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Trends in Entry and Succession of Farm Managers in Korea¹⁾

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Summary

This paper analyzed the trends in the entry and succession of farm managers in Korea using the raw data of the Agriculture Census in years 2000, 2005 and 2010. A population structural equation model was used to analyze population flow patterns of farm household members and trends in the entry and succession of farm managers by age and farming experience. According to analysis results, it was found that new inflow or succession of farmers were made mostly by those in the age range of 30s to 50s. In addition, it was found that aside from the farm managers who have newly entered into the business of farming, more than half of the existing farm managers were successors who have inherited the farming business from parents or close acquaintances. Most of these farm managers are found to have inherited the farming business after having worked in the business together with their conferrer for over 30 years.

Keywords: Korean Agriculture, Entry and Succession of Farm Managers, Farm Population, Agriculture Census

1. Introduction

The structure of Korean agriculture is in the process of transforming itself due to internal and external changes in the environment of the Korean economy. As a result of the agreements made during the Uruguay Round negotiations in the 1990s and due to the launching of the World Trade Organization, the opening up of the domestic market to foreign agricultural products has expanded. Also, the speed of the market liberalization has further accelerated with the reaching of free trade agreements with large economies such as the European Union and the United State following the signing of a free trade agreement with Chile in the turn of the 21 century.

Because of the expanding liberalization of the domestic agricultural market, the production and management structure of farming has been specialized and scaled up centering around full-time farmers. As a result, disparity in the agricultural sector, such as the widening gap in management and production scale, could be observed in the agricultural sector (Hwang et al. 2002). Also, it has become more difficult for family farms, especially those with old farmers, to maintain their business due to the lack of successors. Moreover, as more farmland become idle centering around mountainous regions that are unfavorable for farming,

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1) This study is conducted based on the "Retrospect and Prospect of Structural Change in Korean Agriculture: An Analysis of Agricultural Census (2000, 2005, 2010)" by KREI (Kim *et al.* 2012)

and as the rural exodus to cities continues, Korean agriculture and rural communities are facing the risk of being hollowed out.

In the meantime, Korean agriculture and rural communities are in the process of being transformed. With the retirement of baby boomers looming, coupled with the growing trend to seek new opportunities in the agriculture, there are clear signs that urban residents are returning to the farming business and rural areas. In 2011, the number of urban households that have returned to rural areas has increased sharply to 10,503 households, a 60.8% increase from the previous year. In addition, the ratio of returning farmers to new farmers has increased sharply from 6% in 2001 to 30% in 2011. As a result, new industrial developments are emerging, such as changes in farmland ownership and appearance of new types of farm holdings (Kim et al. 2012).

Analyzing the structural changes of Korean agriculture caused by internal and external changes in the environment as described above and providing basic data are very important for future formulation of policies that aim to improve the industrial structure of Korean agriculture. In particular, analyzing the changing status and role of farm managers who are the main pillar of Korean agriculture can provide important implications to improving the production structure of Korean agriculture, such as securing farmer successors in the face of aging farmers.

The purpose of this study is to analyze the inflow and succession of farm managers by age and farming experience and derive policy implications by analyzing the changing demographic characteristics of farm managers.

2. Model and data

2.1. Model

In order to identify the patterns of farm managers' succession and movement, a population structural equation model was used as defined below.

$$P_{t+1}^{i+1} - P_t^i = -D_{t+1}^{i+1} + I_{t+1}^{i+1} - O_{t+1}^{i+1} \quad i = 1, 2, \dots, N-1 \quad (1)$$

$$P_t^0 - B_t = -D_t^0 + I_t^0 - O_t^0 \quad (2)$$

Here, N denotes age groups. B_t denotes the number of newborn babies in the time period of t , and the population size in the age group of i in t time period is denoted as P_t^i . D_{t+1}^{i+1} denotes the number of deceased in the $(i+1)$ age group in the $(t+1)$ time period and the variables I_{t+1}^{i+1} , O_{t+1}^{i+1} indicate inflow and outflow of population, respectively, in the $(i+1)$ age group in the $(t+1)$ time period. In other words, there are 18 age groups in N , which starts from (0~4 old) to (1~5 old) ... (81~84 old), and (over 85 old). Population size, number of deaths, number of in-migrants, and number of out-migrants in the age group of (0~4 old) in the

time period of t are denoted by P_t^0 , D_t^0 , I_t^0 , O_t^0 respectively.

