

# **Intergenerational Succession in Israeli Family Farms\***

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by

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## **Abstract**

We study, using a probit analysis of Israeli data, the likelihood of having a successor on the family farm at a certain point in time. We identify a number of significant family and farm attributes whose effects are consistent with economic theory based on the notion of bargaining between the generations.

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## **Introduction**

In the last decade, the farm sector in Israel has undergone vast changes, mostly resulting in a sharp drop in profitability. As a result, there is a considerable fear among analysts that family farming in Israel might cease to exist as a major contributor to food supply, export revenues, and national security. Past experience has shown that even when farming cannot provide the family with adequate living, farmers stick to their farm holdings and try to supplement income by other sources, such as off-farm work (one of the reasons is the inability to sell land, water rights, or production quotas without leaving the farm altogether including the family residence). However, since the family farm sector relies heavily on intergenerational succession (Pesquin et al.), the situation might become worse in the long run, since potential successors will refrain from joining a failing business. Hence, the existence or absence of successors on family farms can indicate the longer-run prospects of survival of these farms.

The purpose of this study is to analyze the decision of farm families to have a successor on the farm. We will investigate which family and farm characteristics are associated with higher probabilities of having a successor, and by this infer on the prospects of long-run survival of these farms. The decision of having a successor is not a simple one. On one hand, as will be described below, the parents-owners of the farm have the sole right of nominating a succeeding child. On the other hand, that child has to agree to be nominated as a successor. The issues of which child will succeed (institutional regulations state that the farm can be transferred as one unit to one child only), when will the final ownership transfer be made (declaring a child as a successor does not give him any property rights at the time of declaration), and what will be the rights and obligations of each side of the deal, cannot be disentangled from each other and from other farm

management aspects (Kimhi 1995). These issues are likely to be resolved as a solution to a bargaining game between parents and their children. We will not try to explicitly account for this complicated structural process, but rather look at a sample of farms in a certain point in time and observe in which of the farms a succeeding child has already been nominated. Then we will estimate a probit model in which the dependent variable is the binary indicator of the existence of a successor, and try to infer from the results on the underlying structural process.

In the following section we describe the institutional setup in which family farms in Israel operate, with an emphasis on regulations that affect the succession considerations. After that we bring a brief survey of the empirical evidence on farm succession. The next section includes a brief theoretical discussion, and then we describe the data set used in this study, present the empirical results and discuss their implications. The paper ends with a summary and conclusions.

## **The setup**

The vast majority of family farms in Israel are part of Moshavim (cooperative villages). These villages were established on state-owned land. Each farm family in a certain Moshav was given an equal amount of land, water quota, and production quota, sufficient to generate income that was comparable to the alternative income at the time of settlement. Over the years, with the high technological progress, farm income took a dive, and families who wished to continue farming responded by capital deepening and specialization. Additional land and water resources became available with the turn of some of the families to rely on off-farm activities. Since the farm property could not have been used as collateral for commercial loans, farmers relied on mutual

liability agreements within the cooperatives. Following the financial crisis of the mid-1980's, cooperation has mostly collapsed, and the lack of an alternative source of short-term loans has forced many farm families out of business. Most of them turned to rely on off-farm employment, at least in part, and some, especially near metropolitan areas and tourist attractions, developed non-agricultural enterprises on their farms. Those who continued full-scale farming were able, as a result, to expand their agricultural activities. But even for these farms, the future of agricultural profitability is not clear.

In terms of farm succession, we have to differentiate between two types of villages: those who are located near metropolitan areas, and those who are located in remote areas. The skyrocketing housing demand in the early 1990's has quickly spilled over to nearby farm communities, and farms became attractive to potential successors merely because of the residential value of location. Of course, this has not been the case in more remote areas, and therefore, while in centrally-located villages children compete for being nominated as a succeeding child, many farm families in remote rural areas are doomed to remain without a successor.

