

Lump Sum versus Annuity: Choices of Kentucky Farmers during the Tobacco Buyout Program

Helen Pushkarskaya and Maria I. Marshall

Our study uses the data collected during the implementation of the tobacco buyout program in Kentucky to evaluate how rural households, diverse in income, age, family structure, location, education level, and other characteristics, made a choice between annuities and a lump-sum payment. Subjects in our field experiment did not have to retire or change their employment, as did subjects in many field studies of the choice between annuities and lump-sum payments, which allowed us to evaluate the relationship between the option choice and a decision whether to exit the tobacco market. Our results suggest that while discounted utility theory gives acceptable predictions of the farmers' behavior, other factors have to be taken into consideration. First, there are consistent biases that describe individual intertemporal behavior, such as availability bias or acquiescence bias. Second, there is a certain degree of heterogeneity in individual intertemporal preferences that correlates with their personal characteristics, such as education and production status. Third, our analysis revealed that the decision to exit the tobacco market positively correlated with the decision to take a lump-sum payment.

Key Words: annuity, family business system, intertemporal choice, lump sum, tobacco buyout

JEL Classifications: G11, H31, J10

The U.S. tobacco buyout program, a program that was designed to ease the transition for U.S. tobacco quota holders and U.S. producers from the Depression-era tobacco quota program to the free market, provides a rare opportunity to study how tobacco farmers make choices. Several studies have focused on the impact of the tobacco buyout program (Beach

et al., 2006; Beach, Jones, and Johnston, 2005; Brown, 2005; Gale, 1999; Gale, Foreman, and Capehart, 1999; Snell, 2005). Some of these studies were interested in how the elimination of the tobacco program changes the structure of tobacco farming. Others (e.g., Brown, Snell, and Tiller, 1999) discussed the implications of the elimination of the tobacco program on tobacco farmers, tobacco quota owners, and tobacco dependent communities. Beach et al. (2006) focused on the attitudes of tobacco farmers toward the tobacco buyout program. However, to our knowledge no studies investigated the buyout payment choices available to farmers or how those choices are affected by economic, demographic, and life cycle factors.

The present study examines what factors influence Kentucky tobacco farmers' choice of

Helen Pushkarskaya, assistant professor, Department of Agricultural Economics, University of Kentucky, Lexington, KY. Maria I. Marshall, associate professor, Department of Agricultural Economics, Purdue University, West Lafayette, IN.

This research was supported by the grant from the Research Foundation of the University of Kentucky. We thank Jenny Pushkarskaya for the assistance with data collection.

how to receive the monetary compensation offered as a part of the Tobacco Buyout Program. We surveyed rural households, who were making a choice between receiving nine annual payments and contracting with an authorized financial institution to obtain a lump-sum payment in exchange for these payment flows. The survey took place in the second half of 2005 and the first half of 2006, when family farms just started to receive their first payments and were at the first stages of adjustment to the new economic environment.

The Discounted Utility Theory (DUT; Samuelson, 1937) suggests that individuals prefer the option that promises them the highest net present value from the dollar amount they receive. Atkins (1986), Bütler and Teppa (2003), Curme and Even (1995), Fernandez (1992), and Piacentini (1990) found that while the choices of the majority of recent retirees are consistent with the DUT, they are also affected by various economic and demographic factors. In addition, some studies (e.g., Bütler and Teppa, 2003) have documented the presence of various biases in intertemporal choices, such as acquisition bias or magnitude effect (see Frederick, Loewenstein, and O'Donoghue, 2002). Finally, The Sustainable Family Business Model (Stafford et al., 1999) suggests that modified patterns of interaction are needed for a family firm (e.g., a family owned farm) to remain healthy when responding to changes that occur during normative transitions or non-normative crises in either the family or the family business (Danes et al., 1999; Danes et al., 2002), which suggests that both family structure and internal family events are likely to affect intertemporal preferences of tobacco farmers during the transition from tobacco quota to free-market economy. Here we tested whether the choices of Kentucky farmers were consistent with the predictions of the DUT, evaluated the data for the presence of various biases reported previously in the literature on intertemporal choice, and examined how decisions to exit the market, households' structure, and households' internal events affect households' intertemporal preferences.

Our paper is built as follows. First, we explain the tobacco buyout program in greater

detail, including the structure of the annual payments and the lump-sum contracts, and tax policies associated with both options. Second, we give an overview of the existing theoretical and empirical literature related to the choice between lump sum and annuity and formulate the hypotheses. Third, we explain our methodology and describe our data. Finally, we report our results and provide conclusions for the paper.