In order to analyze the population flow patterns by age, the virtual size of farmers' population is calculated from the population structural equation model. Denoted as (P_{t+1}^{i+1}) , the virtual size of farmers' population indicates the population size of the age group $(i+1)$ in the $(t+1)$ period after taking into consideration the birth and death rates by age under the assumption that there is no inflow or outflow of farmers in the population structural equation model. The actual size of farmers' population in the age group $(i+1)$ in the period $(t+1)$ is P_{t+1}^{i+1} . Here, the net population inflow is found by subtracting the virtual population size from the actual population size. In other words, $P_{t+1}^{i+1} - \widehat{P_{t+1}^{i+1}}$ is the net inflow of farmers in the age group of $(i+1)$ in the period of $(t+1)$.

By using the above population structural equation model, it is possible to calculate the number of farmer successors by farming experience. Since a farmer successor is defined as a farmer who inherits the farming business at a particular time during which the successor has been farming alongside the conferrer, their number is calculated by the net change in the number of farm managers that have the farming experience of $(i+1)$ years in the $(t+1)$ period ²⁾. In other words, the farm successions of farm managers with the experience of $(i+1)$ years in the $(t+1)$ period can be indicated by subtracting (P_t^i) , the number of farm managers with the experience of i years in the t period, from (P_{t+1}^{i+1}) , the number of farm managers with the experience of $(i+1)$ years in the $(t+1)$ period.

The number of farmer successors can be calculated as $P_{t+1}^{i+1} - P_t^i = -D_{t+1}^{i+1} + I_{t+1}^{i+1} - O_{t+1}^{i+1}$ in the above equation (1). Here, D_{t+1}^{i+1} means biological displacement since it denotes the number of deceased farm managers who had the farming experience of $i+1$ years in the $t+1$ period, and $I_{t+1}^{i+1} - O_{t+1}^{i+1}$ means social net inflow of farm managers who had the farming experience of $i+1$ years in the $t+1$ period. $P_{t+1}^{i+1} - P_t^i$ indicates farmer successions with both social and biological net inflows taken into account.

2.2. Data

This study analyzed the trends and patterns of entry and succession of farm managers by age and farming experience using the raw data of the National Survey of Agriculture, Forestry and Fisheries (the Agriculture Census) in years 2000, 2005, and 2010. The national survey is conducted by the Korea National Statistical Office at every five years through complete enumeration and its raw data are used as basic materials for analyzing and forecasting changes in the agriculture and the rural communities.

3. Major findings

3.1. Trends of Farm Households and Farming Population

The number of farm households and the farming population are still on a decreasing trend in the 2000s

2) The farm manager with "0" experience in the $(t+1)$ period is denoted as a new farmer and it is not included in the farmer successor group.

Table 1: Changes in the Number of Farm Households and Farmers (2000~2010)

	Unit	2000	2005	2010	Rate of change (%) 2000~10
Farm households (percentage to total households)	1,000 households (%)	1,383 (9.7)	1,273 (8.0)	1,177 (6.8)	-16.1
Farmers (percentage to total population)	1,000 persons (%)	4,031 (8.8)	3,434 (7.3)	3,063 (6.4)	-27.5
Average number of farm household members	persons	2.9	2.7	2.6	-10.9
Gender ratio	%	95.7	95.4	96.1	
Median age	years	49.9	54.1	55.7	11.0
Age composition					
—0~14 years	%	11.4	9.8	8.8	
—15~64 years		66.9	61.1	59.4	
—65 years or above		21.7	29.1	31.8	
Farm manager					
Average age	years	58.3	61.0	62.3	6.6
Age distribution					
—40s and younger	%	23.8	17.9	14.7	
—60s and older		51.1	58.3	60.9	

Source: Analysis of data from the Agriculture Census of 2000, 2005, and 2010

even though the trend has slowed down compared to the 1990s. The number of farm households in Korea has decreased by 16.1% from 1.383 million in 2000 to 1.177 million in 2010 (Table 1).

