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**Time Allocation Between Farm and Off-Farm
Activities in Israeli Farm Households - 1995**

by

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ABSTRACT

This paper examines the time allocation of Israeli farm families between farm work and off-farm work. We found that extended families behave differently than nuclear families: people in families with adult children or siblings of the farm couple tend to work more off the farm and less on the farm, while people in families with parents tend to work less both on and off the farm. We also found that farm land and capital do not affect time allocation once we control for the productive structure of the farm. The private Arab and Jewish farm families behave differently than families in Moshavim, perhaps due to institutional factors, cultural background, and/or labor market discrimination.

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Introduction

The purpose of this note is to examine the time allocation of Israeli farmers between farming and off-farm activities using data from the 1995 family-farm survey administered by the Central Bureau of Statistics (State of Israel 1998). In a sense, we follow the path of Kimhi (2001), but with a somewhat different emphasis. First, we use all the observations in the data sets, not only nuclear families. Second, we look at farm labor supply in addition to off-farm labor supply. Third, we study the quantitative aspects of labor supply in addition to participation. All these allow a more global examination of the farm and off-farm labor supply situation in Israeli farm households.

The theoretical background and the description of the survey can be found in Kimhi (2001). We proceed directly to the findings.

Descriptive Statistics

Table 1 shows the farm and off-farm labor supply and participation statistics. We find that only 35% of the population work on the farm, while almost half work off the farm. Both farm and off-farm participation rates are higher for males. The farm couple (operator and spouse) has higher participation rates than the other members of their households: 40% of them work on the farm and more than 60% work off the farm. Both participation rates are higher for the farm operators (most of whom are males).

When we look at the quantitative distribution of labor supply, we find that the vast majority of those who work off the farm do it on a full-time basis. Farm work, on the other hand, is more evenly distributed between those who work full time and those who work part time. Males and operators have a higher tendency to work part time as opposed to full time, relative to females and spouses.

Table 2 presents the explanatory variables used in this study and their means in the different population groups. We can see that most of the farm operators are males. Only 3% of the spouses are males. Most females who are farm operators do not have a spouse. Farm operators are about 5 years older than their spouses, on average. 60% of the farm population has at least completed high school. More of the females have less than high school education, but in addition more of them have more than high school education. Few of the people have had any kind of agricultural education, most of them are farm operators.

Most of the farm population has adult children (at least 22 years of age) in their households. 11% of them have siblings of the farm operator or the spouse in their households,

and 5% - parents of the farm operator or the spouse. Only 1% of the farm population lives in households in which the farm operators have non-family partners.

For the geographical distribution of the sample, see table 2 and figure 1. Table 2 also shows that almost three quarters of the family-farm population live in Moshavim (cooperative villages). Among those who live in private villages and towns, about three quarters are Arab. We distinguish between Moshav and other forms of localities because of the unique institutional structure of the Moshav and its effect on time allocation (Kimhi 1998). Although cooperation in the Moshav has deteriorated sharply by 1995, the effects of cooperation on time allocation decisions may be long lasting. The distinction between Arab and Jewish private farms is because of the different attachment to land in the two populations, the different family values and traditions, and perhaps even labor market discrimination.

40% of the farms in the sample were obtained directly by the current operators from the settlement institutes, mostly at the time of establishment of the village. 27% of the farm operators obtained the farm through inheritance or succession, and 33% - purchased the farm from a former non-family operator.

Farms were classified into major branch by the contribution of the different crops and livestock to total farm value added. 33% of the family farms were without a major branch. These are inactive farms with no independent production activity. Most of them simply rent out their land. The most common major crop was fruit, either alone or in combination with other crops or livestock.

Most of the active farms in the sample were classified as specialized farms. These are farms in which one crop is making at least 90% of the value added. Very few farms are highly diversified. These are added to the excluded group of inactive farms. The rest are moderately diversified farms.

Empirical Results

We start by estimating a simple probit off-farm participation equation. Table 3 includes the results for the whole sample (ages 22 and higher), and also separate results for males and females. We find, as in table 1, that women are less likely to work off the farm than males. The tendency to work off the farm is first increasing with age and then decreasing. The tendency to work off the farm is higher in farms in which the current operator received the farm through inheritance, succession, or purchase. Farms whose operators received the farm directly from the settlement institutes, are perhaps operated by elderly people without successors, who find it difficult to obtain off-farm employment. People who were born in Asia (mostly Iran and Iraq)

are more likely to work off the farm. Schooling has a positive effect on the tendency to work off the farm, while agricultural-specific education has a negative effect but only for females.

Farms in which adult children live with their parents are associated with a higher tendency to work off the farm. This is similar to the result of Kimhi (1996), who hypothesized that the adult children substitute for their parents in farm work. The same is true for farms in which siblings of the farm operator or spouse exist, but only for females. Parents of the operator or spouse who live on the farm are associated with a lower tendency of females to work off the farm, perhaps because the females spend more time caring for the elderly parents.

Land and capital do not affect the off-farm participation tendency in a significant way. This is a surprising result, since all previous studies found a strong negative effect of capital. Perhaps this effect is neutralized here by the inclusion of the detailed dummies of the major branch. These dummies have relatively large (in absolute value) negative effects, and are statistically significant except for fruits and poultry. Perhaps the variation in the values of the dummies is closely related to capital stock. The least likely to work off the farm are people who live on cattle, sheep, and other livestock farms.