Tobacco Buyout Program

The Tobacco Transition Payment Program, also called the "tobacco buyout," was designed to help tobacco quota holders and producers make the transition from the Depression-era tobacco quota program to the free market. The Fair and Equitable Tobacco Reform Act of 2004 (P.L. 108–357), signed by President Bush on October 22, 2004, provides annual transitional payments for 10 years to eligible tobacco quota holders and producers. The buyout was funded entirely by assessments of approximately \$10 billion on tobacco product manufacturers and importers.

Different compensations were offered to quota owners and growers. Growers (i.e., quota lessees) received a payment to ease their transition into the free market in the amount of \$3 per pound of tobacco produced in 2002. Quota owners received a payment in the amount of \$7 per pound for the eliminated tobacco quotas. Farmers who both owned and leased tobacco quota (i.e., combined producers) received a combined payment in the amount of \$3 per pound from the leased quota and \$7 per pound from the owned quota.

Payments began in 2005 and continue through 2014. In 2005, the United States Department of Agriculture ruled that quota holders and producers could take a lump-sum payment from qualified financial institutions. All recipients of the tobacco buyout checks received their first payment in 2005, and then, starting from the second payment they had an option to contract with authorized financial institutions to receive a lump-sum payment in exchange for the remaining payment stream. On average, in 2005–2006 financial institutions offered to pay

lump-sum payments using roughly a 6% discount rate. Consequently, if a farmer chooses to take the lump-sum option rather than the annuity, on average he will receive a lump-sum payment that constitutes approximately 80% of the sum of nine annual payments.

The tax implications were different for quota owners and quota lessees. Both annuity and lump sum payments are taxable in the year received. For quota owners the buyout checks were considered as an interest in land and consequently were subject to capital gains tax; while for quota lessees the buyout checks were considered as a replacement of tobacco income, and were subject to income tax as well as self-employment tax. As a result, the lump-sum payments for growers are likely to be taxed at a higher marginal tax rate than the annuity, while for quota owners the difference in options is not likely to be significant.¹

Literature Review

The present study is built on three bodies of literature: the Discounted Utility Theory, biases in intertemporal choice, and the Family-Business system. This section reviews the most relevant results from these three bodies of literature and formulates the hypotheses.

Discounted Utility Theory

The Discounted Utility Theory proposed by Samuelson (1937) remains as the dominant theoretical framework for modeling intertemporal choice. With respect to the choice between a lump-sum payment and annuity payments, the DUT suggests that farmers will prefer the option that promises them the highest net present value from the dollar amount they receive. This implies that farmers will choose a lump-sum payment if the net present value of all returns from the after tax dollar amount of the lump-sum payment is greater than the net present value of all returns from the after tax

dollar amount of annuity. Consequently, two factors should significantly affect the choice between lump-sum payments and annuity: how farmers decide to spend their tobacco money (i.e., what is the expected return on their investments), and how much they have to pay in taxes from each payment option (i.e., what is the after-tax amount they actually receive).

If farmers plan to spend their tobacco buyout check on activities that promise them high returns (i.e., significantly higher than 6% that banks charge recipients of lump-sum payments), then they would prefer the lump-sum option. Consequently, we expect that farmers who plan to start a new business are more likely to exchange the annuity for the lump-sum payment. On the other hand, farmers may save money by using a lump sum to pay off high interest debts (if annual percentage rate on these debts is significantly higher than 6%). Therefore we expect that farmers who are planning to pay off debts are more likely to prefer a lump-sum option.

Existing tax policies suggest the following two predictions. First, since growers and combined producers are subjected to progressive income tax, recipients of large buyout checks from these two groups are more likely to pay higher taxes if they choose to take the lump-sum payment rather than receive annuity payments. Consequently, those, who receive large tobacco checks, should be less likely to take the lump-sum option than the recipients of small tobacco checks. However, for most quota owners the capital gains tax rate is the same regardless the amount taxed. Therefore, the size of the tobacco check should not affect the choice between the two options for quota owners. Second, the consequence of existing tax policies is that on average growers should be more likely to choose annuity payments than quota owners, since if growers prefer a lump-sum option their tax rate is likely to increase, while for owners the rate stays the same. The tax consequences for combined producers vary and increase with the proportion of leased quota. It is also worth noting that low-income farmers were subjected to reduced tax rates, which might have affected their choice. Therefore, we control for low income in our analysis.

¹In Kentucky, buyout checks were exempt from the state income tax, while in some other states, such as North Carolina, buyout payments to growers were subject to 6% state income tax.

Biases in Intertemporal Choice

A number of empirical studies (for extensive review see Frederick, Loewenstein, and O'Donoghue, 2002) have documented various deviations from the DUT. *Magnitude effect* (see Thaler, 1981, among others) suggests that individuals discount large amounts of money at lower rates than small amounts. Buyout payments to farmers vary from as low as \$100 to over \$2 million. Magnitude effect suggests that farmers receiving larger buyout checks should be more likely to prefer the annuity option.

