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RESEARCH ARTICLE

ASSOCIATION BETWEEN THE FARM SUCCESSION AND THE GENERATIONAL INTEGRATION PROCESS

***Víctor Rodriguez-Lizano**

University of Costa Rica, Agricultural Economics and Agribusiness Department, UCR 11501-2060, Montes de Oca 11501, San José, Costa Rica

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ABSTRACT

The exit of younger generations from rural areas has serious negative implications both to farms and to the territory, however, the generalized aging of farmers is occurring worldwide. The main objective of this research is to analyze the drivers that determine the permanence of young farmers in the family farm. The traditional approach focuses on analyzing the socioeconomic conditions and how they influence the probability of a farm being successfully passed to the next generation. Another strand of research states that the most influential factors are those actions the principal farmer conducts with him/her heirs. These actions are collectively called the Generational Integration Process (GIP). We carried out the field work in a horticulture area of Zarcero, Costa Rica where 126 interviews were conducted to old farmers (above 35 years old). Results indicate that indifferent to the socioeconomic level (SI) of the principal famer, the resulting GIP for the heirs considered potential 'Successors' is significantly great than that for 'Not successors'. The successors, however, show significant GIP differences between 'Low SI' and 'High SI'

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INTRODUCTION

Succession is essential for the existence and development of family farms and rural areas. Most farms in the world are family farms (Corsi, 2004), regarding Lowder *et al*., (2016), approximately 75% of agricultural land is held by family farmers. In Central America, family farming contributes to nearly 50% of rural employment (Salcedo, 2014) providing food security through a wide range of agricultural products. The exit of youth from rural areas has serious implications both to farms and to the territory. Researchers have identified that emigration of rural youth can lead to cultural deterioration (Matte, 2017), furthermore, when successors choose to discontinue farming, there is a loss of the farm's specific knowledge (Bertoni, 2016). Other research has found that the farms which do not have a current or potential successor are more likely to enter into a period of stagnation or decline in the years prior to the principal farmer's retirement (Inwood, 2012; Wheeler, 2012). Likewise, older farmers usually tend to have less of a tendency to adopt new technologies or sustainable farming schemes (Dabkiene, 2015). This situation makes the involvement of young farmers fundamental in the adaptation of farms to the current climatic, technological and market demands.

Corresponding author: **Víctor Rodriguez-Lizano,**
University of Costa Rica, Agricultural Economics and Agribusiness Department, UCR 11501-2060, Montes de Oca 11501, San José, Costa Rica.

Two main approaches to analyze farm succession can be distinguished among the literature review. The first one refers to quantitative research in which most publications use correlation analysis between socioeconomic variables and the succession status of the farm. Most of them focused on family, farm and farmer variables (Bertoni, 2016; Suess-Reyes, 2016); and to a lesser extent, some have examined the topic by adding context variables (Creighton *et al*., 2016). The other approach to researching this topic has attempted to understand succession from a qualitative point of view, mainly focusing on the description of the succession process and its stages (Carolan, 2018; Errington, 1998), as well as all the strategies farmers employ so that their relatives can stay on the farm or leave it (Conway *et al*., 2017; Fischer and Burton, 2014; Inwood and Sharp, 2012). In this line, there are studies suggesting that the Generational Integration Process (GIP) is the principal determinant in family farm succession (Perrachón, 2016, p.24). The generalized aging of farmers is occurring in Costa Rica, a phenomenon that is also happening in Europe, where only 11% of farmers are under the age of 40 (Eurostat, 2016) and in Africa where there is evidence that younger generations are increasingly denied to continue working on the family land (Boafo, 2019). In Costa Rica, the average age of farmers is 53.9 years old, and 22.5% of producers are more than 65 years old (INEC, 2015). According to Costa Rican legislation, senior citizen is obtained when inhabitants are older than 65 years of age.

This situation is happening because few young people are entering the sector and because principal farmers continue farming into old age. The main objective of this research is to analyze the association between the GIP and the generational succession of family farms.

