of self-employment and analyzes the change in the productivity of self-employment jobs. Second, we estimate the national economic impact of self-employment job fluctuations from macroeconomic perspectives. We empirically analyze the impact of the change in the percentage of self-employed workers on the macroeconomic figures, such as GDP.

## *II The Status of Self-Employment in Korea*

### **2.1 Definition of Self-Employment**

In the KOSTAT (2016a) “Economically Active Population Survey,” “self-employed workers” are classified into self-employed workers with employees and self-employed

workers without employees. They are defined separately. Self-employed works with employees mean “people who run a business with one or more paid employees.” Self-employed workers without employees mean “people who run a professional business or run a business in an independent form with their own responsibility alone or with unpaid family workers.”<sup>2)</sup>

The World Bank’s definition of self-employed workers is as follows-self-employed workers are those workers who, working on their (own) account or with one or a few partners or in cooperative, hold the type of jobs defined as “self-employment jobs” (i.e. jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced).” The World Bank divides self-employed workers into three subcategories: employers, own-account workers, and members of a producers’ cooperative. The OECD also defines that a self-employment job can be seen as a survival strategy for those who have not found other means of livelihood or as a desire of an entrepreneur or an aspiring entrepreneur to run an enterprise by manifesting entrepreneurship. We can see that the ratio of self-employment jobs has various meanings. In other words, self-employed workers under OECD standards include employers, own-account workers and members of producers’ cooperative along with unpaid family workers. In this study, the KOSTAT definition of self-employment jobs was applied but other statistical data are used as needed.

## 2.2 General Status of Self-Employment Jobs in Korea

The total number of self-employed workers in Korea started to increase in the 1970s and has increased steadily since then. It increased sharply after the foreign exchange

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2) Unpaid family workers are unpaid workers in a business or a farm run by a family member in the same household. Workers who worked more than 18 hours during the survey week are classified as employees.

crisis of 1997 but started to decrease in 2002 when the economy stabilized. However, the number has not decreased since 2012. According to the statistics on the status of workers in the KOSTAT (2016a) “Economically Active Population Survey,” the number of self-employed workers, which was 7.63 million in 1999, reached a peak of 7.98 million in 2002. It tended to gradually decrease after that. The percentage of self-employed workers remained at around 35% until the early 1980s, but it dropped sharply after the 1980s. Since then, it has remained at the level of 25~30% after reaching 36.8% in 1997 and 38.3% in 1998. With the stabilization of the economy in the 2000s, 57% of the self-employed workers are in their 30s and 40s. In the late 2000s, the number of self-employed workers in their 30s and 40s continued to decline and the number of self-employed workers in their 50s increased. The ratio of self-employed workers steadily declined to less than 21% due to changes in domestic and overseas economic conditions such as the credit card crisis in 2003 and the European financial crisis in 2008. In 2009, the percentage of older self-employed workers aged over 50 rose sharply. They flipped with self-employed workers in their 30s and 40s in terms of the percentage of self-employed workers by age. The total number of self-employed workers was 7.24 million in 2009 and 5.57 million in 2016.

In particular, A slightly increase in the ratio of self-employed workers in 2012 can be recognized as a situation in which the instability of the employment market continued but the self-employment jobs played a role as alternative jobs for young people as well as older people aged over 50 who were not employed as paid workers in the labor market (Korea Employment Information Service Press, December 31, 2013). Although the self-employment jobs contributed to an increase in the number of employees in 2012, it seems that there was also a decline in self-employment jobs in 2013 as well as the slowdown in the growth of the total size of the labor force. The recent

decline in the number of self-employed workers is attributable to the slowing of entry to self-employment jobs rather than an increase in self-employed workers' exits from self-employment jobs. For the most part, self-employment jobs have a reverse relationship with the economy. When it was difficult for workers to enter organizations as paid workers, their entry and exit were actively made to and from alternative jobs in industries with relatively low entry barriers such as wholesale and retail, food and hospitality. Self-employed workers in these industries can be seen to have reached saturation. The industries that led an increase in self-employment jobs in 2012 are domestic-based services (112,000) such as wholesale and retail, transportation and food and lodging (Kim et al., 2012). Traditionally, the primary source of self-employment jobs was in the domestic-based service industry. In this industry, there was an increase of 80,000 self-employed workers in 2012 compared to the same period of the previous year. The number of older self-employed workers aged over 50 increased by 157,000 in 2012 compared to the same period of the previous year. Older self-employed workers aged over 50 had difficulties in reemployment due to their age. Therefore, their retirement allowances and family capital became opportunities to start small businesses in the traditional service sector. The number of small businesses consisting of less than 5 people without employees increased by 141,000 compared to the previous year. In addition, the number of self-employed workers aged over 55 supporting their family as household heads increased by 108,000 compared to the previous year.