Geographical location does not seem to matter much for the off-farm participation decision. Participation is significantly lower in the private sectors than in the Moshavim. The difference depends on both ethnicity and gender. Among males, only the Jewish private farmers have lower participation tendencies than in Moshavim. On the other hand, both Arab and Jewish women have lower tendencies to work off the farm, and the difference is much stronger among the Arab women. Among Arabs, tradition may be responsible for the lower tendency of women to work off the farm. Jewish private farms are subject to fewer institutional constraints than in Moshavim on entry and exit and on acquiring resources. Hence, we expect that private farms will be more active and also larger than farms in Moshavim, and as a result demand more family labor. Perhaps this is why both men and women on these farms tend less to work off the farm.

In table 4 we repeat the analysis for operators and spouses only. Few differences are worth noting. Couples who succeeded their parents on the farm are not more likely to work off the farm than those who received the farm from the settlement institutes. Therefore it is the other family members on these farms who drive the positive coefficients in table 3. The Asian origin is important only for operators, not for spouses. The positive effects of the existence of adult children and/or siblings are much stronger for the farm couple than for the other family members. On the other hand, the effects of the existence of parents are not significant. The number of dependent children (up to age 21) has a significantly negative effect on the tendency

of farm couples to work off the farm, while it had no such effect in table 3. This is consistent with an explanation of time costs imposed by dependent children (Kimhi 1996).

We can see more significant negative branch effects, especially for the farm operators, and this makes sense since the operator is, by definition, the person that is most affected by the farm activities. Among spouses, we find significantly lower off-farm participation tendencies in the excluded region, Eastern valleys and Arava. The lower participation tendency of females in Jewish private farms is not significant for the spouses. For operators, we find higher off-farm participation tendencies in highly specialized farms. Perhaps these farms are easier to manage on a part-time basis.

Next, we estimate farm participation equations in a similar way, using the same samples and the same explanatory variables. The results are in tables 5 and 6. In general, we can divide the explanatory variables into two groups. Explanatory variables that affect the tendency to work in general are expected to have similar effects (qualitatively) on farm participation as on off-farm participation. On the other hand, explanatory variables that affect the choice between farm work and off-farm work are expected to have opposite signs in the farm participation equations and in the off-farm participation equations. Gender and age, for example, belong to the first group, and the same is true for agricultural education. The second group includes Asian origin, the existence of adult children, siblings and parents of the farm operators, geographical location, and especially the branch dummies. The coefficients of the branch dummies in the farm participation equations are very large, especially for males, and therefore explain most of the variation in farm participation rates.

Finally, we use the quantitative labor supply data to estimate farm and off-farm labor supply equations by ordered probit. The results are in table 7. The effects of explanatory variables are similar in sign, and in most cases also in the level of significance, to their effects on the participation equations. Therefore we do not discuss them here.

Summary and Conclusions

We have estimated farm and off-farm labor participation equations and labor supply equations of farm families in Israel using data from 1995. We found that the demographic composition of the household affected labor supply in a similar way to earlier findings (Kimhi 1996), namely, the existence of adult children and siblings of the farm couple tends to decrease farm labor supply and participation and increase off-farm labor supply and participation. The existence of parents, on the other hand, decreases both farm and off-farm labor supply and participation. We also found different time allocation patterns in the different types of localities.

This may be caused by institutional factors as well as by cultural traditions and labor market discrimination.

Another interesting finding is that farm capital does not have a statistically significant effect on time allocation once the productive structure of the farm is carefully controlled for. Given that previous research (Ahituv and Kimhi, forthcoming) found evidence for the endogeneity of farm capital in a life-cycle setting, the question is whether the productive structure of the farm can be considered predetermined here. We leave this issue for future research.

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Table 1. Farm and Off-Farm Labor Supply and Participation Statistics

| Population Group | Participation | |
|----------------------------|---------------|----------|
| | Farm | Off-Farm |
| All family members age 22+ | 0.355 | 0.497 |
| Males | 0.422 | 0.592 |
| Females | 0.284 | 0.394 |
| Operators and spouses | 0.400 | 0.607 |
| Operators | 0.453 | 0.713 |
| Spouses | 0.335 | 0.479 |

| Population Group | Farm Labor Supply | | | | |
|----------------------------|-------------------|---------|--------|--------|-----------|
| | None | Up to ¼ | ¼ to ½ | ½ to ¾ | ¾ to full |
| All family members age 22+ | 0.539 | 0.132 | 0.079 | 0.021 | 0.229 |
| Males | 0.485 | 0.153 | 0.099 | 0.029 | 0.234 |
| Females | 0.599 | 0.109 | 0.056 | 0.012 | 0.224 |
| Operators and spouses | 0.493 | 0.149 | 0.098 | 0.026 | 0.234 |
| Operators | 0.463 | 0.164 | 0.126 | 0.036 | 0.210 |
| Spouses | 0.529 | 0.132 | 0.065 | 0.013 | 0.261 |

| Population Group | Off-Farm Labor Supply | | | | |
|----------------------------|-----------------------|---------|--------|--------|-----------|
| | None | Up to ¼ | ¼ to ½ | ½ to ¾ | ¾ to full |
| All family members age 22+ | 0.569 | 0.021 | 0.053 | 0.024 | 0.333 |
| Males | 0.476 | 0.030 | 0.080 | 0.040 | 0.374 |
| Females | 0.671 | 0.011 | 0.023 | 0.006 | 0.289 |
| Operators and spouses | 0.448 | 0.030 | 0.076 | 0.036 | 0.411 |
| Operators | 0.322 | 0.043 | 0.118 | 0.061 | 0.456 |
| Spouses | 0.596 | 0.014 | 0.026 | 0.006 | 0.359 |

Note: participation rates are weighted, labor supply statistics are not.