Omission bias is the tendency to judge harmful actions as worse, or less moral, than equally harmful omissions (inactions). When it comes to making a decision, this bias is similar to *the status quo bias*, because they both favor the default, which in the case of the *omission bias* is not acting. These biases suggest that buyout check recipients are more likely to choose the default option, in this case, annuity payments. Previously, Bütler and Teppa (2003) reported strong evidence of the *acquiescence bias* among retirees, who preferred the default option regardless of which option was offered as default by the pension funds. Omission bias (or acquiescence bias) is likely to manifest among older farmers who lived in the same community for many years, which reveals their tendencies toward stability, status quo, and aversion to change. Consequently, we expect that farmers who lived in the same community longer are more likely to prefer annuity payments to a lump-sum payment.

Availability bias is a rule of thumb, heuristic, or cognitive bias, where people base their prediction of the frequency of an event or the proportion within a population on how easily an example can be brought to mind (Tversky and Kahneman, 1973). Availability bias also suggests that the option that is easier to recall is more likely to be chosen. A quota holder or tobacco producer could enter into an agreement with a private financial institution to receive a lump-sum payment in return for the rights to future payments. Such private institutions were more likely to be located in local financial centers, such as Lexington, Louisville, Cincinnati, and Frankfort. We expect farmers

who live closer to these financial centers are more likely to consider the lump-sum payment option to be more available than farmers who live further from these financial centers. Furthermore, farmers who live closer to financial institutions are likely to face a lower transaction cost of contracting for a lump-sum payment.

Effects of the Household Structure and Internal Events

So far we focused on the literature that investigated intertemporal choices of individuals or firms. However, according to the Economic Research Service 91.6% of farms operating in Kentucky are family businesses. A number of studies (e.g., Duncan, Stafford, and Zuiker, 2003; Heck and Trent, 1999) have demonstrated that family businesses have to be considered as a family-business system, since there are extensive, bidirectional influences between family and business. Therefore, we expect that household structure, such as education of the family members and number of children in the household, should have a significant effect on the choice between a lump-sum payment and annuity payments. Therefore, we include household demographic characteristics as control variables.

The Sustainable Family Business Model (Stafford et al., 1999) suggests that modified patterns of interaction are needed for a family firm (e.g., a family owned farm) to remain healthy when responding to changes that occur during normative transitions or nonnormative crises in either the family or the family business (Danes et al., 1999; Danes et al., 2002). If this premise is accurate, then such internal modifications can influence the intertemporal choices of a family business. Our data, unlike the datasets analyzed by other field studies of the choice between the lump-sum option and annuity, allow investigating whether the presence and magnitudes of changes induced by internal family (e.g., birth, death, marriage, or divorce in the family) or business (decision to exit tobacco market or at least decrease the household dependence on tobacco income) events affect intertemporal choices of households.

We would also expect that farmers who were heavily dependent on tobacco income in 2005 but did not plan to depend on it as heavily in the future would have to go through a period of adjustment after exiting the tobacco market. Consequently, these farmers would prefer to take a lump-sum payment and use this money to ease their transition. Furthermore, we would expect that this effect is stronger for farmers who plan to exit tobacco production completely (i.e., decrease the household's dependence on tobacco income down to zero).

Method

Model

According to the DUT, the decisions guiding an individual should be based on an assessment of the best alternative use of his/her resources. The individual will make a decision of which payment option to choose after examining the alternatives. The individual chooses a payment option such that the level of utility derived from that choice is maximized subject to the family and farm's resource constraints. The underlying conceptual model describes the utility a farm family gains from choosing a particular payment option:

$$(1) \quad U_{ij} = \beta X_{ij} + e_{ij}$$

where U_{ij} is the utility family farm i gains from choice j , X_{ij} is a vector of farmer personal, family, and business characteristics, β is the estimated coefficient, and e_{ij} is the error term. If a farmer makes choice j ($j = 1, \dots, J$), then one can assume that the utility of choice j is the maximum among the J utilities of payment choices. Thus, the probability that a choice j is made, is $Prob(U_{ij} > U_{ik})$ for all k not equal to j (see Greene, 2002).

We used a logit model to analyze how farmer, business, and household characteristics influenced the choice between a lump-sum payment ($Y = 1$) and annuity payments. The logit model is specified as:

$$(2) \quad P(Y_i = 1) = \frac{e^{\alpha + \beta X_i}}{1 + e^{\alpha + \beta X_i}}$$

The estimated Equation (2) provides a set of probabilities for the choices of a family busi-

ness with the characteristics X_i (see Greene, 2002). In estimating the model, annuity payments were used as the reference alternative ($Y = 0$).