### ***III. Analysis of Macroeconomic Impact of Self-Employment Job Fluctuations***

#### **3.1 Previous Research**

Blau (1987), Blanchflower (2000), Rupasingha (2010) and Carmona et al. (2012) empirically

analyzed the impact of employment, sales and productivity created by self-employment jobs on macroeconomic variables such as GDP and the unemployment ratio. In Korea, Ryu and Choi (1999)'s analysis is the beginning of the relevant self-employment research that seeks self-employment characteristic and the process of change using Statistics Korea's materials. In these studies, the status of self-employment jobs was analyzed in regard to the comovement of self-employment jobs with macroeconomic variables in terms of activation of entrepreneurship from the econometric viewpoint by using VAR (vector autoregressive) model and other similar methods. Previous research results show that there is a negative Granger Causality between the self-employment job activation and the unemployment ratio and that there is either no correlation or weak pro-cyclicality between the self-employment job activation and real GDP. This phenomenon is not universal. It varies depending on the industrial characteristics and the developmental level of each country.

Since previous studies have mainly dealt with overseas cases, there have hardly been any cases of empirically analyzing the comovement and impact of Korean self-employment job fluctuations and macroeconomic variables. This study intends to examine the causality between major self-employment job-related variables and macroeconomic variables such as GDP and unemployment. The impact of self-employment job-related variables' variability on macroeconomic variables is quantified to estimate the impact of self-employment jobs. Key variables related to self-employment job are not available in time-series except for the number of self-employed workers. Therefore, the number of self-employed workers is used as the key variable.

#### **3.2 Models and Data**

In order to grasp the dynamic relationship of variables, we use a VAR model to grasp the impact of self-employment job fluctuations and macroeconomic variables on each

other (Sims, 1980).

$$x_t = c_1 + \sum_{i=1}^n a_{1i}x_{t-i} + \sum_{j=1}^m b_{1j}y_{t-j} + u_{1t} \quad (1)$$

$$y_t = c_2 + \sum_{i=1}^p a_{2i}y_{t-i} + \sum_{j=1}^q b_{2j}x_{t-j} + u_{2t} \quad (2)$$

Where,  $x$  is self-employment job-related variables,  $y$  is major macroeconomic variables. The Granger Causality test, designed by Granger (2004), was conducted to identify causality between self-employment job fluctuations and macroeconomic variables. In Equation (1), when statistically testing and rejecting  $H_0 : b_{11} = \dots = b_{1m} = 0$ , the results statistically significant information, indicating a Granger causality of  $y \rightarrow x$ . It can be said that there is causality. That is to say, the past figures of  $y$ , was able to explain a certain part of  $x$ . The impact of an exogenous shock to self-employment job-related variables on macroeconomic variables in the dynamic structural formula was analyzed by means of the Impulse Response Analysis. The number of self-employed workers and the percentage of self-employed workers in the KOSTAT (2016b) ‘‘Economically Active Population Survey’’ are used as the variables in the analysis. In addition, the nominal and real gross domestic product growth ratios, the unemployment and the employment per-

centages are used as the macroeconomic variables. The percentage of self-employed workers is observed separately according to the percentage of total self-employed workers, the percentage of self-employed workers with employees and the ratio of self-employed workers without employment and analyzed based on annual data.

### 3.3 Basic Statistics and Correlation

#### 3.3.1 Basic Statistics by Variables

The correlation between self-employed and major macroeconomic variables were analyzed by varying the period pairwise (i.e., according to each pair of analysis variables), because there is a difference in the period during which statistics can be obtained for each variable. The basic statistics for each major variable used in the analysis are as follows.