Table 2. Means of Explanatory Variables

| Variable | Age 22+ | Males | Females | Couple | Operators | Spouses |
|-----------------------------------|---------|-------|---------|--------|-----------|---------|
| <u>Gender and Age</u> | | | | | | |
| Male* | 0.52 | 1.00 | 0.00 | 0.50 | 0.89 | 0.03 |
| Female | 0.48 | 0.00 | 1.00 | 0.50 | 0.11 | 0.97 |
| Age | 45.41 | 45.06 | 45.79 | 51.45 | 53.88 | 48.52 |
| <u>Country of Origin</u> | | | | | | |
| Israeli/European/American origin* | 0.69 | 0.71 | 0.66 | 0.59 | 0.56 | 0.63 |
| Asian origin | 0.21 | 0.20 | 0.23 | 0.28 | 0.31 | 0.26 |
| African origin | 0.10 | 0.09 | 0.11 | 0.12 | 0.13 | 0.11 |
| <u>Level of Schooling</u> | | | | | | |
| Below high school* | 0.40 | 0.38 | 0.42 | 0.47 | 0.48 | 0.46 |
| High school | 0.38 | 0.42 | 0.33 | 0.31 | 0.33 | 0.30 |
| Higher education | 0.23 | 0.20 | 0.25 | 0.21 | 0.19 | 0.24 |
| <u>Type of Schooling</u> | | | | | | |
| General Education* | 0.94 | 0.92 | 0.97 | 0.93 | 0.89 | 0.97 |
| Agricultural Education | 0.06 | 0.08 | 0.03 | 0.07 | 0.11 | 0.03 |
| <u>Family Structure</u> | | | | | | |
| Existence of adult children | 0.72 | 0.73 | 0.72 | 0.62 | 0.61 | 0.64 |
| Existence of brothers | 0.11 | 0.10 | 0.12 | 0.08 | 0.08 | 0.08 |
| Existence of parents | 0.05 | 0.05 | 0.05 | 0.03 | 0.03 | 0.02 |
| Existence of partners | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Number of children 0-21 | 0.82 | 0.83 | 0.82 | 0.73 | 0.69 | 0.77 |
| Number of children 22+ | 1.22 | 1.26 | 1.16 | 0.89 | 0.88 | 0.91 |
| <u>Geographical Region</u> | | | | | | |
| Eastern Galilee and Golan | 0.08 | 0.09 | 0.08 | 0.09 | 0.09 | 0.10 |
| Western Galilee | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| Yizre'el valley and lower Galilee | 0.10 | 0.11 | 0.09 | 0.10 | 0.10 | 0.10 |
| Eastern valleys and Arava* | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Center | 0.51 | 0.51 | 0.52 | 0.49 | 0.49 | 0.48 |
| South | 0.18 | 0.17 | 0.19 | 0.20 | 0.19 | 0.21 |
| <u>Type of Locality</u> | | | | | | |
| Moshav* | 0.72 | 0.71 | 0.73 | 0.70 | 0.71 | 0.70 |
| Arab | 0.21 | 0.22 | 0.21 | 0.22 | 0.22 | 0.23 |
| Private Jewish | 0.06 | 0.06 | 0.06 | 0.07 | 0.08 | 0.07 |

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Table 2. (continued)

| Variable | Age 22+ | Males | Females | Couple | Operators | Spouses |
|--|---------|-------|---------|--------|-----------|---------|
| <u>Method of Acquiring Farm</u> | | | | | | |
| Received from settlement institutes * | 0.41 | 0.40 | 0.41 | 0.39 | 0.40 | 0.38 |
| Succeeded or obtained as inheritance | 0.25 | 0.25 | 0.25 | 0.28 | 0.27 | 0.29 |
| Purchased from non-family | 0.34 | 0.35 | 0.34 | 0.33 | 0.33 | 0.33 |
| <u>Farm Attributes</u> | | | | | | |
| Land (dunams) | 56.6 | 56.4 | 56.8 | 55.9 | 53.4 | 59.0 |
| Capital (NIS1,000,000) | 0.14 | 0.14 | 0.14 | 0.13 | 0.12 | 0.13 |
| <u>Major Farm Branch(es)</u> | | | | | | |
| Fruits | 0.23 | 0.22 | 0.23 | 0.24 | 0.23 | 0.24 |
| Vegetables and field crops | 0.12 | 0.12 | 0.11 | 0.12 | 0.12 | 0.12 |
| Flowers and nurseries | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 |
| Poultry | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 |
| Cattle, sheep and other livestock | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 | 0.06 |
| No major branch | 0.30 | 0.29 | 0.31 | 0.32 | 0.33 | 0.30 |
| Fruits, vegetables and field crops | 0.08 | 0.08 | 0.08 | 0.07 | 0.07 | 0.07 |
| Fruits, flowers and nurseries | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Fruits and poultry | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Vegetables, field crops and livestock | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 |
| Fruits, vegetables, field crops, and livestock | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| <u>Level of Specialization</u> | | | | | | |
| Highly diversified or inactive * | 0.31 | 0.30 | 0.31 | 0.32 | 0.34 | 0.30 |
| Moderately diversified | 0.24 | 0.25 | 0.24 | 0.23 | 0.22 | 0.24 |
| Specialized | 0.45 | 0.45 | 0.45 | 0.45 | 0.44 | 0.46 |
| Number of cases | 8574 | 4496 | 4078 | 5217 | 2802 | 2415 |

Note: means based on all valid observations on the relevant variable.