Data

This paper reports on unique data from the Appalachian region. The data were collected between June 2005 and August 2006, when Kentucky tobacco farmers were just beginning to adjust to the new economic environment. The survey addressed a comprehensive set of issues related to the tobacco buyout program. In particular, the respondents were asked how much money they expect to receive (i.e., sum of 10 annual payments) and what option (lump-sum or annuity) they had chosen. The collected data also provided information on farmers' personal, family, business, and community characteristics.

We originally mailed a survey to 5,000 randomly-selected rural households in Kentucky and received 702 responses in total. Four-hundred forty-two were tobacco farmers who had received a tobacco buyout check, of which 378 respondents answered all the questions essential to this study.

Variables

The dependent variable LUMPSUM reflects the response to the question "There were several payment options available for those who were to receive tobacco buyout checks. Which option did you choose?" The variable was coded "1" if the respondent had chosen a lump-sum payment and "0" otherwise. To test our hypotheses we used a logit model with four groups of variables: variables related to net present return, variables related to the biases of intertemporal choice, variables related to internal family and business events, and household demographics variables. The variables used in the analysis are summarized in Table 1.

The first group of regressors that are expected to have an effect on the probability of choosing the lump-sum option are expenditure option, income, production status, and the amount of the tobacco check. Farmers were

Table 1. List and Description of Dependent and Independent Variables in the Model

Variable	Description and Units
LUMPSUM	"1" if the respondent chose the lump-sum option, "0" otherwise
DEBT	"1" if the respondent plans to pay off debts using tobacco buyout money, "0" otherwise
STARTDUE	"1" if the respondent plans to start a new business using the tobacco buyout money, "0" otherwise
OWNER	"1" if the respondent owned and did not lease tobacco quota, "0" otherwise
GROWER	"1" if the respondent leased tobacco quota, but did not own it, "0" otherwise
COMBINED	"1" if the respondent both owned and leased tobacco quota, "0" otherwise
INCOME	"1" if the respondent's household annual income was less than \$30,000 a year, "0" otherwise
LOGSUM	Natural log transformation of the sum of 9 annual payments the respondent is to receive, dollar amount was measured in thousands.
TENURE	A number of years the respondent lived in the same community, measured in decades
LOUISVILLE	Highway miles from the center of the county where the respondent's farm is located to Louisville
LEXINGTON	Highway miles from the center of the county where the respondent's farm is located to Lexington
FRANKFORT	Highway miles from the center of the county where the respondent's farm is located to Frankfort
CINCINNATI	Highway miles from the center of the county where the respondent's farm is located to Cincinnati
BIRTH	"1" if there was a birth in the respondent's household in 2005, "0" otherwise
DEATH	"1" if there was a death in the respondent's household in 2005, "0" otherwise
DIVORCE	"1" if the respondent divorced in 2005, "0" otherwise
MARRIAGE	"1" if the respondent married in 2005, "0" otherwise
EXIT	"1" if the respondent plans to exit tobacco production in the future, "0" otherwise
DCHANGE	A difference between the percentage of income the household expects to receive from the tobacco production in 2007 and the percentage of income the household received from the tobacco production in 2004
COLLEGE	"1" if the respondent completed at least some college, "0" otherwise
AGE	The age of the respondent, measured in decades
GENDER	"1" if the respondent is female, "0" otherwise
CHILDREN	Number of dependents younger than 18 years of age in the household

given a choice of several expenditure options in our questionnaire (they could check all that apply): paying off debt, spending money on usual household expenses or medical bills, investing in a retirement fund or in the stock market, investing in new or existing on-farm or off-farm business activities, and starting a new business using the buyout check. We assumed that farmers expected to receive a particularly high return from two expenditure options: paying off high interest debts and starting a new business. Therefore, two variables—DEBT and STARTDUE—are used to represent some

of the expenditure options available to tobacco farmers. Both variables are expected to increase the probability of choosing the lump-sum option.

Three variables described production status of the farmer: GROWER, (equal to "1", for growers and "0" otherwise), OWNER, and COMBINED. The last variable, COMBINED, was not included in the regression, since combined producers served as a reference group in the logistic regression. We expect that GROWER has a negative effect and OWNER has a positive effect on the probability of

choosing the lump-sum payment. The binary variable INCOME is included in the model as a control variable. The dollar amount of the tobacco check in our sample was distributed log-normally ($p = 0.40$), therefore the log transformation of the dollar amount was included in the model as the variable LOGSUM. We expect that as the amount of the tobacco check increases the probability of choosing the lump-sum option decreases.

The second group of regressors is used to account for some biases of intertemporal choice, such as the omission (acquiescence or status-quo) bias and the availability bias. It includes the variable TENURE (years of tenure in the community) and four variables that represent the distances from the local major cities, LEXINGTON, CINCINNATI, LOUISVILLE, and FRANKFORT.² To measure the distance we use highway miles from the center of the county where the respondent's farm is located.³ All five variables are expected to decrease the probability of choosing a lump-sum payment.