#### 3.3.2 Correlation

According to the correlation coefficient of the major variables, the ratio of self-employed workers generally has a higher correlation with the real growth ratio than with the nominal growth ratio. It also has a higher correlation with the employment ratio than with the unemployment ratio. In addition, the ratio of self-employed workers has a positive correlation with the economic growth

**Table 1**  
**Basic Statistics by Variables**

	Ratio of total self-employed workers	Ratio of self-employed workers with employees	Ratio of self-employed workers without employees	Nominal growth ratio	Real growth ratio	Unemployment ratio	Employment ratio	Gini's coefficient
Average	30.36	6.50	21.55	14.59	7.09	3.74	57.40	29.78
Median value	30.19	6.57	20.17	13.46	7.30	3.65	57.40	30.40
Maximum value	37.25	7.73	29.36	35.54	14.80	7.10	60.90	32.50
Minimum value	22.54	4.63	16.52	-1.05	-5.70	2.00	52.80	25.70
Standard deviation	4.21	0.85	3.68	8.59	4.14	1.17	2.24	1.94
Available period	63-13	80-13	80-13	71-12	71-13	66-13	65-13	81-13
Observed value	51	34	34	42	43	48	49	32

Note: Because there was a difference in the statistical period available for each variable, the analysis was done with the longest available time-series for each variable.

ratio and a negative correlation with the employment ratio.

### 3.3.3 Unit root test

If the variables used in the analysis are non-stationary data, a spurious regression problem may occur. In order to take this into consideration, a unit root test was performed. In terms of the time-series trends of the main variables used in the analysis, it can be seen that some variables, such as the ratio of self-employed workers, tend to show time-series trends. In order to see this

more clearly, a unit root test was performed. The analysis shows that it was unlikely to reject the null hypothesis that the ratio of self-employed workers has a unit root. Therefore, it was regarded as non-stationary data.

The analysis shows that it is possible to reject that each first difference variable (i.e., the amount of the change compared to the previous period) has a unit root at a 5% significance level. In order to solve the problem caused by the non-stationariness, the variable of the ratio of self-employed workers was analyzed by using the amount of the

**Table 2**  
**Correlation between Variables**

Variable	Ratio of total self-employed workers	Ratio of self-employed workers with employees	Ratio of self-employed workers without employees	Nominal growth ratio	Real growth ratio	Unemployment ratio	Employment ratio	Gini's coefficient
Ratio of total self-employed workers	1							
Self-employed workers with employees	-0.59*	1						
Self-employed workers without employees	0.98	-0.73*	1					
Nominal growth ratio	0.80*	-0.46*	0.64*	1				
Real growth ratio	0.50*	-0.13	0.34*	0.64*	1			
Unemployment ratio	0.56*	-0.36*	0.42*	0.03	-0.19	1		
Employment ratio	-0.81*	0.79*	-0.80*	-0.43*	-0.32*	-0.73*	1	
Gini's coefficient	-0.01	-0.41*	0.09	-0.59*	-0.28	0.59*	-0.34	1

Note: \* is significant at the 5% level.

**Table 3**  
**Unit root Test Results of Major Variables**

Variable	T-Statistic <sup>1)</sup>		Lag length <sup>2)</sup>
	Level	1st difference	
Ratio of total self-employed workers	-0.91	-4.48**	0
Ratio of self-employed workers with employees	-2.46	-3.21**	1
Ratio of self-employed workers without employees	-2.76*	-4.02**	1
Nominal growth ratio	-2.84*	-5.85***	0
Real growth ratio	-3.80**	-5.43***	0
Unemployment ratio	-3.51**	-5.12***	1
Employment ratio	-2.78*	-4.95***	0

Note: 1) The t-Statistic is an Augmented Dickey-Fuller test result. \* and \*\* reject the null hypothesis that the variable has a unit root at a 10% and 5% significance level respectively.

2) The lag length is set up to max lag 8 based on Schwarz information criterion.

change compared to the previous period. This variable is marked with ‘ $\Delta$ ’.

#### IV. Analysis Results

##### 4.1 Ratio of Self-Employed Workers and the Real Growth Ratio

###### 4.1.2 VAR Model Estimation

The VAR model estimation results showed that the impact of the change in the real growth ratio and the change in the ratio of self-employed workers on each other is only significant in the case of the impact of the change in the real growth ratio on the change in the ratio of self-employed workers with

employees. It is similar to the case above.

