# How Will Tobacco Farmers Respond to the Quota Buyout?
# Findings from a Survey of North Carolina Tobacco Farmers

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**Abstract**

The tobacco quota buyout is expected to have significant impacts on U.S. tobacco markets, farmers, tobacco-dependent communities, and public health. Using data from four surveys of a panel of North Carolina tobacco farmers conducted between 1997 and 2004, we investigate changing farmer attitudes towards and intentions following a quota buyout.

**Key Words:** Tobacco, farm diversification, quota buyout, farmer attitudes

**JEL Classifications:** Q12, Q18

## INTRODUCTION

In recent years, there has been a great deal of speculation regarding tobacco farmers' responses to a potential tobacco quota buyout and how this may affect tobacco markets, tobacco-dependent communities, and public health. Even before the termination of the tobacco quota program in October 2004, major changes had been taking place in the U.S. tobacco market in recent years, including an increasing reliance on international trade, substantial reductions in domestic tobacco marketing quotas, production cost increases, and a rapid increase in the proportion of tobacco production that is being raised under contract. Each of these developments has been contributing to significant changes in tobacco markets and, by extension, tobacco-dependent communities, which have led to concerns about the availability of profitable substitutes for tobacco (Gale, 1999; Gale, Foreman, and Capehart, 2000; President's Commission, 2001; Hull, 2002). Tobacco is grown in over 500 U.S. counties in 23 states, but production is concentrated in the Southern states of North Carolina, Kentucky, Virginia, Tennessee, South Carolina, and Georgia (USDA NASS, 2004).

Removal of tobacco quotas and price supports has brought U.S. prices closer to the world price and made U.S. tobacco more competitive on global markets. It also allows geographic relocation of tobacco production (tobacco quotas could not be transferred across county lines, except for burley tobacco in Tennessee) and removes restrictions on the quantity grown. The end of the tobacco quota program was almost universally expected to speed the transition towards fewer, larger, more efficient farms that has taken place throughout agriculture, but which has been slowed in tobacco by the presence of the tobacco quota program, and we have already seen this begin to take place (Brown, 2005; Snell, 2005). Smaller and older tobacco farmers are particularly likely to exit the market following the buyout (Tiller, 2003) and there may be some

overall reallocation of flue-cured tobacco production towards the high-yield regions of eastern North and South Carolina and southern Georgia (Gale, Foreman, and Capehart, 2000). However, the number of growers is generally expected to decline substantially even in North Carolina, which is particularly well-suited for tobacco production and accounts for approximately 40 percent of the national crop. Both Brown (2005) and Snell (2005) predict that more than 50 percent of tobacco farmers may leave the sector within the next couple of years.

Changes taking place in tobacco markets may also have impacts for attitudes towards public health policies aimed at reducing tobacco use. As the number of people deriving income from tobacco and the share of regional income attributable to tobacco production decline in many regions, there may be a reduction in opposition to tobacco control policies in tobacco-producing states. This may contribute to a continuation of recent trends towards increasing taxes on tobacco products and higher expenditures on tobacco use production and cessation programs in tobacco-producing regions.

In this study, we use data from a longitudinal survey of a panel of North Carolina tobacco farmers to explore changing farmer intentions and attitudes regarding the buyout over time and the influence of farmer preferences, resource endowments, market incentives, risk, and biophysical factors on tobacco farmers' plans to continue growing tobacco, change their tobacco acreage, and diversify into non-tobacco products as well as their attitudes towards tobacco farming and tobacco control. Our results suggest the buyout will lead to substantial changes in the distribution of tobacco acreage as well as in farmer attitudes. We find that intentions following the buyout and expected changes in attitudes towards tobacco farming and tobacco control differ significantly with tobacco acreage grown and share of income derived from tobacco.

## BACKGROUND

The rise and decline in the number of tobacco farms during the 20th century is similar to the experience in production of most farm commodities grown in the U.S. Widespread mechanization and yield improvements dramatically improved labor efficiency in agriculture. As a result, the number of people employed in agriculture dropped from 35 percent of the labor force in 1900 down to 2 to 3 percent today. In addition, the relentless downward pressure on food prices left little room for farmers to boost their margins in farming.