The third group of regressors describes the internal family and business events. It includes four variables that reflect major life cycle events that occurred in the preceding year such as BIRTH of a child, DEATH, DIVORCE, and MARRIAGE. While the Sustainable Business Model suggests that these variables can significantly affect intertemporal preferences of the households, it does not provide any specific predictions about the directions of these effects. The third group also includes two variables that describe planned and ongoing changes in the business part of the family-business system. The variable EXIT indicates that a farmer does not plan to grow tobacco in the future. The variable DCHANGE is defined as the

difference between the percentage of income the household expects to receive from tobacco production in 2007 and the percentage of income the household received from tobacco production in 2004, and is expected to decrease the probability of choosing the lump-sum option.

Finally, we control for household personal characteristics. Specifically, we included the binary variable COLLEGE, which indicates the respondent completed at least some college, AGE, and GENDER. The variable CHILDREN is equal to the number of dependents younger than 18 years of age in the household. We did not include regressors describing ethnicity and marital status in the model, because 94% of respondents were white and 96% of respondents were married.

The complete descriptive statistics for the regression variables are presented in Table 2, which also reports descriptive statistics for the households that chose a lump-sum payment and the households that preferred the annuity option. The descriptive statistics by option choice indicate that younger and more educated farmers, with more children, who plan to reduce their household dependence on tobacco more drastically during the next 3 years ($F > 4.4$, $p < 0.04$) on average are more likely to prefer the lump-sum option. The data also demonstrate that farmers who plan to use their tobacco buyout money either to pay off their debts or to start their own new business also tend to choose a lump-sum payment ($F > 9.6$, $p < 0.002$).

Sample Limitations

The relatively low response rate (14%) might be related to two factors. First, the survey was long (it contained approximately 60 questions about farm, household, and personal characteristics). Second, the target group was a rural Kentucky population (mostly farmers) who may be reluctant to participate in research studies.

Despite these limitations, though, average age and family size in our sample are similar to the Kentucky average of 55.2 years and 0.5 children, respectively. However, our sample

²Distances to other Kentucky towns (e.g., Owensboro or Hopkinsville) were originally included in the model, but these distances were not significantly correlated with the option choice made by farmers and were excluded from the final model.

³Despite ranking 37th in size by area, Kentucky has 120 counties, third in the United States. Therefore, the distance from the center of the county to the major city is a good approximation of the distance from the individual farm to the major city.

Table 2. Descriptive Statistics

	Farmers Who Chose the Lump-Sum Option, n = 91		Farmers Who Chose the Annuity Option, n = 287		Full Sample, n = 378	
	Count	%	Count	%	Count	%
LUMPSUM	—	—	—	—	91	24
Binary Variables						
DEBT	48	52.7	93	32.4	141	37.3
STARTDUE	14	15.4	11	3.8	25	6.6
GROWER	40	44.0	77	26.8	117	31.0
OWNER	17	18.6	58	20.2	75	19.8
COMBINED	34	37.4	152	53.0	186	49.2
INCOME	13	14.3	29	10.1	42	11.1
BIRTH	5	5.5	6	2.1	11	2.9
DEATH	7	7.7	37	12.9	44	11.6
DIVORCE	2	2.2	7	2.4	9	2.4
MARRIAGE	9	9.9	15	5.2	24	6.3
EXIT	55	60.4	172	59.9	227	60.1
COLLEGE	68	74.7	180	62.7	248	65.6
GENDER	14	15.4	48	16.7	62	16.4
Continuous Variables						
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
LOGSUM	1.41	0.69	1.54	0.63	1.51	0.65
TOBACCO CHECK, \$K	51.3	39	55.8	34	54.7	35
TENURE	33.33	17.81	42.81	17.52	40.56	18.02
LOUISVILLE	100.77	35.62	100.38	43.8	100.47	41.96
LEXINGTON	81.43	54.06	84.43	60.66	83.72	59.11
FRANKFORT	86.55	47.53	86.17	57.29	86.26	55.07
CINCINNATI	163.61	77.12	172.76	77.23	170.59	77.2
DCHANGE	-0.57	1.75	-0.18	0.97	-0.28	1.21
AGE	50.5	14.94	56.17	13.03	54.81	13.71
CHILDREN	0.76	1.07	0.38	0.76	0.47	0.86

does include more educated operators relative to the Kentucky average of 41% (Census of Agriculture, 2002), who received larger than Kentucky average (\$48,000) tobacco buyout payments. We hypothesize that more educated farmers would be more active participants in the scientific studies, while recipients of larger checks (which mean large-scale tobacco producers) would feel more involved in tobacco farming and thus consider their opinions more valuable. In addition, almost 40% of the respondents in our sample indicated that they plan to continue to grow tobacco in the future, while tobacco Extension specialists suggest that only approximately 25% of former tobacco dependent farmers had continued to produce

tobacco. Table 2 also reveals that a little over 30% of our respondents were growers, while according to Womach (2004), approximately 56% of Kentucky tobacco was produced by tobacco quota lessees. These discrepancies suggest that our sample was subject to selection bias, i.e., farmers who were interested in producing tobacco in the future were more likely to respond to our survey, while tobacco quota lessees were underrepresented.