The results of the causality test as well show that the causality of the changes in the ratio of self-employed workers by the change in the real growth ratio is only significant in the case of self-employed workers with employees. In the case of causality the other way around, the impact was observed to be completely insignificant.

The estimated Impulse Response also shows no significant impact on the real growth ratio’s response to an exogenous shock to the ratio of total self-employed workers or the ratio of self-employed workers without employees.

In the case of self-employed workers with employees, the standard deviation is 0.26,

**Table 4**  
**Estimated VAR Model of the Ratio of Total Self-Employed Workers and the Real Growth Ratio**

(Ratio of self-employed workers: total self-employed workers)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Real growth ratio
Ratio of self-employed workers (t-1)	0.18 [1.00]	0.06 [0.05]
Real growth ratio (t-1)	-0.02 [-0.77]	0.34* [1.87]
Intercept	-0.15 [-0.70]	4.24*** [3.11]
Adj. R-squared	0.00	0.05

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 5**  
**Estimated VAR Model of the Ratio of Self-Employed Workers with Employees and the Real Growth Ratio**

(Ratio of self-employed workers: self-employed workers with employees)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Real growth ratio
Ratio of self-employed workers (t-1)	0.16 [0.84]	-1.05 [-0.31]
Real growth ratio (t-1)	0.03** [2.39]	0.38* [1.70]
intercept	-0.17* [-1.89]	4.01*** [2.61]
Adj. R-squared	0.28	0.05

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

which means that a 1% increase in the ratio of self-employed workers with employees due to an exogenous shock had an impact of increasing the real growth ratio in the short term. The cumulative impact over 5

years showed a 11.3% increase (2.94/0.26 = 11.3). This is a somewhat higher figure, but as the ratio of self-employed workers in Korea is about 6%, it is very difficult to increase it by 1%.

**Table 6**  
**Estimated VAR Model of the Ratio of Self-Employed Workers without Employees and the Real Growth Ratio**

(Ratio of self-employed workers: self-employed workers without employees)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Real growth ratio
Ratio of self-employed workers (t-1)	0.19 [1.02]	0.17 [0.15]
Real growth ratio (t-1)	-0.05 [-1.58]	0.35* [1.80]
intercept	0.02 [0.08]	4.22*** [3.11]
Adj. R-squared	0.11	0.05

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 7**  
**Causality Test Results of the Ratio of Self-Employed Workers and the Real Growth Ratio**

	Ratio of self-employed workers	Ratio of self-employed workers
	Real growth ratio	Real growth ratio
Ratio of total self-employed workers	0.958	0.439
Ratio of self-employed workers with employees	0.754	0.017**
Ratio of self-employed workers without employees	0.880	0.113

Note: 1) The values in the table are p-values. The null hypothesis is to have no causality.

2) \*, \*\* and \*\*\* mean significant Granger causality at a 10%, 5%, and 1% significance level respectively.

**Table 8**  
**Estimated Impulse Response of the Real Growth Ratio to the Ratio of Self-Employed Workers**

	Total self-employed workers		Self-employed workers with employees		Self-employed workers without employees	
1	-0.53	(0.67)	2.21**	(0.61)	-1.27	(0.65)
2	-0.14	(0.72)	0.61	(0.63)	-0.34	(0.68)
3	-0.04	(0.38)	0.12	(0.49)	-0.09	(0.41)
4	-0.01	(0.15)	0.01	(0.25)	-0.02	(0.18)
5	0.00	(0.05)	-0.01	(0.10)	-0.01	(0.07)
Cumulatively up to 5	-0.72	(1.62)	2.94*	(1.69)	-1.72	(1.64)

Note: 1) Impulse Response to 1 standard deviation shock of the error term in the formula to determine the ratio of self-employed workers is estimated. Numbers in parentheses are standard errors.

2) \* and \*\* are significant at a 10% and 5% significance level respectively.

## 4.2 Ratio of Self-Employed Workers and the Unemployment Ratio

### 4.2.1 VAR Model Estimation

The results of the VAR model estimation showed that the impact of the change in the unemployment ratio on the ratio of self-employed workers is only significant in the case of the impact of the ratio of self-employed workers with employees and the unemployment ratio on each other. It is similar to the two cases above.