In an attempt to mitigate negative impacts on farm proprietors and rural communities, the federal government has intervened in agriculture on a regular basis beginning with the Agricultural Adjustment Acts of 1933 and 1938. Through the years, a combination of commodity loan programs, deficiency payments, and conservation set-asides has attempted to stabilize prices, reduce risks, and discourage over-production. Tobacco regulation has differed somewhat from other field crops in the use of a quota system to limit production and avoid destructive price movements. Table 1 includes a timeline of key tobacco legislation.

The allotment and quota systems used for tobacco from 1933 through 2004 controlled the quantity produced, in order to limit over-production and subsequent downward price adjustments. The high profitability of tobacco relative to most other crops through much of the past several decades is widely attributed to the federal quota program. However, target quantity programs such as the tobacco quota system have inadequate mechanisms to keep domestic prices close to world levels. Over the past 30 years, the U.S. price had risen to a 50 percent premium over its foreign competitors, giving cigarette manufacturers a strong incentive to substitute towards imported leaf. Increases in imports were a major contributing factor to the quota cuts experienced by growers over the last decade of the tobacco quota program.

## Table 1. Tobacco Related Legislation in the 20th Century

**1911:** The Justice Department's case to break up the tobacco trust succeeds. The Supreme Court rules that the American Tobacco Co is violating the Sherman Antitrust Act. Companies that emerged from the break-up include: American Tobacco (37 percent market share); R. J. Reynolds (20 percent); Liggett & Myers (28 percent).

**1933:** The Agricultural Adjustment Act (AAA) of 1933 is passed by the Roosevelt administration, guaranteeing price supports in exchange for limiting production via allotments and quotas. As long as farmers do not grow more than their allotted acreage, the government will buy any unsold tobacco. The act aims to reduce production by 30 percent and is to be financed by a tax on processors of agricultural products.

**1935:** The Tobacco Inspection Act is enacted by Congress. This act established the framework for development of official tobacco grade standards, authorized the Secretary of Agriculture to designate tobacco auction markets with mandatory inspections of each lot to determine its grade and type, and provided for the distribution of daily price reports showing the current average price for each grade. The Agricultural Marketing Service's Tobacco Division was established to provide these services to the industry.

**1936:** AAA of 1933 is declared unconstitutional by the Supreme Court on the grounds that it is illegal to tax one group (buyers of agricultural commodities) as a way of financing another (growers).

**1938:** AAA of 1938 is passed, this time authorizing marketing quotas in tobacco for the 1940 growing season based on tobacco production acreage. The 1938 AAA is almost identical to the 1933 version, except that programs are funded through general taxation, adhering to the Supreme Court's ruling of 1936.

**1939-1945 (WORLD WAR II):** As part of the war effort, Roosevelt makes tobacco a protected crop. Smoking is so popular that a shortage of tobacco results. By 1945, cigarette sales reached an all-time high.

**1949:** AAA of 1938 is amended, this time authorizing price supports.

**1962:** Lease and Transfer provisions let growers rent their tobacco allotments to other farmers in the same county. Mechanization of curing and harvesting and under-planting of quotas motivate this legislation.

**1966:** Poundage quotas replace acreage allotments due to dramatic increases in yields per acre, reductions in demand as a result of health concerns.

**1982:** The No-Net-Cost Tobacco Program Act is passed, requiring the government's Commodity Credit Corporation to recover all its costs for quota enforcement, price supports, and leaf grading programs through assessments on growers. As a result, taxpayers no longer pay for losses incurred by the program, although they still pay about $16 million a year in administrative costs to run it. Act also allows sale of quotas within counties.

**1986:** Tobacco Improvement Act of 1986 reduced price support level for tobacco and required cigarette manufacturers to purchase 1974-1986 existing loan stocks held by the Flue-Cured Tobacco Cooperative Stabilization Corp. over a period of 8 years, ending in 1994. Price support and quota formulas were revised in an effort to generate more market-oriented price and production levels.

**1986:** In the Omnibus Reconciliation Act of that year, allowance for effective quotas was introduced. If a grower is unable to sell his/her entire quota in a given year, the amount of the "under-marketing" is added to the next year's quota, increasing the effective quota for that grower.

**2003:** Tobacco Quota buyout bills debated in Congress.

**2004:** The Fair and Equitable Tobacco Reform Act of 2004 (Reform Act) was passed as part of the American Jobs Creation Act of 2004, ending the federal tobacco quota program and price supports.