At this point we have to return to the institutional structure of Moshavim in order to fully understand the terminology of "succeeding child". The legal framework is not exactly the same in all Moshavim, depending on the type of their land lease (Regev), but we will not go into the differences but rather emphasize the common denominators. In principle, the title of "succeeding child" is given to one of the farm couples' children who is accepted as a member in the village cooperative. Practically, however, it has been conceived as an indication that this child will eventually be given full ownership of his parents' farm (more precisely, the right to use the farm). The most important aspect of this definition is that only one of the children can be declared as a successor, and the other children can understand from this declaration that they have to look for a

different place to make a living. After being declared by the parents as a succeeding child, and approved by the cooperative's general assembly, the successor is allowed to build his residence on his parents' plot. This way the successor has a considerable advantage over someone else who has to buy a separate plot for his house, especially in areas where land prices are high. On one hand, this creates an incentive for declaring the succeeding child as early as one of the children is about to settle down and is willing to succeed. On the other hand, building the house makes the declaration of the succeeding child practically irreversible (although some exceptions always exist), and this creates an incentive to delay the decision. It is important to emphasize that being declared as a succeeding child, the child has no immediate property rights on the farm, and his future remains subject to the parents' decision. It is customary that at a certain point in time, when the parents get older, they transfer the legal ownership of the farm to the succeeding child, in return for an implicit or explicit obligation to provide them in their old age (Pesquin et al.). After such a legal transfer, the parents have no property rights on the farm, and unless some formal contract has been made (not the common phenomenon), are basically dependent on the child's good will. It should be emphasized again that farms can be sold or transferred to a child as one whole unit only.

Here is the time to take a look at what happens in other countries. Succession by a child is not unique to Israel. It has economic advantages everywhere, such as family-specific human capital (Rosenzweig and Wolpin), risk sharing (Guinnane), old-age security (Pesquin et al.), and tax incentives (Boehlje and Eisgruber). In most western economies, farmland is privately owned, and farmers are free to sell their farm or parts of it to anyone, a family member or a stranger. As a result, farms are often sold to one of the children or more than one. When the farm is sold to one child, he often takes a mortgage on it in order to pay his parents. When the farm is given to more

than one child, often one of them buys the others' parts (Tauer). In contrast to the situation in Israel, property rights elsewhere are very well defined. Both in Israel and in other countries, farm succession is a gradual process: the designated successor first shares farm work, later on takes part in farm management, and eventually becomes the sole owner (Blanc and Perrier-Cornet; Coughenour and Kowalski; Errington and Tranter). However, it is not easy to determine the existence and the identity of a successor on farms outside of Israel, unless he has already taken legal ownership. In Israel, on the other hand, the status of a succeeding child, although not giving the successor any legal rights, gives a pretty good idea that this child will eventually be the next legal owner of the farm. Hence, we can say that a farm with a "succeeding child" present has a higher probability of eventually having a successor than a similar farm in which a successor has not yet been nominated. This difference in probability of eventual succession is the focus of the empirical work reported later in this study.

## **Theoretical background**

Kimhi (1994) expressed the timing of succession as a solution to a planning problem aiming at maximizing the present value of the farm. However, he did not differentiate between the declaration of a succeeding child and the legal ownership transfer, and therefore that framework is too simple for our purposes. Pesquin et al. suggested to look at the succession process as a solution to a Nash bargaining game. We adopt their assumption that having a successor raises the value of the farm and hence its derived income, and therefore an agreement between the parents and the successor is possible whenever there exists an allocation of farm income between the

generations that makes both parties better off than their second-best alternative. The second-best alternative can be, for the parents - eventually selling the farm outside the family, and for the child - finding an alternative source of income, or for both, delaying the decision on succession by another period before making an irreversible agreement. Dealing with cross-sectional data, we focus on the probability that such an agreement has been reached prior to the time of the survey, and try to link it to a number of observable family and farm attributes. These attributes can be those affecting both the value of the farm given within-family succession, and the alternatives of both generations.

### **Empirical analysis**

We used data collected during the years 1994-5 in nine different Moshavim, representing young as well as more mature Moshavim, and located throughout the country. The question that serves as the focal point of this paper was “Is there a succeeding child on the farm?” Other than that, we asked for detailed family and farm information, and several other aspects of the succession process. Out of the 133 farm families surveyed, 127 provided complete information on the relevant questions. Table 1 includes the sample means of selected variables, in the whole sample as well as in the subsamples of those who had a successor on the farm and those who did not.