* excluded category

Table 3. Off-Farm Participation Equations, All Family Members

| Variable | All family members | | All males | | All females | |
|--------------------------|--------------------|-------------|-----------|-------------|-------------|-------------|
| | Estimate | t-statistic | Estimate | t-statistic | Estimate | t-statistic |
| Constant | -3.6159 | -20.1230 ** | -3.8997 | -15.4450 ** | -3.7651 | -14.3980 ** |
| Female | -0.5966 | -18.4030 ** | | | | |
| Age | 0.1484 | 24.2750 ** | 0.1643 | 19.5570 ** | 0.1286 | 14.1230 ** |
| Age squared | -0.0014 | -23.2600 ** | -0.0016 | -18.8060 ** | -0.0012 | -13.6420 ** |
| Succeeded | 0.2669 | 5.5320 ** | 0.3531 | 5.1360 ** | 0.1778 | 2.5920 ** |
| Purchased | 0.2469 | 5.6890 ** | 0.2615 | 4.2900 ** | 0.2315 | 3.7090 ** |
| Asian origin | 0.2926 | 5.9060 ** | 0.3818 | 5.3180 ** | 0.1796 | 2.5450 * |
| African origin | 0.0919 | 1.5110 | 0.0707 | 0.7830 | 0.0826 | 0.9900 |
| High school | 0.3593 | 8.2100 ** | 0.3546 | 5.9900 ** | 0.2971 | 4.4170 ** |
| Higher education | 0.4652 | 9.3030 ** | 0.4377 | 6.1250 ** | 0.3915 | 5.3260 ** |
| Agricultural Education | -0.0330 | -0.4580 | 0.1137 | 1.2850 | -0.4296 | -2.9870 ** |
| Adult children | 0.0321 | 8.2640 ** | 0.1692 | 3.0870 ** | 0.5087 | 8.9010 ** |
| Brothers | 0.2115 | 2.2620 * | 0.0483 | 0.4320 | 0.3738 | 3.1380 ** |
| Parents | -0.1488 | -2.5370 * | -0.0695 | -0.8230 | -0.2194 | -2.6190 ** |
| Partners | 0.0603 | 0.3650 | -0.1499 | -0.6560 | 0.2517 | 1.0590 |
| Children 0-21 | -0.0016 | -0.1450 | 0.0034 | 0.2320 | -0.0088 | -0.5420 |
| Children 22+ | -0.0010 | -1.2120 | -0.0190 | -1.7460 | 0.0024 | 0.1920 |
| Land | 0.0000 | -0.8930 | -0.0001 | -0.8770 | 0.0000 | -0.2550 |
| Capital | -0.0076 | -0.5540 | -0.0006 | -0.0340 | -0.0197 | -0.7650 |
| Fruits | -0.4461 | -1.7350 | -0.6240 | -1.6020 | -0.3058 | -0.8970 |
| Vegetables, field crops | -0.9361 | -3.5490 ** | -1.1659 | -2.9330 ** | -0.7987 | -2.2610 * |
| Flowers, nurseries | -0.8522 | -3.1290 * | -1.0242 | -2.5150 * | -0.7445 | -2.0200 * |
| Poultry | -0.4015 | -1.5090 | -0.5667 | -1.4130 | -0.2834 | -0.7980 |
| Cattle, sheep, other. | -1.0007 | -3.5300 ** | -1.3583 | -3.2340 ** | -0.6820 | -1.7580 |
| Fruits & Vegetables... | -0.6059 | -2.2680 * | -0.7236 | -1.8040 | -0.5726 | -1.5920 |
| Fruits & Flowers... | -0.6570 | -2.3590 * | -0.8053 | -1.9240 | -0.5598 | -1.4960 |
| Fruits & Poultry | -0.5722 | -2.1350 * | -0.7131 | -1.7710 | -0.4698 | -1.3070 |
| Vegetables & Cattle... | -0.6696 | -2.4720 * | -0.8269 | -2.0400 * | -0.5975 | -1.6310 |
| Frts., Vegts., Cattle... | -0.8232 | -2.8710 ** | -1.0285 | -2.4140 * | -0.6926 | -1.7800 |
| Eastern Galilee | 0.1930 | 1.7870 | 0.2220 | 1.4650 | 0.1818 | 1.1680 |
| Western Galilee | 0.0358 | 0.3240 | 0.1258 | 0.8220 | -0.0938 | -0.5710 |
| Lower Galilee | 0.2906 | 2.7360 ** | 0.3887 | 2.6160 ** | 0.2380 | 1.5380 |
| Center | 0.1481 | 1.5480 | 0.0880 | 0.6540 | 0.2360 | 1.7270 |
| South | 0.0778 | 0.7750 | 0.0919 | 0.6500 | 0.0645 | 0.4500 |
| Arab | -0.2090 | -3.2950 ** | -0.0822 | -0.9670 | -0.4851 | -4.8350 ** |
| Private Jewish | -0.3664 | -5.3040 ** | -0.3945 | -4.1970 ** | -0.3191 | -3.1060 ** |
| Moderately diversified | 0.1461 | 0.5640 | 0.3327 | 0.8500 | 0.0057 | 0.0170 |
| Specialized | 0.2582 | 1.0030 | 0.4081 | 1.0470 | 0.1793 | 0.5240 |