Sources: Borio, 2001; ERS, 2001; Toussanint, 1992.

As quota levels and tobacco income fell sharply and the same quota program that had increased tobacco profitability in earlier decades began to be blamed, at least in part, for the problems facing tobacco growers, several members of Congress from tobacco-producing states began introducing legislation to end the current federal tobacco quota program and compensate quota holders and growers in recent years. This work resulted in the Fair and Equitable Tobacco Reform Act of 2004, which was passed as part of the American Jobs Creation Act of 2004 and signed into law by the President on October 22, 2004. This legislation ended federal regulation of the quantity of tobacco produced and provided $9.6 billion to growers and quota owners. An additional $500 million was provided for use in disposition of stocks held by grower associations and the Commodity Credit Corporation.

Quota holders will be paid a total of $7 for each pound of basic quota owned based on 2002 levels, with the payments being made in equal installments over 10 years. Growers who grew tobacco in 2002, 2003, or 2004 will receive $3 per pound of quota grown, based on the 2002 effective marketing quota. Those who grew in all three years are eligible for the full $3 per pound. Those who grew in only 1 or 2 years are eligible for 1/3 or 2/3 of the full payment, respectively. As for quota holders, these payments will be made in equal installments over a 10 year period. By the end of the program, many quota holders were leasing to other farmers and were no longer growing tobacco themselves, but those were growing tobacco are eligible for both quota holder and grower payments. The majority of payment recipients will receive relatively little money. It is estimated that the top 20 percent of recipients will receive about 80 percent of the total payments (EWG, 2005).

As mentioned above, many farmers are likely to exit tobacco production now that the buyout has taken place, but others may expand production given their greater flexibility in the

absence of quotas. The removal of price supports has made U.S. tobacco much more competitive on global markets and the decrease in tobacco price received is offset by the elimination of quota lease payments. Thus, while recent events in tobacco markets have heightened concern regarding the availability of profitable substitutes for tobacco, continued and even expanded tobacco production is likely to be attractive to larger, more efficient operations better able to compete in a free market.

One of the primary driving factors behind the quota cuts over the last decade of the federal program was the decline in domestic demand for tobacco products. Along with substitution of cheaper imported tobacco, much of this decrease can be attributed to higher cigarette excise taxes, increases in cigarette prices to cover industry payments under settlement agreements, and more intensive antismoking efforts. Even in the tobacco-producing states, which have tended to have much lower taxes on tobacco products and smaller expenditures on smoking prevention and cessation than those states that do not produce tobacco, there has been increasing attention to public health issues. Most tobacco-producing states have substantially increased taxes on tobacco products in recent years as well as spending on anti-smoking efforts. This is likely attributable in part to the declining economic importance of the tobacco sector. As farmers and tobacco-dependent communities become less dependent on tobacco income, it is likely that their attitudes towards tobacco control will soften. This may contribute to tobacco state legislators being more likely to pass additional tax increases or take other measures to reduce the public health impacts of tobacco products as the expected effects on the impacted constituency shrink.[1] These additional measures, if taken, would further impact the demand for tobacco products.

[1] On the other hand, consolidation could result in a more politically powerful group of growers.

## DATA AND METHODS

We examine the impact of farm, household, and market characteristics on tobacco farmers' intentions following the buyout based on a series of surveys of a panel of tobacco farmers. We combine these longitudinal survey data with market data collected from secondary sources to examine the influence of farmer preferences, resource endowments, market incentives, risk, and biophysical factors on tobacco farmers' intentions to continue growing tobacco or change their tobacco acreage, diversify into non-tobacco products, and other decisions. We estimate logit regression models of whether the respondents would advise their children to go into tobacco farming (ADVISE) and farmer stated expectations that they will leave tobacco farming for a reason other than retirement (EXIT); a generalized ordered logit model of farmers' intentions to either increase tobacco acreage, keep acreage the same, decrease tobacco acreage, or exit tobacco production altogether if the federal program were ended;[2] and ordered logit models for respondents' support, neutrality, or opposition to a policy to encourage restaurants to voluntarily ban smoking and the level of farmers' perceived risk of public smoking restrictions.