As mentioned before, we wish to identify the factors which differentiate between farms with and without a successor. We do this by estimating a probit model in which the dependent variable is binary: it takes the value of one if a successor is present, zero otherwise. This binary variable can be thought of as the realization of an unobserved latent variable which is the

difference between household utility conditional on having a successor, and the utility conditional on not having a successor, where it takes the value of one if this difference is positive, zero otherwise. Household utility can be thought of as a weighted average of parents' utility and the utility of the successor, where the weights are Pareto weights derived from the outcome of the underlying bargaining game.

The following variables are hypothesized to affect the succession decision. Age is expected to first increase the probability of having a successor, as children become older and more suitable for succession, and both parents and children become more prepared to make long-run decisions. Eventually, the probability of succession is expected to start declining with age, as a very old farmer who did not transfer the farm to a successor probably does not have a suitable child who is willing to succeed. Education is expected to affect the probability of succession in either way, as more educated parents can have better ability to evaluate the benefits of timely succession, but also the costs of an unsuccessful succession. The effect of off-farm work is also ambiguous: on one hand, a successor is perhaps less needed on a part-time farm; on the other hand, a farmer who works only on the farm is perhaps more sensitive to having a successor on the farm, since there is more to lose if the succession is not successful. The age differential between parents and children could delay succession at younger ages, hence it is expected to be negatively correlated with the succession variable. The number of children is expected to delay the succession decision, as it hurts the bargaining position of the potential successors (Kimhi 1995). The number of sons is expected to have a stronger effect than the number of daughters. Whether one of the parents inherited the farm could make them positively or negatively inclined towards the succession process, depending on their personal experience, and hence the effect of this variable is ambiguous. Farm characteristics are affecting the succession process to the extent that



they affect the value of the successor to farm income. For example, a successor is more important on dairy farms since farm work can be much more conveniently divided between two people than in other farms (Pesquin et al.).

The probit results can be found in table 2, which includes the estimated coefficients as well as the calculated effect of a unit change in each explanatory variable on the probability of having a successor. The likelihood-ratio statistic for the hypothesis that all the coefficients except for the intercept are zero is 83 with 13 degrees of freedom, meaning that the hypothesis is rejected at all reasonable degrees of freedom. The percent of correct predictions is 77% for farms with a successor and 84% for farms without a successor. We have also calculated four different  $R^2$ -based goodness-of-fit measures (Windmeijer) which had values between 50% and 80%.

The age effect is first positive and then negative, as expected, although the coefficient of the squared term is only marginally significant. The highest probability of having a successor occurs at the age of 82, which means that practically the effect of age is positive but is decreasing with age. At the sample means, an additional year of age increases the probability of having a successor by 23 percentage points. Note that all this is true when the age differential between the household head and the eldest child is held fixed, as well as the other explanatory variables. Alternatively, holding the head's age fixed and increasing the age differential (i.e., making the child younger), decreases the probability of having a successor by 13 percentage point per year.

In households in which the heads have less than 12 years of schooling, the probability of having a successor is lower by 22 percentage points. This indicates that education increases the likelihood of succession. Perhaps better-educated parents can work out more easily and efficiently a solution to the bargaining game with the potential successors, hereby allowing themselves to reach an earlier succession decision without increasing the risk of making a bad decision. The probability of having a

successor is higher when the household head is working mainly off the farm, but the difference is not statistically significant. The number of children also does not significantly affect the succession probability, but it can be seen that the number of sons has a positive effect while the number of daughters has a very small negative effect. Farmers who inherited the farm from their parents have a lower probability (by 17 percentage points) of having a successor, but this effect is only marginally significant. Perhaps these farmers are more aware of the shortcomings of making an early decision about succession.