* coefficient significant at 5%; ** coefficient significant at 1%.

Table 4. Off-Farm Participation Equations, Farm Operator and Spouse

| Variable | Operator & spouse | | Operator only | | Spouse only | |
|--------------------------|-------------------|-------------|---------------|-------------|-------------|-------------|
| | Estimate | t-statistic | Estimate | t-statistic | Estimate | t-statistic |
| Constant | -0.4561 | -1.3880 | 1.2861 | 2.6580 ** | -3.1956 | -5.5620 ** |
| Female | -0.9018 | -20.1540 ** | -0.5473 | -5.5500 ** | 0.2227 | 1.0820 |
| Age | 0.0511 | 4.2860 ** | -0.0067 | -0.3900 | 0.1098 | 5.0520 ** |
| Age squared | -0.0007 | -6.2310 ** | -0.0002 | -1.4250 | -0.0012 | -5.9260 ** |
| Succeeded | 0.0477 | 0.7130 | 0.0647 | 0.6570 | -0.0085 | -0.0910 |
| Purchased | 0.1223 | 2.0460 * | 0.2374 | 2.6540 ** | 0.0118 | 0.1420 |
| Asian origin | 0.0867 | 1.3920 | 0.1915 | 2.0410 * | -0.0205 | -0.2390 |
| African origin | -0.0265 | -0.3590 | 0.0236 | 0.2160 | -0.0517 | -0.4970 |
| High school | 0.2962 | 5.1340 ** | 0.3163 | 3.9330 ** | 0.2257 | 2.6160 ** |
| Higher education | 0.5981 | 8.7650 ** | 0.7476 | 6.9520 ** | 0.4695 | 4.9440 ** |
| Agricultural Education | -0.0949 | -1.0630 | -0.0087 | -0.0790 | -0.4259 | -2.2660 * |
| Adult children | 0.8462 | 16.5900 ** | 0.9390 | 13.1740 ** | 0.7931 | 10.0910 ** |
| Brothers | 0.6653 | 4.5030 ** | 0.5414 | 2.4570 * | 0.7533 | 3.6770 ** |
| Parents | -0.0253 | -0.2940 | -0.0124 | -0.0980 | -0.0850 | -0.7070 |
| Partners | 0.2557 | 0.9740 | 0.1810 | 0.4610 | 0.3248 | 0.9060 |
| Children 0-21 | -0.0548 | -3.6130 ** | -0.0542 | -2.4060 * | -0.0611 | -2.9170 ** |
| Children 22+ | 0.0327 | 2.6650 ** | 0.0228 | 1.2630 | 0.0400 | 2.3850 * |
| Land | 0.0000 | -0.4040 | 0.0000 | -0.6170 | 0.0000 | -0.0590 |
| Capital | -0.0043 | -0.2920 | 0.0008 | 0.0380 | -0.0109 | -0.4490 |
| Fruits | -0.9302 | -3.0190 ** | -1.1304 | -2.3950 * | -0.7259 | -1.7890 |
| Vegetables, field crops | -1.7045 | -5.3710 ** | -2.0300 | -4.1890 ** | -1.4517 | -3.4490 ** |
| Flowers, nurseries | -1.5734 | -4.7910 ** | -1.9115 | -3.8280 ** | -1.2679 | -2.9060 ** |
| Poultry | -0.9269 | -2.8650 ** | -1.2715 | -2.5800 ** | -0.5970 | -1.3920 |
| Cattle, sheep, other. | -1.7452 | -5.1310 ** | -1.8701 | -3.6330 ** | -1.3836 | -2.9730 ** |
| Fruits & Vegetables... | -1.1390 | -3.5290 ** | -1.4059 | -2.8680 ** | -0.9468 | -2.1970 * |
| Fruits & Flowers... | -1.3056 | -3.8990 ** | -1.4810 | -2.9060 ** | -1.2006 | -2.6880 ** |
| Fruits & Poultry | -1.0484 | -3.2410 ** | -1.2542 | -2.5380 * | -0.7909 | -1.8470 |
| Vegetables & Cattle... | -1.3636 | -4.1290 ** | -1.6858 | -3.3650 ** | -1.0977 | -2.4820 * |
| Frts., Vegts., Cattle... | -1.4475 | -4.0950 ** | -1.5730 | -2.9650 ** | -1.2833 | -2.6760 ** |
| Eastern Galilee | 0.1252 | 0.9650 | -0.0966 | -0.5090 | 0.4041 | 2.0970 * |
| Western Galilee | 0.3295 | 2.4110 * | 0.2732 | 1.3950 | 0.4142 | 1.9730 * |
| Lower Galilee | 0.4887 | 3.7490 ** | 0.2983 | 1.5980 | 0.8195 | 4.1400 ** |
| Center | 0.2630 | 2.2580 * | -0.0378 | -0.2260 | 0.6808 | 3.8280 ** |
| South | 0.0408 | 0.3370 | -0.1860 | -1.0690 | 0.4219 | 2.3010 * |
| Arab | -0.3270 | -3.8560 ** | -0.1873 | -1.5680 | -0.4569 | -3.6100 ** |
| Private Jewish | -0.3452 | -4.1290 ** | -0.5052 | -4.3240 ** | -0.1144 | -0.9390 |
| Moderately diversified | 0.4974 | 1.6030 | 0.8201 | 1.7300 | 0.2379 | 0.5800 |
| Specialized | 0.6848 | 2.2220 * | 0.9878 | 2.0930 * | 0.4314 | 1.0630 |