The primary data source for this paper is a panel of North Carolina tobacco farmers. The panel was drawn from 14 of the 15 counties that produce the most flue-cured tobacco in the state and surveyed in 1997, 1999, 2001, and 2004 to date. There were 1,236 tobacco farmers in the initial sample, but there has been substantial attrition over time. In the most recent survey, there were 535 farmers that responded to the survey and that continue to have tobacco-related income. These data were combined with secondary data on wages, crop prices, yields, and other relevant

[2] This model was initially estimated as a standard ordered logit model, but unlike the public health attitudes models, it violated the parallel regressions assumption. The generalized ordered logit is less restrictive, allowing parameters to vary across equations.

factors. One advantage of these data is that they were first collected prior to many of the major upheavals in the tobacco market that have taken place recently. Thus, we have a unique longitudinal dataset that covers a period of tremendous change in the market for tobacco with which to examine the changing attitudes and interests of tobacco farmers.

The data used in estimation of our models fall into the following five basic categories:

**Household-specific Characteristics:** Household preferences are not measured directly, so they are proxied using demographic and other variables expected to influence farm household preferences and managerial ability. The variables used in the empirical analysis are age of household head[3] (AGE); age of household head squared (AGESQ); dummy variables for household head educational attainment categories (less than high school (ED_LTHS; reference category), high school graduate (ED_HS), some college (ED_SOMECOLL), and college graduate (ED_COLLGRAD)); a dummy variable for household head gender (MALE); a dummy variable for household head race (WHITE); a dummy variable for household head tobacco use (TOBACCO); and a dummy variable indicating whether the household was in a county that received targeted information regarding opportunities to diversify away from tobacco (TX). All of these variables were collected from survey respondents except for TX, which was assigned based on the county where the farm household was located.

**Resource Endowments:** These variables measure the resources available to the landowner and include asset holdings such as land, labor, and wealth.[4] The labor variables used

[3] For the purposes of this study, the household head is the person within the household that makes decisions regarding tobacco production.

[4] In the absence of capital constraints, wealth should theoretically not be an important determinant of landowner behavior.

to represent these characteristics include dummy variables for whether the household head is married (MARRIED) and whether they have children (CHILD), both of which are included to proxy additional time endowment for the household because the survey did not directly collect data on the number of members of each household and their ages. Total acreage owned (TOTALLAND) was only collected in the 2004 survey and was assumed to be constant across the survey period. In addition, acres of tobacco grown (TOBACRES) and share of household income derived from tobacco (TINCSH) were included as measures of household resources related to tobacco. The share of household income from tobacco was only collected directly in the 2004 survey and is used in cross-sectional analyses of farmer attitudes towards public health policies using the 2004 survey data only.

**Market Incentives:** This category includes factors explicitly related to exogenous economic determinants of decisions, such as prices, availability of markets, and infrastructure. We used future harvest period tobacco prices to represent tobacco price expectations (Foreman, 2005). Due to lack of cross-sectional price variation, we substituted expected revenue for prices based on multiplying the expected price by the yield reported by the survey respondents. For those that did not report their yield, we used the average yield for respondents from that county. ER_TOB is the expected tobacco revenue per acre.

To proxy for off-farm labor opportunities, we used the average wage per job for each county for each year (OFFFARM), downloaded from the BEA Regional Economic Accounts (BEA, 2005). One of the most important input costs for tobacco growers is leasing quota. We used lease prices reported by survey respondents for 2002 and 2003 and scaled them back to earlier years based on the national cost for land and quota divided by the average yield (Foreman, 2005). This assumes that all lease rates were changing at the same rate while

maintaining their distribution across particular farms. For households that did not report a lease price (most of whom reported that they did not lease from or to others), we used the average of reported lease prices per pound for their county to represent the lease price that would have been available to them had they chosen to enter the quota lease market.

**Risk and Uncertainty:** These variables reflect the uncertainty in the market and institutional environment under which decisions are made, primarily yield and price risk. There has been relatively little variation in the tobacco price in recent years, due in large part to the programs in place to stabilize it. Thus, we include only the variance of yield over the period from 1960 to 2003 by county to represent the yield risk for that county (TOB_YVAR).