In the terms of the causality as well, the impact of ‘the employment ratio on the ratio of self-employed workers’ was shown to be only significant in the case of self-employed workers with employees.

The result of analyses that an exogenous shock to the unemployment ratio has on the level of self-employment showed that it did not have a significant impact on the level of total of self-employment. But the ratio of the self-employed workers with and without employees had an antidromic effect until the second term.

## 3.3 Ratio of self-Employed Workers and the Gini’s Coefficient

### 3.3.1 VAR Model Estimation

The results of the estimation showed that the impact of the ratio of self-employed workers on Gini’s coefficient is only significant in the case of self-employed workers with

**Table 9**  
**Estimated VAR Model of the Ratio of Total Self-Employed Workers and the Unemployment Ratio**

(Ratio of self-employed workers: total self-employed workers)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Unemployment ratio
Ratio of self-employed workers (t-1)	0.22 [1.20]	0.31 [1.16]
Unemployment ratio (t-1)	-0.03 [-0.26]	0.57*** [3.99]
intercept	-0.19 [-0.51]	1.50*** [2.81]
Adj. R-squared	-0.02	0.36

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 10**  
**Estimated VAR Model of the Ratio of Self-Employed Workers with Employees and the Unemployment Ratio**

(Ratio of self-employed workers: self-employed workers with employee)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Unemployment ratio
Ratio of self-employed workers (t-1)	0.61*** [3.21]	-0.40 [-0.57]
Unemployment ratio (t-1)	0.07* [1.65]	0.55*** [3.29]
intercept	-0.24 [-1.46]	1.49** [2.44]
Adj. R-squared	0.21	0.34

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

employees. Gini's coefficient had a significant negative impact on only self-em-

ployed workers without employees. In the case of the ratio of self-employed

**Table 11**  
**Estimated VAR Model of the Ratio of Self-Employed Workers without Employees and the Unemployment Ratio**

(Ratio of self-employed workers: self-employed workers without employees)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Unemployment ratio
Ratio of self-employed workers (t-1)	0.35* [1.90]	0.30 [1.26]
Unemployment ratio (t-1)	-0.08 [-0.70]	0.54*** [3.59]
intercept	0.02 [0.04]	1.63*** [2.88]
Adj. R-squared	0.05	0.36

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 12**  
**Causality Test Results of the Ratio of Self-Employed Workers and the Unemployment Ratio**

	Ratio of self-employed workers Unemployment ratio	Ratio of self-employed workers Unemployment ratio
Ratio of total self-employed workers	0.245	0.793
Ratio of self-employed workers with employees	0.571	0.099*
Ratio of self-employed workers without employees	0.206	0.482

Note: 1) The values in the table are p-values. They refer to the null hypothesis which is that there is no causality.

2) \*, \*\* and \*\*\* mean significant Granger causality at a 10%, 5%, and 1% significance level respectively.

**Table 13**  
**Estimated Impulse Response of the Unemployment Ratio to the Ratio of Self-Employed Workers**

	Total self-employed workers		Self-employed workers with employees		Self-employed workers without employees	
1	0.15	(0.15)	-0.55**	(0.14)	0.32**	(0.14)
2	0.27	(0.18)	-0.40**	(0.16)	0.37**	(0.17)
3	0.19	(0.15)	-0.26	(0.16)	0.26	(0.16)
4	0.12	(0.11)	-0.16	(0.12)	0.15	(0.12)
5	0.07	(0.07)	-0.09	(0.09)	0.08	(0.08)
Cumulatively up to 5	0.80	(0.55)	-1.45**	(0.57)	1.19**	(0.56)

Note: 1) Impulse Response to 1 standard deviation shock of the error term in the formula to determine the ratio of self-employed workers is estimated. Numbers in parentheses are standard errors.