Finally, we analyzed 378 surveys, which is significantly less than the number of subjects used in other field studies (often several tens of thousands respondents). Nevertheless, our sample is very compelling for the study of the choice between annuity and a lump-sum

payment, because we have an opportunity to analyze the choices of individuals who did not have to make a decision to change their employment or exit the market. Therefore, our sample allowed us to evaluate how future production plans were correlated with the choice between annuity and lump-sum payments for farm households, heterogeneous in terms of age, income, education, occupation, and other characteristics. Furthermore, most field studies investigated financial decision making of urban individuals/or households, while we analyzed the choices of rural households during a period of major transition in their local economy.

Although our sample cannot be considered fully representative of the rural Kentucky population, we believe it is sufficiently large to investigate factors significantly affecting the choices of tobacco farmers. In support of this claim, we later evaluate whether the apparent response biases are likely to affect our results.

Results and Discussion

A logit model was used to analyze the effects of economic, demographic, and life cycle factors on farmers' choice of payment option. We used LIMDEP 9.0 and SPSS 16 to run the logistical regressions reported in this paper. Table 3 reports the results of the logit model. The first column reports the regression coefficients, and the last column reports the odds ratio of taking the lump-sum option with respect to the annuity option.

Overall, our results support most of our hypotheses. For instance, consistently with DUT, what farmers planned to do with the money had a statistically significant affect on the choice between lump-sum and annuity. Paying off debt and starting a new business were both statistically significant at the 1% level. For example, farmers who planned to use a tobacco check to pay off debts were 3.7 times more likely to choose the lump-sum option, and farmers, who planned to start a new business using a buyout check, were 5.4 times more likely to prefer the lump-sum option. Size of the tobacco payment was negatively correlated with the probability of taking the lump-sum option.

Table 3. Results of Logit Regressions (dependent variable LUMPSUM)

Variable	Coefficient	Std. Dev.	Odds Ratio
Constant	-1.935**	(0.772)	
Net present value			
DEBT	1.309*	(0.297)	3.70
STARTDUE	1.688*	(0.495)	5.41
OWNER	0.310	(0.398)	1.36
GROWER	1.174*	(0.383)	3.23
INCOME	-0.001***	(0.001)	1.00
LOGSUM	-0.631*	(0.245)	0.53
Biases of intertemporal choice			
TENURE	-0.001	(0.001)	1.00
LOUISVILLE	-0.013**	(0.006)	0.99
LEXINGTON	-0.034**	(0.015)	0.97
FRANKFORT	0.047*	(0.017)	1.05
CINCINNATI	-0.001	(0.004)	1.00
Internal family and business events			
BIRTH	0.887	(0.750)	2.43
DEATH	-1.045**	(0.500)	0.35
DIVORCE	-0.395	(0.953)	0.67
MARRIAGE	0.819*	(0.494)	2.27
EXIT	0.424	(0.371)	1.53
DCHANGE	-0.318*	(0.110)	0.73
Household demographics			
AGE	-0.000	(0.001)	1.00
GENDER	0.002	(0.001)	1.00
COLLEGE	0.679**	(0.316)	1.97
CHILDREN	0.001	(0.001)	1.00

*, **, *** indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Log Likelihood = -169.08

In the logistic regression we used log transformation of the dollar amount of the tobacco check; therefore the effect of the change in the dollar amount, given by the regression coefficient, is not constant but depends on the size of the check. We estimated the marginal effect at the mean dollar amount of \$54,700. Our analysis suggests that if the buyout check increases by \$1000, then the probability of taking the lump-sum payment decreases by approximately 1%. This effect was equally strong across all production groups (interaction terms of this variable and variables GROWER and OWNER was not significant, $p > 0.1$), which contradicts predictions of DUT, but is consistent with the presence of the magnitude effect.

The type of tobacco producer a farmer is (owner, grower, combined) has a statistically significant affect on the probability of choosing the lump-sum option. Being a grower was statistically significant at the 1% level. A grower was 3.23 times more likely than a combined producer to choose the lump-sum option. Grower income was statistically significant at the 10% level. If a farmer has an annual income less than \$30,000 then he is less likely than a farmer with income over \$30,000 to choose the lump-sum option. This result contradicts DUT, which predicts that growers who have to pay a progressive income tax on tobacco payment will prefer to receive annual payments.