**Biophysical Factors:** This refers to influences on the physical production process associated with farming. However, the farmer survey did not collect information on slope, soil quality, or other biophysical factors. Consequently, we used tobacco yield reported by respondents to proxy soil quality for growing tobacco. Yield information was not collected before the 2004 survey, so yield in previous years was assumed to be equal to the average of the yields reported in the 2004 survey for the 2002 and 2003 seasons.

In addition to the variables described above, there are a number of government policies that could influence landowner decisions. These policies could enter the empirical models through adjustments to expected prices (e.g., due to price supports), price variability (e.g., through price supports, crop insurance), or through dummy variables representing the presence of a policy. Of course, the most important policy that may have affected decisions regarding tobacco production over this time period is the tobacco quota program. Since these policies are all implemented at the national or market level, the only variation in them is over time. For this reason, we use time dummy variables to capture changes in quota and other policies.

## RESULTS

Table 2 presents results of two models examining farmer attitudes. In the first, we analyze the factors determining whether tobacco farmers indicated they would advise their children to grow tobacco. One striking finding in our survey results was that the proportion of tobacco farmers that indicated they would advise their children to grow tobacco plunged from just over 67 percent in 1997 to 21 percent in 2004. Thus, the dummy variables for survey year are highly significant and become increasingly negative over time relative to the reference year (1997; the first year of the survey), demonstrating a large negative shift in attitudes towards the future of tobacco farming. Farm operators that were white, male, and married were less likely to advise their children to grow tobacco, as were those located in urban or adjacent counties. Those with larger tobacco acreage grown and more total land owned, on the other hand, were more likely to advise their children to grow tobacco.

The second model examined whether farmers indicated that they expected to exit tobacco production for some reason other than retirement. The survey year dummy variables were highly significant in this regression as well, although with a positive and increasing effect over time. Consistent with farmers responses on whether they would advise their children to grow tobacco, this indicates farmers were becoming less confident of the future of tobacco farming over time. Age has a negative effect for this question, as expected, because these farmers are much more likely to leave tobacco production through retirement. For this model, attending at least some college had a significant positive effect on farmer expectations that they would leave tobacco production for a reason other than retirement, which may indicate better off-farm possibilities. Having children increased the probability that farmers indicated they expected to exit, as did higher tobacco yield variability. Those that use tobacco products were less likely to exit.

Farmers with larger tobacco acreage grown were less likely to expect to exit, though increasing at a slower rate as acreage increased.

**Table 2. Logit Models of Tobacco Farmer Attitudes**

| | Advise Children to Grow Tobacco? | Expect to Exit Tobacco Production for Reason Other than Retirement? |
|---|---|---|
| AGE | 0.012 | -0.065*** |
| | (0.011) | (0.009) |
| ED_HS | -0.055 | 0.060 |
| | (0.391) | (0.304) |
| ED_SOMECOLL | -0.114 | 0.684** |
| | (0.424) | (0.320) |
| ED_COLLGRAD | -0.144 | 0.764** |
| | (0.447) | (0.331) |
| MALE | -0.799* | -0.348 |
| | (0.471) | (0.321) |
| WHITE | -1.478*** | -0.476 |
| | (0.560) | (0.390) |
| TOBACCO | 0.088 | -0.488*** |
| | (0.227) | (0.168) |
| TX_DUR | 0.020 | -0.055 |
| | (0.291) | (0.224) |
| TX_POST | 0.541 | -0.135 |
| | (0.379) | (0.266) |
| MARRIED | -0.790** | -0.214 |
| | (0.385) | (0.255) |
| CHILD | | 0.631** |
| | | (0.318) |
| TOTALLAND | 0.001*** | -0.000 |
| | (0.000) | (0.000) |
| TOBACRES | 0.008* | -0.012*** |
| | (0.004) | (0.003) |
| TOBACRESSQ | -0.000 | 0.000*** |
| | (0.000) | (0.000) |
| ER_TOB | -0.000 | 0.000 |
| | (0.000) | (0.000) |
| OFFWAGE | -0.120 | 0.045 |
| | (0.080) | (0.054) |
| URBAN | -0.883*** | 0.134 |
| | (0.273) | (0.189) |
| TOB_YVAR | 0.021*** | 0.009** |
| | (0.006) | (0.004) |
| SYR99 | -2.122*** | 1.312*** |
| | (0.264) | (0.235) |
| SYR01 | -2.361*** | 1.560*** |
| | (0.289) | (0.248) |
| SYR04 | -3.446*** | 1.945*** |
| | (0.332) | (0.260) |
| Constant | 0.844 | -1.164 |
| | (1.780) | (1.220) |
| Observations | 1,582 | 1,756 |