2) \*\* is significant at the 5% level.

workers with employees and Gini's coefficient, all mutual causality is significant,

while all mutual causality between the ratio of self-employed workers without employees

**Table 14**  
**Estimated VAR Model of the Ratio of Total Self-Employed Workers and Gini's Coefficient**

(Ratio of self-employed workers: total self-employed workers)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Gini's coefficient
Ratio of self-employed workers (t-1)	0.94 <sup>***</sup> [26.17]	-0.04 [-0.54]
Gini's coefficient (t-1)	-0.11 <sup>**</sup> [-2.13]	0.84 <sup>***</sup> [8.78]
intercept	4.37 <sup>**</sup> [2.46]	5.66 [1.64]
Adj. R-squared	0.96	0.72

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 15**  
**Estimated VAR Model of the Ratio of Self-Employed Workers with Employees and Gini's Coefficient**

(Ratio of self-employed workers: self-employed workers with employees)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Gini's coefficient
Ratio of self-employed workers (t-1)	0.78 <sup>***</sup> [12.76]	0.60 <sup>**</sup> [2.29]
Gini's coefficient (t-1)	-0.05 <sup>**</sup> [-2.35]	0.94 <sup>***</sup> [9.61]
intercept	3.10 <sup>***</sup> [3.33]	-2.08 [-0.52]
Adj. R-squared	0.89	0.76

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 16**  
**Estimated VAR Model of the Ratio of Self-Employed Workers without Employees and Gini's Coefficient**

(Ratio of self-employed workers: self-employed workers without employees)

Independent variable	Dependent variable	
	Ratio of self-employed workers	Gini's coefficient
Ratio of self-employed workers (t-1)	0.90 <sup>***</sup> [26.19]	-0.06 [-0.92]
Gini's coefficient (t-1)	-0.07 [-1.25]	0.85 <sup>***</sup> [8.91]
intercept	3.77 <sup>**</sup> [2.18]	5.51 <sup>*</sup> [1.83]
Adj. R-squared	0.96	0.72

Note: 1) The lag order is set based on Schwarz information criterion.

2) Numbers in parentheses are t-statistics and \*\* is significant at the 5% level.

**Table 17**  
**Causality Test Results of Ratio of Self-Employed Workers and Gini's Coefficient**

	Ratio of self-employed workers Gini's coefficient	Ratio of self-employed workers Gini's coefficient
Ratio of total self-employed workers	0.587	0.033**
Ratio of self-employed workers with employees	0.022**	0.018**
Ratio of self-employed workers without employees	0.353	0.208

Note: 1) The values in the table are p-values. The null hypothesis is to have no causality.

2) \*, \*\* and \*\*\* mean significant Granger causality at 10%, 5%, and 1% significance level respectively.

**Table 18**  
**Estimated Impulse Response of the Gini's Coefficient to the Ratio of Self-Employed Workers**

	Total self-employed workers		Self-employed workers with employees		Self-employed workers without employees	
1	0.29	(0.18)	-0.63***	(0.15)	0.54***	(0.17)
2	0.23	(0.16)	-0.46***	(0.14)	0.43***	(0.15)
3	0.17	(0.15)	-0.30*	(0.15)	0.34**	(0.15)
4	0.13	(0.14)	-0.17	(0.16)	0.27	(0.15)
5	0.10	(0.14)	-0.06	(0.16)	0.21	(0.15)
Cumulatively up to 5	0.92	(0.75)	-1.62**	(0.73)	1.78**	(0.75)

Note: 1) Impulse Response to 1 standard deviation shock of the error term in the formula to determine the ratio of self-employed workers is estimated. Numbers in parentheses are standard errors.

2) \*, \*\* and \*\*\* are significant at a 10%, 5%, and 1% significance level respectively.

and Gini's coefficient is not significant.

The results of the Impulse Response Analysis showed that an exogenous shock to the ratio of total self-employed workers does not show a significant impact on Gini's coefficient. However, when the analysis on exogenous shocks to the ratio of self-employed workers with and without employees was done separately, an increase in the ratio of self-employed workers with employees shows a positive impact on Gini's coefficient in the short term. On the other hand, an increase in the ratio of self-employed workers without employees shows a negative impact on Gini's coefficient growth in the short term. Therefore, the data indirectly suggests that an increase in the ratio of self-employed workers with employees due to an exogenous

shock may lead to the reduction of social costs by mitigating income inequality in the short term.