The probability of taking a lump-sum option decreased by almost 3% with every 10 years lived in the same community, which supports our hypothesis that omission bias manifests more strongly among farmers who lived longer in the same community. Proximity to financial centers had a statistically significant effect on the probability of taking a lump-sum payment. For example, the probability of taking a lump-sum payment decreased by 5% with a mile increase in the distance from Lexington, and by approximately 3% with a mile increase in the distance from Louisville. The probability of taking a lump-sum payment was positively correlated with the distance from Frankfort. We observe this inverse relation, possibly, because this smaller Kentucky city is located between Lexington and Louisville. Consequently, proximity to Frankfort means an increase in the distance to Lexington and Louisville. Therefore our data are consistent with a presence of availability bias.

Internal household and business events significantly affected the probability of choosing a lump-sum payment. Experiencing a recent death in the family was statistically significant at the 5% level and having recently married was statistically significant at the 10% level. Farmers who had experienced death in the household were approximately 70% less likely to take a lump-sum option. Farmers who were recently married were 2.3 times more likely to prefer the lump-sum option. The decision to decrease household dependence on tobacco production had a statistically significant affect

on the choice between lump-sum payments and annuity. On average, farmers who were planning to decrease the dependence of their household on tobacco income by 10% within the next 2 years were 30% more likely to prefer a lump-sum option. The only household demographic variable that was statistically significant is having some college education. Farmers who had some college education were almost twice as likely to choose the lump-sum option.

Finally, in order to evaluate the effect of response biases, we defined an additional variable LARGE equal to 0 if LOGSUM < 1.51 (less than a sample mean), and 1 otherwise. We then included interaction terms of this variable, the variable COLLEGE, the variable EXIT, and the variable GROWER with all other variables included in the final model. This allowed us to measure the effect (if any) that the higher proportion of more educated and large scale farmers, and smaller proportion of growers and farmers who plan to exit tobacco farming in our sample would have on our results. This analysis revealed that some of our results were affected by response biases. For instance, DEATH in the household correlates positively with probability to take a lump-sum option among "larger-scale" farmers and negatively among farmers with college education, which suggests that the effect of death might be misestimated in our paper. However, no other interaction terms with LARGE and COLLEGE were significant, which suggests that "larger-scale" and education response biases did not interfere with our other results. The negative effect of DCHANGE on the probability to take a lump sum option was weaker (however still present) among growers than among other groups of producers, which suggests that we somewhat over estimated the magnitude of its effect in our analysis. The effect of AGE and CHILDREN on the probability to take a lump-sum option was positive and significant among farmers who planned to exit tobacco farming, while not significant among farmers who plan to continue to grow tobacco in the future. Since in our sample more farmers indicated that they plan to continue growing tobacco in the future than on average in Kentucky, our analyses might

underestimate the effect of these variables on the choices of Kentucky farmers. Nevertheless, according to these additional analyses, results describing the effects of the net present return variables and the variables related to biases of intertemporal choice were not affected by the response bias. Therefore, it does not affect the most important conclusion of our paper: farmers' choices between a lump-sum option and annuity can be predicted not only by DUT but also by various biases of intertemporal choice.

Conclusion

Empirical studies, and in particular field studies, are conducted in order to test and enhance existing theories. Our study uses the tobacco buyout in Kentucky to evaluate the predictions of the discounted utility model, to test for presence of some known biases in the intertemporal choice, and to evaluate whether, consistent with the Sustainable Family Business Model, internal events in the family-business system affect intertemporal preferences.

The tobacco buyout program allowed us to study how rural households, diverse in income, age, family structure, location, education level, and other characteristics, made a choice between annuity and a lump-sum payment. The tobacco buyout program affected all tobacco farmers, not only individuals who decided to change employment, as is the case with many of the studies on intertemporal choice. Recipients of the tobacco check, even though they had to adjust to the new economic environment, did not have to retire or change their employment, as did subjects in many field studies of the choice between annuity and lump-sum payments. Therefore, our results complement previous field studies, by reporting empirical data of choices of a population group that has not been studied before, made in an environment different from those studied.

Our results suggest that while discounted utility theory gives decent predictions of the farmers' behavior; other factors have to be taken into consideration. First, there are consistent biases that describe individual intertemporal behavior, such as availability bias,

acquiescence bias, and, possibly, the magnitude effect. Second, internal events in both family and business affect intertemporal preferences of the family-business system. For instance, our analysis revealed that the decision to exit the tobacco market positively correlated with the decision to take a lump-sum payment. To the best of our knowledge, no other field study of the choice between the lump-sum payments and annuity evaluated this effect directly. The interruptions in the regular household's routine significantly affect the probability of choosing one option over the other. Therefore, our results support decision-making models based on the household rather than individual characteristics and preferences, as, for example, suggested by Duncan, Stafford, and Zuiker (2003).