MATERIALS AND METHODS

Literature suggests that in addition to socioeconomic variables, the principal farmer influences succession through concrete actions oriented to the heir's introduction to farm management, actions which over time will generate a successor (Perrachón, 2016; Dirven, 2002). Díaz-Méndez (1999) mentions that children's inclusion in social and work-related activities is determined by the action strategies taken by the parents, which, in rural areas, are often related to the continuity of the farm on which the entire family depends. The message from these authors is that succession is more than a single defined moment, it is a process. In fact, Dirven (2002, p.25) defines generational succession in agriculture as a process of transferring, during one's lifetime or not, to the next generation the use of the patrimony and the management of the farming operation. Likewise, Cabrera (1998), mentions that succession is a process that begins even before the successors take over management of the farm as it is. According to Perrachón (2016), succession is mostly based on the GIP, which refers to the ability of distinct generations to relate as a family with the goal of passing on the farm. As such, if the integration process is successful, the more likely the farm is to have a successor. Key actions that make up the GIP are:

- Communication between the principal farmer and successor about the intention of succession (communication): Dodero (2006) found out in twelve Latin American countries that lack of communication is the second most common cause of problems related to growth or succession among family businesses.
- Incorporating the successor into farm decision-making (decision-making): Failure to be incorporated into farm decision-making leads to future farmers with little management capacity and puts the continuity of the farm at risk (25).
- Give compensation for work done on the farm (payment): Mazorra (1999) indicates that financially compensating a successor is of great importance, whereby the principal farmer uses payment as an incentive to keep a son/daughter working on the farm.
- Allow sons/daughters access to formal education (financial support for studying): Dirven (2002) indicated that formal education is invaluable cultural capital and can create synergies with acquired experiences in production techniques, agricultural business management, marketing channels and credit management.
- Allow the heir to independently manage a segment of the farm (land): Mesen (2009) mentions the importance of giving a segment of the farm to the son/daughter so that he/she can develop and manage that segment of the farm as independently as possible.
- Planning: this refers to creating an action plan for farm succession. In general, few farmers have any idea about how they are going to pass on administrative control of the farm, and those who have a plan have not always discussed it with those who they consider are involved (25). Good succession planning begins much prior to the younger generation being of age to assume control of the farm (Bjuggren, 2001). While the first step in planning is to identify an heir, actually creating an action plan helps the principal farmer take explicit or tacit measures toward succession.

Each of the GIP actions are going to affect the probability of family farm succession through a complex network of relationships and synergies. The data was collected in Zarcero, region located 67 km northwest of San Jose, the capital of Costa Rica. In this area, where agriculture is crucial to the local economy, the typical farm is small (<5 hectares) and family-run (INEC, 2015). Our initial database was provided by the National Ministry of Agriculture and Livestock, and included the principal farmer's address. We complemented this database with snowball sampling; two types of data were collected, the first was from older farmers (above 35 years old) and the second was from younger farmers (less than 35 years old). We established the young farmers to be less than 35 years old since that corresponds to the cutoff age established by Costa Rican institutions for considering a farmer as young (Consejo de la Persona Joven, 2002). There are 198 vegetable farmers in Zarcero who are older than 35 and who have children older than 15 (INEC 2015). In order to estimate a representative sample of these farmers, we applied the formula of proportions where N=198, $Z_{\alpha/2}$= 1.96, d=5%, p=0.5 and q=0.5. Given those parameters, we estimated a sample size of 117 farmers, however we obtained 126 valid surveys. The survey instrument consisted of six closed-ended items: four were statements that required a response on a scale of 1 (very much in favor) to 5 (very much against) and two were questions requiring a yes/no answer. From this survey we quantified each principal farmer's GIP level with each of his/her children. Likewise, for each child we generated a dichotomous variable 'successor' based on the principal farmer's opinion. This variable had a value of 1 if the child was presented as a potential successor and a 0 if he/she was not a potential successor. The average number of children per farmer is 2.74, which gave us an initial database of 345 observations that enabled us to obtain a GIP level for each child. 40 surveys were considered incomplete thus that they were eliminated, which gave us a final database of 305 complete observations.

For the older farmers we estimated a Socioeconomic Index (SI). To generate this index, first a Principal Components Analysis (PCA) was carried out using socioeconomic variables. The value of SI for each farmer is a weighted average of the farmer's score for each component multiplied by its respective weight, which gave us a continuous variable for the SI. In order to isolate the effect of socioeconomic variables on succession we used the SI. Given its normal curve (KS p-value = 0.2) we recoded it into three levels: level one is to the 33rd percentile (SI=Low), level two is to the 66th percentile (SI=Medium), and level three is to the 100th percentile (SI=High). In the second step we quantified the farmers' GIP with each of their children. The maximum number of points a farmer can obtain in GIP with each of his/her children is 22 points and the minimum is 4 points. Henceforth, the sum of the GIP variables scores will be called the GIP-sum. Next we observe the GIP-sum both for the children who are considered successors and for those who are not. We carried out this analysis according to the SI level.