### ***V. Conclusion and Implications***

An exogenous shock to the ratio of total self-employed workers does not show a significant impact on the real growth ratio either. However, when the analysis of exogenous shocks to the ratio of self-employed workers with and without employees was done separately, an increase in self-employed employers showed a positive impact on real economic growth. The impact of an increase in the ratio of total self-employed workers appears to be insignificant because the positive impact of an increase in the ratio of self-em-

ployed workers with employees on real economic growth is offset by the impact of an increase in the ratio of self-employed workers without employees. A 1% increase in the ratio of self-employed workers with employees due to an exogenous shock increased the real growth ratio in the first year and the cumulative impact for 5 years is expected to be 11.3%. The Impulse Response of the real growth ratio to a 1% increase in the ratio of self-employed workers without employees shows that the cumulative impact for 5 years was -2.58% but the analysis does not reject that the impact is statistically "0."

In the case of the unemployment ratio as well, the change in the ratio of total self-employed workers and the ratio of self-employed workers without employees did not show a significant impact. On the other hand, an increase in the ratio of self-employed workers with employees showed decreased the unemployment ratio, while an increase in the ratio of self-employed workers without employees has rather the negative impact of increasing the unemployment ratio in the short term (1 year).

The results of an Impulse Response Analysis of Gini's coefficient to the change in the ratio of self-employed workers showed an increase in the ratio of self-employed workers with employees has the positive impact of decreasing Gini's coefficient in the short term. Therefore, the data suggests that an increase in the ratio of self-employed workers with employees due to an exogenous shock may lead to the reduction of social costs. As a result, the rapid change in the ratio of self-employed workers due to changes in the external environment has a different impact on both economic growth and job creation according to the type of the self-employment jobs. If the ratio of self-employed workers with employees declines sharply due to external factors, there is expected to be a negative impact on economic growth, employment and unemployment. On the other hand, the decrease in the ratio of self-employed workers without employees was shown to have a positive impact on the macro-

economy.

In future studies, it will be necessary to do additional analysis on quarterly data in order to estimate the short-term impact of macroeconomic variables on the change in the ratio of self-employed workers.

The level of self-employed workers can be additionally analyzed with such level variables as the number of self-employment workers without ratio variable since the level of self-employment can change according to the rise or fall in the number of total workers. The level of self-employed workers can be additionally analyzed with such level variables as the number of self-employment workers without ratio variable since the level of self-employment can change according to the rise or fall in the number of total workers. It is also necessary to conduct analysis by industry, focusing on small self-employed workers by means of using the SMBA definition of small commercial and industrial businessmen and not the KOSTAT (2016a) definition of self-employed workers. It is necessary to conduct analysis on small self-employment jobs rather than the total number of self-employed workers in order to describe the fall in self-employment jobs. Particularly, it is necessary to do analysis that focuses on the sales or the productivity of self-employed workers rather than the number of self-employed workers. The time-series data are secured and the small self-employed workers are defined. Also, economic censuses are continuously carried out even though they are excluded in this study due to the absence of available data. In particular, previous research suggested that there is much variance the actual rates of self-employment between types of business while this paper only analyzed self-employed jobs with and without employees. Future researchers will need to conduct additional research through industry specific analysis.

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## 자영업이 국가경제에 미치는 영향

김우형\*

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우리는 본 논문에서 자영업의 변화가 국민경제에 미치는 영향 분석을 통해 올바른 정책 방향을 제시하고자 한다. 즉, 자영업의 현황 및 자영업자 지원의 정책 방향을 제시하고자 한다. 우리는 변수들의 동태적 관계를 파악하기 위해 VAR 모형을 사용하여 자영업 추이와 거시경제 변수 간의 상호 영향을 파악하였다. 분석 결과 자영업자 비중의 외생적 충격은 실질성장률에 대해 유의한 영향이 없으나, 고용 있는 자영업자와 고용 없는 자영업자로 구분하여 분석할 경우 고용 있는 자영업자의 비중의 증가는 실질성장에 긍정적인 영향이 있는 것으로 나타났다. 향후 연구에서는 자영업자 비중 변화에 대한 거시경제 변수의 단기적 효과를 추정하기 위해 분기별 자료 등으로 추가 분석을 시도할 필요가 있다.

**주제어** : 외생적충격, VAR 모형, 거시경제, 자영업

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