* coefficient significant at 5%; ** coefficient significant at 1%.

Table 5. Farm Participation Equations, All Family Members

| Variable | All family members | | All males | | All females | |
|--------------------------|--------------------|-------------|-----------|-------------|-------------|-------------|
| | Estimate | t-statistic | Estimate | t-statistic | Estimate | t-statistic |
| Constant | -3.6434 | -16.6190 ** | -3.6322 | -11.7260 ** | -4.1116 | -12.8230 ** |
| Female | -0.4593 | -12.6380 ** | | | | |
| Age | 0.0775 | 10.9650 ** | 0.0731 | 7.5980 ** | 0.0844 | 7.8210 ** |
| Age squared | -0.0008 | -10.4350 ** | -0.0007 | -7.3000 ** | -0.0008 | -7.4560 ** |
| Succeeded | 0.0101 | 1.8530 | 0.0584 | 0.7660 | 0.1410 | 1.7620 |
| Purchased | 0.0914 | 1.8090 | 0.0632 | 0.9050 | 0.1168 | 1.5730 |
| Asian origin | -0.1907 | -3.3930 ** | -0.2055 | -2.6380 ** | -0.1619 | -1.9450 |
| African origin | 0.0345 | 0.5100 | -0.0981 | -0.9680 | 0.1153 | 1.2230 |
| High school | 0.0711 | 1.4470 | -0.0222 | -0.3350 | 0.1420 | 1.8540 |
| Higher education | 0.0046 | 0.0820 | -0.1798 | -2.2640 * | 0.1403 | 1.6470 |
| Agricultural Education | 0.0636 | 0.8440 | 0.0359 | 0.4030 | 0.5034 | 3.1740 ** |
| Adult children | -0.3297 | -7.4800 ** | -0.5621 | -8.8150 ** | -0.0976 | -1.5210 |
| Brothers | -0.4279 | -4.4776 ** | -0.4931 | -4.1110 ** | -0.4500 | -3.1640 ** |
| Parents | -0.2096 | -3.1740 ** | -0.1438 | -1.5270 | -0.2626 | -2.7250 ** |
| Partners | 0.4367 | 2.3840 * | 0.3465 | 1.3270 | 0.4576 | 1.7880 |
| Children 0-21 | 0.0100 | 0.8170 | 0.0286 | 1.7320 | -0.0126 | -0.6680 |
| Children 22+ | -0.0108 | -1.1900 | -0.0243 | -2.0260 * | 0.0079 | 0.5630 |
| Land | 0.0000 | -0.9980 | 0.0000 | -0.0910 | -0.0001 | -1.2270 |
| Capital | 0.0135 | 1.0370 | 0.0034 | 0.2130 | 0.0302 | 1.2030 |
| Fruits | 2.1795 | 8.3450 ** | 2.8303 | 6.7990 ** | 1.6637 | 4.7500 ** |
| Vegetables, field crops | 2.4858 | 9.2830 ** | 3.0557 | 7.1910 ** | 2.0423 | 5.6600 ** |
| Flowers, nurseries | 2.8059 | 10.1840 ** | 3.2150 | 7.4220 ** | 2.5685 | 6.8600 ** |
| Poultry | 2.2006 | 8.1340 ** | 2.8602 | 6.6860 ** | 1.6636 | 4.5520 ** |
| Cattle, sheep, other. | 2.8502 | 10.0220 ** | 3.4241 | 7.6480 ** | 2.4069 | 6.2450 ** |
| Fruits & Vegetables... | 2.3119 | 8.5280 ** | 2.9197 | 6.8150 ** | 1.8575 | 5.0700 ** |
| Fruits & Flowers... | 2.4231 | 8.5980 ** | 2.9080 | 6.5600 ** | 2.0576 | 5.4050 ** |
| Fruits & Poultry | 2.4340 | 8.9560 ** | 2.9803 | 6.9500 ** | 2.0472 | 5.5730 ** |
| Vegetables & Cattle... | 2.5496 | 9.2850 ** | 2.9611 | 6.8570 ** | 2.3133 | 6.2020 ** |
| Frts., Vegts., Cattle... | 2.5772 | 8.9060 ** | 3.2197 | 7.0900 ** | 2.0312 | 5.1980 ** |
| Eastern Galilee | 0.0815 | 0.7520 | 0.1621 | 1.0210 | -0.0069 | -0.0430 |
| Western Galilee | -0.1531 | -1.3590 | 0.0342 | 0.2140 | -0.3461 | -2.1380 * |
| Lower Galilee | -0.3398 | -3.0870 ** | -0.1048 | -0.6700 | -0.6619 | -4.1910 ** |
| Center | -0.2119 | -2.1350 * | -0.1436 | -1.0100 | -0.2796 | -2.0100 * |
| South | -0.1961 | -1.8430 | -0.0871 | -0.5710 | -0.3144 | -2.1040 * |
| Arab | -0.0202 | -0.3010 | 0.1499 | 1.6620 | -0.2138 | -2.0370 * |
| Private Jewish | 0.0710 | 1.0170 | 0.2149 | 2.2380 * | -0.0805 | -0.7700 |
| Moderately diversified | 0.2516 | 0.9970 | -0.1093 | -0.2740 | 0.4769 | 1.3970 |
| Specialized | 0.0619 | 0.2470 | -0.2709 | -0.6810 | 0.2567 | 0.7580 |