For a policy maker our results suggest that a presence of nonfinancial bias toward the default option has to be taken into account. Our results also suggest that for individuals who are planning to drastically change their lifestyle (e.g., change employment), a lump-sum option seems to be more attractive, therefore they are likely to appreciate the government decision to allow banks to offer a lump-sum option to them. Overall, our results suggest that future buyout programs have to consider not only a question of how much money needs to be paid to buyout recipients, but also what option is to be offered as a default option.

[Received March 2008; Accepted March 2009.]

References

- Atkins, G.L. *Spend It or Save It? Pension Lump Sum Distributions and Tax Reform*. Washington, D.C.: Employee Benefit Research Institute, 1986.
- Beach, R.H., A.S. Jones, W.D. Austin, and E.C. Crankshaw. "Tobacco Farmer Attitudes towards Tobacco Manufacturers: Divergence of Interests in a Rapidly Changing Market." American Public Health Association Annual Conference, November 4–8, 2006, Boston, MA (2006).
- Beach, R.H., A.S. Jones, and S.A. Johnston. *Tobacco Farmer Interest and Success in Diversification*. Internet site: <http://purl.umn.edu/19151> (2005).

- Brown, A.B. "“Outlook and Situation.” *Burley Tobacco, 2005 Information.* North Carolina Cooperative Extension Service Publication AG-376(2005):1–5.
- Brown, A.B., W.M. Snell, and K.H. Tiller. "The Changing Political Environment for Tobacco—Implications for Southern Tobacco Farmers, Rural Economies, Taxpayers, and Consumers." *Journal of Agricultural and Applied Economics* 31,2(1999):291–308.
- Bütler, M., and F. Teppa. "The Personal Discount Rate: Evidence from Swiss Pension Funds." Working paper, 2003.
- Census of Agriculture, 2002. Internet site: <http://www.agcensus.usda.gov>.
- Curme, M.A., and W.E. Even. "Pension Coverage and Borrowing Constraints." *The Journal of Human Resources* 30,4(1995):701–12.
- Danes, S.M., M.A. Rueter, H-K Kwon, and W. Doherty. "Family FIRO Model: An Application to Family Business." *Family Business Review* 15,1(2002):31–43.
- Danes, S.M., V. Zuiker, R. Kean, and J.A. Danes. "Predictors of Family Business Tensions and Goal Achievement." *Family Business Review* 12,3(1999):241–52.
- Duncan, K.A., K. Stafford, and V.S. Zuiker. "Family Integrity." *A Toolkit for Home-Based Entrepreneurs*. Heck, R.K.Z., Puryear, A.N. and Tomblin, P.A. eds., pp. 57–67. Conference Monograph, Lawrence N. Field Center for Entrepreneurship and Small Business, New York: Baruch College, 2003.
- Fernandez, P. "Pre-retirement Lump Sum Distributions." *Trends in Pensions*. John Turner and Daniel Beller, eds. Washington, D.C.: U.S. Dept. of Labor, PWBA, 1992.
- Frederick, S., G. Loewenstein, and T. O'Donoghue. "Time Discounting and Time Preference: A Critical Review." *Journal of Economic Literature* 40-2,1(2002):351–401.
- Gale, F. "Tobacco Communities Facing Change." *Rural Development Perspectives* 14(1999):36–43.
- Gale, H.F., L. Foreman, and T. Capehart. *US Tobacco Farming Trends*. Washington, D.C.: Economic Research Center, US Department of Agriculture, 1999.
- Greene, W.H. *2000 Econometric Analysis*, 4th ed. Upper Saddle River, NJ: Prentice-Hall, Inc., 2002.
- Heck, R.K.Z., and E.S. Trent. "The Prevalence of Family Business from a Household Sample." *Family Business Review* 12,3(1999):209–19.
- Piacentini, J.S. *Preservation of Pension Benefits.* EBRI Issue Brief, 98. Washington, D.C.: Employee Benefit Research Institute, 1990.
- Samuelson, P.A. "A Note on Measurement of Utility." *The Review of Economic Studies* 4,2(1937):155–61.
- Snell, W. *The Buyout: Short-Run Observations and Implications for Kentucky's Tobacco Industry*. Internet site: http://www.uky.edu/Ag/TobaccoEcon/publications/buyout_short-run.pdf (2005).
- Stafford, K., K. Duncan, S. Danes, and M. Winter. "A Research Model for Sustainable Family Businesses." *Family Business Review* 12(1999): 197–208.
- Thaler, R.H. "Some Empirical Evidence on Dynamic Inconsistency." *Economics Letters* 8,3(1981):201–7.
- Tversky, A., and D. Kahneman. "Availability: A Heuristic for Judging Frequency and Probability." *Cognitive Psychology* 5,2(1973):207–32.
- Womach, J. *Tobacco Quota Buyout Proposals in the 108th Congress*. CRS Report for Congress, April 2004.