Meanwhile, the aging of farm household members has been accelerating. The median age of farm household members has increased by 11% from 49.9 years in 2000 to 55.7 years in 2010. As a result, the share of farm household members aged between 15 and 64 who are able to work has dropped by 7.5 percentage points from 66.9% in 2000 to 59.4% in 2010. In the case of old farmers aged over 65 years, the percentage has increased by 10.1 percentage points to 31.8% from 21.7%. As can be seen in the age distribution of farm household members in Table 1, the increase rate of old farmers is the largest, which shows that the aging of farmers has been accelerating.

The phenomenon of aging can also be seen through the age distribution of farm managers. The average age of farm managers has increased by four years in 2010 from 2000, and their age distribution shows that the number of farm managers aged 60 or more has increased by 9.8 percentage points and the number of farm managers in the age group 40s or less has decreased by 9.1 percentage points.

3.2. Patterns of Farm Household Members' Out-Migration from Agriculture by Age

If we examine the net-inflow patterns of farmers by age, we can see that there is a continuous inflow of

farm household members centering around the age group between the 40s and the 50s. Until the early and mid-1990s, there was a net-outflow of farmers in Korea in all age groups except those in the 80s or above age band. During the period from 1995 to 2000 with a financial crisis called the IMF bailout program, however, there was a net inflow of farmers in the age group their early 40s and 50s and, consequently, a net inflow of children aged between 5 and 14. In the early 2000s when the country recovered from the financial crisis, there was an out migration of farm household members who are in their early and mid-40s, but there was a net inflow of farm household members aged between 45 and 59 (See Table 2).

In the years from 2005 to 2010, in-migrant farm household members in their age 40s and 50s accounted for around 10% of the 40s and 50s age farm household population and this shows that a net inflow of farm household members had taken place centering around the 40s ~ 50s aged farm household members. During the same period, the percentage of net population inflow among the farmers aged between 40 and 44 was 15.4%, 13.5% in the case of farmers aged between 45 and 49, 9.6% in the age group of 50 to 54, and 7.0% in the age group of 55 to 59. What this shows is that in the 2005~2010 period, the back-to-farm migration had taken place centering around the age group of 40s and 50s.

Table 2: Changes in the Net Inflow of Farm Household Members by Age

unit: person, (%)

Age \ Year	2000—05	2005—10
0~4	-41,514 (-61.7)	3,035 (4.8)
5~9	8,902(7.8)	12,288 (15.5)
10~14	1,436 (0.9)	13,662 (10.6)
15~19	-42,383 (-26.9)	-19,832 (-14.9)
20~24	-112,184 (-75.2)	-64,586 (-69.5)
25~29	-75,978 (-53.1)	-29,255 (-24.5)
30~34	-77,884(-65.6)	-43,254 (-43.5)
35~39	-25,374 (-19.6)	-414 (-0.4)
40~44	-10,275 (-5.6)	23,353 (15.4)
45~49	6,755 (2.6)	28,533 (13.5)
50~54	17,460 (6.1)	27,542 (9.6)
55~59	17,871 (5.6)	21,054 (7.0)
60~64	-3,432 (-1.0)	-629 (-0.2)
65~69	-20,159 (-4.9)	-19,703 (-6.3)
70~74	-40,721 (-13.2)	-57,481 (-18.1)
75~79	-36,111 (-22.7)	-64,413 (-31.9)
80 or over	-15,555 (-12.7)	-37,298 (-27.2)

Note: The figures in the brackets indicate percentage of net inflow of farm household members in the corresponding age group.