RESULTS

Quantitative analysis of the relationship between GIP, SI and farm succession: For older farmers, median farm size is 2.82 ha and only 19(15%) of the farms are organic. 93 (74%) of them do not add value to the production and 107 (85%) raise two or more kind of vegetables. The average age is 56.71 years old and the average time working on the farm is 39.78 years. For the older farmers, we based the socioeconomic characterization on the Socioeconomic Index (SI) obtained from PCA, which explains 69% of the variance of all the socioeconomic variables considered. A summary of the results of the PCA is presented in Table 1.

Table 1. Results of the Principal Components Analysis

Capital Component (Weight=50%)	Innovation Component (Weight=27%)	Other Income Component (Weight=23%)
Land tenure	Value-added production	Other income
Greenhouse square meters	Education	
Monthly income		

The results of the PCA enabled us to obtain an SI (continuous variable) for each farmer through the weight of each component. Then, we recode the values as low SI, Medium SI and High SI. For each SI level we observed the GIP-sum for the principal farmer's children who are considered successors and for those who are not (Table 2).

Table 2. Average values of the GIP-sum per SI level, according to the heir's condition

	Condition of the child	General	Low SI	Medium SI	High SI
GIP-sum	Not successor	11,71 (n=212)	12,58 (n=77)	13,25 (n=73)	13,89 (n=62)
	Successor	16,25 (n=133)	17,11 (n=46)	17,76 (n=41)	19,24 (n=46)

With respect to the intra-SI analysis, we applied a Kruskal-Wallis test (p-value <0.05) in which the comparison showed that indifferent to SI level, the resulting GIP-sum value for 'Successor' is significantly great than that for 'Not successor'. We conducted an inter-SI analysis for 'Successor' and for 'Not successor'. For the latter, the GIP-sum variable is not significantly different at any SI level. The successors, however, only show significant differences between Low SI and High SI. Furthermore, this group shows a slight increase in the GIP-sum as SI increases, which means that SI has a positive and small effect on the level of GIP.

We supported the abovementioned results by conducting a correlation analysis between the continuous variable SI and the GIP-sum, in which a low dependency was observed (Pearson correlation is 0.194 (p-value = 0.000). Successors have a higher GIP level than the non-successors, however, this is an aggregated variable and it is not possible to analyze whether or not this behavior is applicable to each of the variables that it includes: communication, decision-making, payment, financial support while studying, land and planning. Given this, we disaggregated the analysis for each variable of the GIP-sum and did a Chi-square test of each against the 'Successor' variable (Table 3).

Tabla 3. Dependence of each of the GIP-sum variables with the successor variable

	Communication	Decision-making	Payment	Financial support while studying	Land	Planning
Chi-square	Sig (0.00)	Sig (0.00)	Sig (0.00)	Sig (0.538)	Sig (0.00)	Sig (0.00)

In all cases, except for the variable 'Financial support while studying', there is a dependence between the level of each action in the GIP-sum and the variable 'Successor', where the successors have a higher level of each variable compared to the non-successors.

These results remain constant even among each of the three SI levels. We observed that whether or not the heir is considered a successor, the principal farmer provides financial assistance necessary for higher education, which suggests that the heir is given the opportunity to study, regardless of their farm staying- decision making.

Conclusion

Results suggests that there is a direct relationship between GIP and positive farm succession. This result is even consistent at different socioeconomic levels, such that there is a marginal increase in GIP as the principal farmer's socioeconomic level increases. Policy actions oriented towards maintaining an active agricultural sector by keeping young people on family farms should not only aim for good economic conditions, but also for improving what we call here the GIP. The probability of having positive farm succession could increases if policies are directed as much towards the successors as they are towards the successors' parents.

This results are of particularly relevant for developing countries as Costa Rica, because such policies do not necessarily imply high levels of public spending, since they can be carried out through information campaigns about the importance of: a) succession planning, b) communication between the principal farmer and the son/daughter about the intention to pass on the family farm, and c) incorporating the son/daughter in farm decision-making from an early age. Furthermore, none of these actions are dependent on the socioeconomic conditions of the farmer which makes them policies that are equally applicable to all social strata. In this sense, increasing the principal farmer's awareness regarding succession is fundamental for family farm well-being and the future of agriculture.

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