Farmers in the north of the country have a much higher probability of having a successor than farmers in other areas, other things equal. It should be noted that farms in the north are different in observed attributes than farms in other parts of the country. They have more land, more fruits, vegetables, dairy and poultry enterprises, and their operators are less educated, work less off the farm, and are more likely to be second-generation operators. Hence, the relatively large coefficient of the North variable can in part be attributed to multicollinearity, and as a result, the 62 percentage point differential is not practically meaningful.

A successor is less likely to be found on farms with more land. This is perhaps due to the fact that farms with more land had a lower incentive to invest in capital-intensive modern activities and hence require less labor to operate (resulting in a lower demand for successors) and are less profitable (resulting in a lower supply of successors). Farms growing fruits or vegetables are more likely to have a successor (by 27 percentage points), probably due to the higher demand for managerial labor. The coefficient of having a dairy enterprise also has a positive coefficient but it is not significantly different from zero. Farms with a poultry enterprise have a lower probability (by 30 percentage points) of having a successor, probably due to the low labor intensity and low profitability experienced on such enterprises.

## **Summary and Conclusions**

In this paper we have examined the family and farm attributes which affect the likelihood of having a successor on the farm at a certain point in time. We have identified a number of significant attributes, whose effects are consistent with economic theory based on the notion of bargaining between the generations. In particular, we found that the probability of having a successor is rising with the age of the operator (in a decreasing rate) and his level of schooling, and with the age of the oldest child, holding the age of the parents constant. We failed to find a significant influence on the probability of succession of the number of children and of the parents' off-farm work status. We found significantly higher succession probabilities in farms which are located in the north and/or grow fruits and vegetables, and significantly lower succession probabilities in farms which were inherited from an older generation or have a poultry enterprise.

Overall, we conclude that intergenerational succession does seem to be affected by economic factors in Israel. Whether this is due to the specific institutional environment or a general phenomenon, can be inferred by comparisons to data from other countries. This is an important issue which is left for future research.

**Table 1. Variable Definitions and Sample Means**

Variable	Definition	Whole Sample Mean	Farms with Successor	Farms without Successor
Age	Age of farm owner in years	56.09	63.72	50.62
Educ11	Up to 11 years of schooling (D)	0.30	0.42	0.22
Mainoff	Owner works mainly off-farm (D)	0.24	0.19	0.27
Agediff	Owner's age when eldest child was born	25.98	25.49	26.32
Daughters	Number of daughters	1.41	1.30	1.49
Sons	Number of sons	1.61	1.59	1.62
Inherit	Owner inherited the farm (D)	0.37	0.23	0.47
North	Farm located in the north (D)	0.24	0.30	0.20
Land	Size of farmland owned (dunam=0.25acre)	45.39	44.60	45.95
Fruitveg	Owner grows fruits and/or vegetables (D)	0.74	0.74	0.74
Dairy	Farm includes a dairy operation (D)	0.23	0.30	0.18
Poultry	Farm includes a poultry operation (D)	0.39	0.36	0.41
Successor	A successor exists on the farm (D)	0.42	1.00	0.00

Note: Dummy variables are indicated by (D).

**Table 2. Probit Results**

Variable	Coefficient	Effect on Succession Probability
Intercept	-18.879 (-2.278)**	

**Table 2** (Continued)

Variable	Coefficient	Effect on Succession Probability
Age	0.5761 (2.112)**	+0.23
Age Squared	-0.0035 (-1.610)*	
Educ11	-0.7905 (-2.028)**	-0.22
Mainoff	0.4197 (0.925)	+0.14
Agediff	-0.1066 (-2.138)**	-0.13
Daughters	-0.0098 (-0.044)	-0.01
Sons	0.2413 (0.981)	+0.30
Inherit	-0.5403 (-1.459)*	-0.17
North	2.1763 (3.587)***	+0.62
Land	-0.0201 (-2.172)**	-0.03
Fruitveg	1.0009 (2.309)**	+0.27
Dairy	0.5079 (1.071)	+0.18
Poultry	-1.0002 (-2.512)***	-0.30

Notes: t-statistics in parentheses; \*, \*\*, \*\*\*: significant at 10%, 5%, and 1%, respectively.

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