Note: Standard errors in parentheses. Superscripts ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

The percentage of both tobacco farmers that planned to exit tobacco and that planned to expand acreage increased over time, but differed considerably by tobacco acreage grown. In our most recent survey of North Carolina tobacco farmers, conducted in early 2004, about 35 percent of the respondents indicated they would stop growing tobacco if there were a quota buyout while 39 percent indicated they would increase tobacco acreage, 21 percent would keep acreage the same, and 4 percent would decrease acreage. However, intentions differ significantly with tobacco acreage grown. Only 22 percent of farmers with 25 or more acres of tobacco plan to exit compared with 60 percent of farmers with less than 5 acres of tobacco. Almost half of all tobacco farmers with 25 or more acres planned to expand tobacco acreage following a buyout, while only 23 percent of those with less than 5 acres were planning to expand.

Table 3 presents the results of our analysis using a generalized ordered logit model of farmer intentions to stop growing tobacco, decrease tobacco acreage, keep acreage the same, or increase acreage if the federal tobacco program were ended. The results show that operator age has a negative effect and tobacco acreage has a positive effect across all comparisons, which indicates that smaller and older tobacco producers are less likely to continue producing tobacco, less likely to keep tobacco acreage the same or greater, and less likely to increase tobacco acreage. Higher educational attainment increased the probability that operators planned to increase their tobacco acreage. White farmers were more likely to keep acreage at least the same or expand. There was also a positive effect in the most recent survey year, reflecting an increase in farmers expectations of increasing acreage. This may reflect in part the sharp reductions in tobacco quota that had taken place, increasing farmer interest in raising tobacco acreage relative to these reduced levels. Higher expected revenue per acre is associated with farmers being more

likely to continue production and to keep acreage at least as high as before the end of the program. The diversification treatment effect has a negative effect on tobacco acreage.

**Table 3. Generalized Ordered Logit Model for Tobacco Acreage Intentions if the Federal Tobacco Program Ended**

| | Plan to continue growing tobacco | Plan to keep tobacco acreage the same or greater | Plan to increase tobacco acreage |
|---|---|---|---|
| AGE | -0.022*** | -0.024*** | -0.033*** |
| | (0.008) | (0.007) | (0.008) |
| ED_HS | 0.361 | 0.196 | 0.602** |
| | (0.265) | (0.238) | (0.304) |
| ED_SOMECOLL | 0.540* | 0.023 | 0.503 |
| | (0.295) | (0.258) | (0.327) |
| ED_COLLGRAD | 0.485* | 0.374 | 1.038*** |
| | (0.288) | (0.273) | (0.341) |
| MALE | -0.828*** | -0.515* | -0.226 |
| | (0.313) | (0.308) | (0.345) |
| WHITE | -0.061 | 0.744** | 0.718* |
| | (0.351) | (0.329) | (0.421) |
| TOBACCO | 0.030 | -0.089 | 0.037 |
| | (0.158) | (0.148) | (0.155) |
| TX_DUR | -0.321 | -0.351* | -0.437** |
| | (0.211) | (0.199) | (0.211) |
| TX_POST | -0.376* | -0.337 | -0.400* |
| | (0.214) | (0.209) | (0.217) |
| MARRIED | -0.097 | 0.086 | 0.165 |
| | (0.261) | (0.238) | (0.233) |
| CHILD | 0.259 | -0.027 | -0.054 |
| | (0.300) | (0.280) | (0.313) |
| TOTALLAND | -0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) |
| TOBACRES | 0.020*** | 0.016*** | 0.008*** |
| | (0.003) | (0.003) | (0.003) |
| TOBACRESSQ | -0.000*** | -0.000*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) |
| ER_TOB | 0.000*** | 0.000** | 0.000 |
| | (0.000) | (0.000) | (0.000) |
| OFFWAGE | 0.026 | 0.067 | 0.081* |
| | (0.050) | (0.049) | (0.046) |
| URBAN | 0.068 | 0.014 | -0.213 |
| | (0.167) | (0.157) | (0.170) |
| TOB_YVAR | 0.004 | -0.001 | -0.003 |
| | (0.004) | (0.003) | (0.004) |
| SYR01 | -0.080 | -0.147 | -0.130 |
| | (0.156) | (0.137) | (0.155) |
| SYR04 | 0.115 | 0.403** | 0.769*** |
| | (0.203) | (0.193) | (0.184) |
| Constant | -0.615 | -0.604 | -1.417 |
| | (1.081) | (1.022) | (1.128) |
| Observations | 1,204 | 1,204 | 1,204 |