* coefficient significant at 5%; ** coefficient significant at 1%.

Table 6. Farm Participation Equations, Farm Operator and Spouse

| Variable | Operator & spouse | | Operator only | | Spouse only | |
|--------------------------|-------------------|-------------|---------------|-------------|-------------|-------------|
| | Estimate | t-statistic | Estimate | t-statistic | Estimate | t-statistic |
| Constant | -2.9538 | -7.7580 ** | -2.5938 | -4.6360 ** | -2.4147 | -3.8940 ** |
| Female | -0.5288 | -11.4660 ** | -0.2193 | -1.6970 | -0.8328 | -3.4310 ** |
| Age | 0.0558 | 4.1090 ** | 0.0382 | 1.9300 | 0.0499 | 2.1660 * |
| Age squared | -0.0006 | -4.4640 ** | -0.0004 | -2.5160 * | -0.0005 | -2.0890 * |
| Succeeded | 0.1554 | 2.1700 * | 0.0989 | 0.9800 | 0.1849 | 1.7730 |
| Purchased | 0.0419 | 0.6490 | 0.0120 | 0.1310 | 0.0861 | 0.9210 |
| Asian origin | -0.2271 | -3.4270 ** | -0.2238 | -2.4110 * | -0.2216 | -2.2730 * |
| African origin | -0.0136 | -0.1730 | -0.2040 | -1.8300 | 0.1535 | 1.3750 |
| High school | 0.0732 | 1.1890 | 0.0081 | 0.0980 | 0.1137 | 1.1760 |
| Higher education | 0.0251 | 0.3540 | -0.0572 | -0.5660 | 0.0509 | 0.4790 |
| Agricultural Education | 0.0047 | 0.0550 | -0.0047 | -0.0470 | 0.4570 | 2.3190 * |
| Adult children | -0.2788 | -5.0560 ** | -0.4366 | -5.6190 ** | -0.0689 | -0.8100 |
| Brothers | -0.4036 | -2.9430 ** | -0.4925 | -2.7040 ** | -0.4142 | -1.8620 |
| Parents | -0.0499 | -0.5630 | -0.0773 | -0.6350 | -0.0285 | -0.2130 |
| Partners | 0.6658 | 2.3850 * | 0.5540 | 1.3960 | 0.7819 | 2.0030 * |
| Children 0-21 | 0.0155 | 0.9620 | 0.0385 | 1.6930 | -0.0070 | -0.2980 |
| Children 22+ | -0.0084 | -0.6720 | -0.0305 | -1.7370 | 0.0157 | 0.8630 |
| Land | -0.0001 | -1.1470 | 0.0000 | -0.1520 | -0.0001 | -1.3690 |
| Capital | 0.0091 | 0.6290 | -0.0004 | -0.0180 | 0.0248 | 0.9430 |
| Fruits | 1.9341 | 6.5340 ** | 2.6278 | 5.7490 ** | 1.2908 | 3.0740 ** |
| Vegetables, field crops | 2.2579 | 7.4180 ** | 2.8260 | 6.0240 ** | 1.7472 | 4.0470 ** |
| Flowers, nurseries | 2.5230 | 7.9920 ** | 2.9930 | 6.1850 ** | 2.0933 | 4.6910 ** |
| Poultry | 2.1980 | 7.1000 ** | 3.0236 | 6.3720 ** | 1.3263 | 3.0130 ** |
| Cattle, sheep, other. | 2.7357 | 8.2780 ** | 3.0876 | 6.1240 ** | 2.3501 | 5.0200 ** |
| Fruits & Vegetables... | 2.0322 | 6.5540 ** | 2.7789 | 5.8470 ** | 1.3251 | 3.0020 ** |
| Fruits & Flowers... | 2.1802 | 6.7850 ** | 2.7007 | 5.5060 ** | 1.7037 | 3.7330 ** |
| Fruits & Poultry | 2.3060 | 7.4190 ** | 3.0681 | 6.4320 ** | 1.5659 | 3.5580 ** |
| Vegetables & Cattle... | 2.2851 | 7.2030 ** | 2.5882 | 5.3380 ** | 2.0773 | 4.5900 ** |
| Frts., Vegts., Cattle... | 2.2960 | 6.7590 ** | 2.9403 | 5.6770 ** | 1.6738 | 3.5070 ** |
| Eastern Galilee | -0.0751 | -0.5580 | 0.0378 | 0.2010 | -0.1583 | -0.8130 |
| Western Galilee | -0.4063 | -2.9010 ** | -0.1511 | -0.7720 | -0.6619 | -3.1950 ** |
| Lower Galilee | -0.4218 | -3.1100 ** | -0.0818 | -0.4320 | -0.8291 | -4.1530 ** |
| Center | -0.3689 | -3.0060 ** | -0.2324 | -1.3620 | -0.4783 | -2.6760 ** |
| South | -0.3925 | -3.0280 ** | -0.1573 | -0.8680 | -0.6461 | -3.4400 ** |
| Arab | -0.0457 | -0.5360 | 0.2908 | 2.4490 * | -0.4151 | -3.1590 ** |
| Private Jewish | -0.0554 | -0.6680 | 0.1748 | 1.5210 | -0.2972 | -2.3990 * |
| Moderately diversified | 0.5601 | 1.9520 | 0.0320 | 0.0730 | 1.0510 | 2.5640 * |
| Specialized | 0.3945 | 1.3870 | -0.0834 | -0.1900 | 0.8236 | 2.0290 * |