Source: Analysis of raw data from the Agriculture Census in the corresponding year.

In the case of 60s and older age band, however, there was a net outflow of farming population. What this means is that farmers in the age group of the 60s and older have mostly either transferred or given up their business.

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3.3. Analysis of the Entry and Succession of Farm Managers by Age

The reduction of farm households and the aging of farm managers are not the phenomena that can be observed in all age groups of farm managers. If we look at the results of a dynamic cohort analysis that examines how the number of farm households has changed in different age groups during the past 10 years, we can see that the aging of farmers was not a lopsided phenomenon where the number of farm households declined in all age groups to be left with only old farm managers.

If we examine how the number of farm managers has changed in each age group from the aspect of cohort trends (See Table 3), we can see that the number of farm managers who were in age group of the 20s in 2000 has rather increased by an annual average of 15.4% from 7,300 (farm households) in 2000 to 33,900 in 2010 when the farm managers have aged to be in their 30s. Similarly, the number of farm managers who were in their 30s in 2000 has increased by an average of 5.0% annually from 84,200 farm managers in 2000 to 138,900 farm managers in 2010 when the farm managers have aged to be in their 40s.

On the other hand, the number of farm managers in the age 50s in 2000 has decreased by an average of -0.005% annually from 348,100 in 2000 to 347,900 in 2010 when they have aged to be in their 60s. Likewise, the number of farm managers who were in the age 60s in 2000 has decreased by an average of 2.6% annually from 479,500 in 2000 to 371,500 in 2010 when they have aged to be in their 70s.

What this means is that there were inflows of new farmers or farmer successors in the age groups where the number of farm managers increased. In the age groups where the number of farm managers decreased, however, farm managers retired or handed over their farms to successors.

According the results of a dynamic cohort analysis by age group, it was found that new inflows of farm managers or farm successions occurred centering around farm managers in the age group or the 30s to the 50s in the 2000~2010 period. The age group that saw the most number of new incomer and successions was

Table 3: Changes in the Age Distribution of Farm Managers

unit: 1,000 households, %

Age	2000		2005		2010		Variation 2000~10	
	Number of Households	Proportion	Number of Households	Proportion	Number of Households	Proportion	Number of Households	%
29 or less	7.3	0.5	2.4	0.2	2.3	0.2	-5.0	-68.3
30~39	84.2	6.1	40.0	3.1	33.9	2.9	-50.3	-59.7
40~49	237.7	17.2	185.8	14.6	138.9	11.8	-98.8	-41.6
50~59	348.1	25.2	302.9	23.8	282.7	24.0	-65.3	-18.8
60~69	479.5	34.7	430.5	33.8	347.9	29.5	-131.6	-27.4
70 or more	226.7	16.4	311.3	24.5	371.5	31.6	144.9	63.9
Total	1,383.5	100.0	1,272.9	100.0	1,177.3	100.0	-206.2	-14.9

Source: Analysis of raw data from Agriculture Census in the corresponding year.

farm managers in their 40s (54,700 households), followed by 50s (45,000 households) and 30s (26,600 households) (See Table 3). If we further break down the age groups, we can see that the new entry of farm managers and farm successions during the 2000~2010 period occurred with farm managers who are as old as the early 60s. The entry and succession of farm managers during the 2005~2010 period was most active with farm managers aged 30 to 34 years, followed by 35~39 year olds, 40~44 year olds, and 45~49 year olds.

In the case of farm managers in the age 60s, however, it was found that there was no noticeable demographic change although retirement and farm successions continued. As for the age group of the 70s or over, retirement was the principal means of exit from the farming business.

3.4. Analysis of Entry and Succession of Farm Managers by Farming Experience

In 2000, there were 55,128 farm managers who had the farming experience of less than 5 years. And in 2005, there were 66,958 farm managers who had the farming experience of 5 to 10 years. The difference between the two numbers is 11,830 and this figure shows the number of farm managers who have inherited the farming business during the 2000~2005 period.