Note: Robust standard errors in parentheses. Superscripts ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Finally, in the ordered logit models for tobacco grower attitudes towards public health issues, we find that the share of income derived from tobacco has a significant positive effect on opposition to policies to encourage voluntary smoking bans in restaurants and a significant negative effect on perceived risk of public smoking restrictions for tobacco farmers. This suggests that opposition to tobacco control policies may continue to decline as tobacco farmers exit production or have further reductions in the share of income derived from tobacco. We also find that the diversification program had a negative effect on opposition to voluntary smoking bans and a positive effect on perceived risk. This suggests that the diversification program was successful in showing growers alternative sources of income and reducing their perceived risk.

**Table 4. Ordered Logit Models of Tobacco Grower Attitudes towards Public Health Issues**

| | Policies to Encourage Voluntary Restaurant Smoking Bans (0=Support, 1=Neutral, 2=Oppose) | Perceived Risk of Public Smoking Restrictions (0=Great Risk, 1=Moderate Risk, 2=Slight Risk, 3=No Risk) |
|---|---|---|
| AGE | -0.011 | -0.072 |
| | (0.066) | (0.061) |
| AGESQ | -0.000 | 0.001 |
| | (0.001) | (0.001) |
| ED_HS | 0.449 | -0.085 |
| | (0.362) | (0.372) |
| ED_SOMECOLL | 0.411 | 0.417 |
| | (0.396) | (0.381) |
| ED_COLLGRAD | 0.322 | 0.441 |
| | (0.386) | (0.387) |
| MALE | 0.022 | 0.192 |
| | (0.428) | (0.429) |
| WHITE | 1.078*** | -0.935** |
| | (0.396) | (0.406) |
| TOBACCO | 0.338 | 0.044 |
| | (0.224) | (0.183) |
| TX | -0.352* | 0.395** |
| | (0.206) | (0.181) |
| MARRIED | -0.227 | 0.582** |
| | (0.321) | (0.274) |
| CHILD | 0.714* | 0.655* |
| | (0.409) | (0.387) |
| TINCSH | 1.057*** | -0.877*** |
| | (0.380) | (0.331) |
| Observations | 457 | 458 |

Note: Robust standard errors in parentheses. Superscripts ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

## CONCLUSIONS

We examine the impact of farm, household, and market characteristics on tobacco farmers' intentions following the buyout based on a series of surveys of a panel of tobacco farmers. We surveyed North Carolina tobacco farmers in 1997, 1999, 2001, and 2004 about their tobacco production, as well as their attitudes, knowledge, and behaviors regarding on-farm diversification, off-farm employment, tobacco manufacturers, tobacco control, and other key issues. We combine these longitudinal survey data with market data collected from secondary sources to estimate the influence of farmer preferences, resource endowments, market incentives, risk, and biophysical factors on tobacco farmers' intentions to continue growing tobacco or change their tobacco acreage as well as their attitudes towards public smoking restrictions.

The results are generally consistent with expectations, indicating large negative shifts in attitudes towards the future of tobacco production in recent years, that a large proportion of tobacco farmers would exit production in the event of a buyout, and that farmer attitudes towards public smoking restrictions are affected by the share of their income derived from tobacco. We find that older farm operators and those with less tobacco acreage are more likely to intend to exit production if the federal tobacco program ended. In addition, we find that providing information about diversification opportunities to farmers may play an important role in their attitudes towards tobacco production and intentions to stay in tobacco production or alter acreage grown. Having more information about diversification opportunities also seems to reduce opposition to public health policies and perceived risk of these policies to tobacco farmers.

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