* coefficient significant at 5%; ** coefficient significant at 1%.

Table 7. Farm and Off-Farm Labor Supply Equations, All Family Members

| Variable | Off-farm work | | Farm work | |
|--------------------------|---------------|-------------|-----------|-------------|
| | Estimate | t-statistic | Estimate | t-statistic |
| Constant | -3.0091 | -33.3710 ** | -3.0115 | -25.0360 ** |
| Female | -0.4226 | -26.5520 ** | -0.2772 | -14.7710 ** |
| Age | 0.1260 | 45.6100 ** | 0.0565 | 15.6830 ** |
| Age squared | -0.0012 | -45.9660 ** | -0.0006 | -15.3820 ** |
| Succeeded | 0.2290 | 9.0960 ** | 0.0180 | 0.5440 |
| Purchased | 0.1929 | 8.8640 ** | 0.0158 | 0.5400 |
| Asian origin | 0.2670 | 10.5170 ** | -0.1568 | -4.8470 ** |
| African origin | 0.0714 | 2.2300 * | -0.0044 | -0.1110 |
| High school | 0.3094 | 13.8960 ** | 0.0406 | 1.4630 |
| Higher education | 0.4172 | 17.2170 ** | -0.0465 | -1.5340 |
| Agricultural Education | -0.1843 | -4.4040 ** | 0.0620 | 1.2170 |
| Adult children | 0.2818 | 15.1790 ** | -0.3130 | -14.9480 ** |
| Brothers | 0.2010 | 4.8100 ** | -0.2832 | -5.3080 ** |
| Parents | -0.1384 | -4.3030 ** | -0.2127 | -5.0890 ** |
| Partners | 0.1027 | 0.6650 | 0.4397 | 1.7860 |
| Children 0-21 | -0.0062 | -1.1120 | 0.0092 | 1.1730 |
| Children 22+ | -0.0017 | -0.4130 | -0.0109 | -1.9140 |
| Land | -0.0001 | -0.7720 | 0.0000 | -0.0560 |
| Capital | -0.0073 | -0.2140 | 0.0098 | 0.3610 |
| Fruits | -0.7295 | -3.2920 ** | 2.2556 | 23.4200 ** |
| Vegetables, field crops | -1.1963 | -5.3540 ** | 2.6693 | 27.1480 ** |
| Flowers, nurseries | -1.0897 | -4.6270 ** | 3.0289 | 26.5330 ** |
| Poultry | -0.5600 | -2.5000 * | 2.1522 | 20.8200 ** |
| Cattle, sheep, other. | -1.2693 | -5.5720 ** | 2.8797 | 27.4000 ** |
| Fruits & Vegetables... | -0.9093 | -4.0390 ** | 2.4058 | 23.2190 ** |
| Fruits & Flowers... | -0.9834 | -4.2220 ** | 2.6104 | 22.7370 ** |
| Fruits & Poultry | -0.8181 | -3.6010 ** | 2.3862 | 21.8480 ** |
| Vegetables & Cattle... | -0.9096 | -3.9700 ** | 2.6889 | 24.2960 ** |
| Frts., Vegts., Cattle... | -1.0332 | -4.1740 ** | 2.7641 | 20.3170 ** |
| Eastern Galilee | 0.0528 | 0.8310 | -0.1411 | -2.0980 * |
| Western Galilee | 0.0494 | 0.7730 | -0.3216 | -4.9460 ** |
| Lower Galilee | 0.2656 | 4.1790 ** | -0.3829 | -5.9150 ** |
| Center | 0.1060 | 1.8380 | -0.2830 | -4.7770 ** |
| South | 0.0317 | 0.5220 | -0.2913 | -4.4670 ** |
| Arab | -0.1333 | -4.1170 ** | -0.0593 | -1.7020 |
| Private Jewish | -0.2417 | -7.8450 ** | 0.1339 | 4.0140 ** |
| Moderately diversified | 0.3922 | 1.7580 | 0.0840 | 0.7940 |
| Specialized | 0.5078 | 2.2890 * | -0.1271 | -1.2470 |

* coefficient significant at 5%; ** coefficient significant at 1%.