In the 2000~2005 period, there were 16,201 farm managers who inherited the farming business and had farming experience of 10 to 15 years, whereas the number of farm managers who inherited the farming business and had farming experience of 20 to 25 years was 44,902 (See Table 4).

It was also found that during the same period, farm managers who inherited the farming business and had the farming experience of 5 to 10 years accounted for 17.6% of the total number of farm managers. Similarly, the ratio of farm manager successors who had the farming experience of 10 to 15 years was 20.5%,

Table 4: Changes in the Number of Farmer Successors by Farming Experience

unit: number of farmer successors, (%)

Period Experience	2000~2005	2005~2010
5~10 years	11,830 (17.6)	27,527 (35.6)
10~15 years	16,201 (20.5)	24,943 (27.1)
15~20 years	-33,129 (-67.8)	-30,029 (-61.2)
20~25 years	44,902 (39.6)	49,265 (50.3)
25~30 years	-85,766 (-127.9)	-66,479 (-142.9)
30 years or more	766,793 (90.4)	687,219 (91.1)
Total	720,831 (58.9)	692,446 (62.0)

Note: The figures in the parentheses show the ratios of successor farmers in their corresponding category of farming experience, and the negative values indicate the exit of farm managers.

Source: Calculations are derived from the raw data of the Agriculture Census.

and farm succession was most active among the farm managers who had the farming experience of over 30 years.

As for the farm managers who inherited the farming business during the 2000~2005 period, it was revealed that in 2005 they accounted for 58.9% of the total number of farm managers excluding the new farmers (defined as farmers with farming experience of less than five years). In other words, this means that, with the exception of farm managers who newly entered the farming business, more than half of the total number of farm managers were farmers who inherited the farming business from their parents and others.

In the case of the 2005~2010 period, the number of farm managers who inherited the farming business comprised 62.0% of the total number of farm managers in 2010 excluding new farmers. As in the case of the 2000~2005 period, the percentage of farm managers who inherited the farming business during the 2005~2010 period was highest (91.1%) among the farm managers who had farming experience of more than 30 years. In other words, what this shows is that most farm managers inherited the farming business after having worked in the business together with their parents for over 30 years.

In the meantime, the changes in the number of farm managers who had the farming experience of 15~20 years and 25~30 years are represented with negative figures. What this shows is that there were far

more farm managers who exited from the farming business (through out-migration or retirement) than those that entered the business through farm succession). In other words, we can see that the numbers of farm managers who had the farming experience of 15~20 years and 25~30 years have continued to decrease for the past 10 years.

4. Conclusion

In the case of farming population, it was revealed that amid the aging of farmers, there were net inflows of farmers centering around the aged group of the 40s and the 50s. In the past 10 years, new entry and succession of farmers were made centering around farmers in the age of the 30s to the 50s, whereas it remained stagnant among farmers in their 60s. As for the farmers aged 70 or more, they were driven out of the workforce through retirement and farm transfers.

As for the transfer of farming business, it was revealed that 58.9% of farmers who had over five years of farming experience have succeeded the business during the 2001~2005 period, whereas 62.0% of farmers were farmer successors of over five years of farming experience during the 2006~2010 period. During the ten-year period from 2000 to 2010, when the age of farm succession had lowered, the phenomenon of delaying the farm succession could also be observed. In other words, during the 2000~2005 period, the farmers who have become farm managers with little farming experience were mostly in the age of the 50s, but in the 2005~2010 period, the age of succeeding farmers had fell to the relatively young 40s. But, in the case of farmers with a long farming experience of 20 to 24 years, the majority age of farm successions has increased to the 50s, which implies that super-aged farm managers are delaying their retirement.

As the aging of farm managers progressed, net inflows of farmers were made centering around young and middle-aged farmers in their 30s to 50s, and the modes of succession, too, are being diversified. In order to effectively improve the agricultural management structure related to management transfers and farm successions, it is necessary to formulate policies that take into account different modes of farm successions for each farming type and farming experience.

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