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Cross-Commodity Perspective on Contracting:
Evidence from Mississippi

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Abstract

This analysis presents the results of a survey of agricultural producers in Mississippi regarding their use of contracting. The study focuses on cross-commodity differences in contracting and the variable underlying contracting. Logistic regression models are used to examine the impacts of variables coming from transactions cost economics and risk on contracting decisions. Support is found for the effects of transactions cost, but price risk is not found to be an important determinant of contracting decisions.

Keywords: transactions cost, survey, logistic regression, contracting

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Abstract

This analysis presents the results of a survey of agricultural producers in Mississippi regarding their use of contracting. The study focuses on cross-commodity differences in contracting and the variable underlying contracting. Logistic regression models are used to examine the impacts of variables coming from transactions cost economics and risk on contracting decisions. Support is found for the effects of transactions cost, but price risk is not found to be an important determinant of contracting decisions.

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1 Introduction

Contracting in agriculture is not a new phenomenon. However, the increasing role of concentration and industrialization in agriculture has refocused attention on the type and extent of use of contracts in agriculture. Data from Perry and Banker suggest that the use of contracting has increased, in some cases dramatically, over the past ...ve years (Table 1). The available data also show considerable disparity in the use of contracting across commodities. Differing degrees of “industrialization” (Drabenstott) may be used to describe differences across commodities, but industrialization is broadly defined and somewhat amorphous. A closer examination of the underlying fundamental differences between commodities may be more fruitful in gaining perspective on the reasons for differences in contracting across commodities.

Empirical examination of contracting has understandably been focused on the poultry and hog sectors (Goodhue, Rausser and Simon; Gillespie and Eidman; Martin; Kliebenstein and Lawrence; Johnson and Foster; Hennessey and Lawrence), although some work in fruits and vegetables has been done as well (Hueth et al.). However, examination of Table 1 shows that contracting is increasing in ...ber, ...eld crops and other livestock as well.

Contracting in agriculture is somewhat difficult to define because of the broad range of potential contract types. Market transactions occur on a continuum ranging from spot transactions to complete vertical integration (i.e., coordination through direct ownership of

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the productive resources). Contracts are typically viewed as lying close to spot transactions, but some contract types such as resource providing and production management contracts (Kohls and Uhl) take on characteristics of quasi-integration. Kohls and Uhl provide the following definitions for these contracts:

- ² **Resource providing contract**—a contract with terms that often specify certain production resources to be used and the place of their purchase. The contractor usually provides the producer with financing ranging from operational to fixed investment financing, and a degree of managerial assistance and supervision. Product prices are usually based on the open market, and income guarantees are minimal. In such contracts, the contractor may influence the technology and size of operations of the producer in order to increase and stabilize the market for their own products. Examples of these may lie in some fruit, nut, vegetable, and ornamental horticulture contracts.
- ² **Production management contract**—a contract with terms that often include marketing and production stipulations of both the resource providing and market (cash forward) contracts. In addition, they provide for the transferring of part or all of the market price and income risks from the producer to the contractor. This is usually done by paying the producer a prearranged return per unit of product or by guaranteeing against market-oriented financial loss. In these contracts, the contractor assumes a substantial part of the managerial responsibility of the producer. These contracts come closest to obtaining the managerial and financial control and risk that occurs when the integration is effected through complete ownership (complete vertical integration).

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Examples are poultry and some hog contracts.

Some contracts such as cash forward contracts and marketing pools are viewed as simple marketing tools from the producer's perspective. However, the supply chain management uses and implications of these contracts suggests that a broader, vertical coordination view of these tools is warranted. Viewing traditional marketing tools in this fashion may bear fruit in understanding why producers contract.

The purpose of this paper is two-fold. First, primary data collected on contracting behavior and underlying fundamental explanatory factors for a cross-section of Mississippi farms is presented. Second, these data are used to offer some perspective on the role that theoretically important variables may be playing in contracting decisions. The purpose is not to provide a comprehensive analysis of contracting, per se, but to provide some perspective on differences across commodities and outline future research needs.

2 Related Literature

There is a rich literature in the area of vertical integration and coordination. Within this literature, transactions cost economics has emerged as a primary explanatory tool for examining contracting and vertical integration relationships (Williamson 1979, 2000). Unlike neoclassical economic theory, transactions cost economics assumes that transactions do not occur in a frictionless environment. Rather, transactions cost theory holds that the cost of carrying out a transaction in the marketplace will have a direct effect on the vertical structure of the market/firm. Despite criticisms of the transactions cost theory as tautological

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(Slater and Spencer; Williamson, 2000), there has been empirical support for the hypotheses generated from transactions cost theory (see, e.g., Lieberman; Joskow; Hobbs; Levy). Despite the evidence found in general markets, little examination of agricultural markets has been conducted, and those studies in agriculture are in a commodity-specific context, which limits generalization of findings to other commodities.

2.1 Transactions Cost

Williamson (1996) provides a description that is useful in understanding the contracting decision. Assume there are two potentially different profit functions:

$$\pi^i = R(X) - C(X; k; \theta) - \theta k - G_i; \text{ and}$$

$$\pi^m = R(X) - C(X; k; \theta) - \theta k - G_m$$

where π^i is the profit associated with contract type i , π^m is the profit associated with spot sales, $R(X)$ is the revenue associated with selling a given output X , $C(X; k; \theta)$ is a twice differentiable, concave cost function, k is the degree of asset specificity¹ with a per unit cost of θ , G_i and G_m are the governance costs² associated with contract type i and spot sales, respectively, and θ is a shift parameter. It is assumed that $C_X > 0$, $C_k < 0$, and $C_{Xk} < 0$.

¹ Asset specificity is defined as the magnitude of economic costs associated with redeploying an asset to its best alternative use, and by its best alternative user (Williamson, 1979; Klein, Crawford and Alchain). Two key concepts associated with asset specificity are quasi-rents and the "hold-up" problem. A quasi-rent is the difference between the best alternative return on the capital before it is invested and the return it must receive to prevent alternative use after the capital has been invested (Hennessy and Lawrence). The hold-up problem arises when the buyer of the product attempts to appropriate the rents from the seller by forcing disadvantageous contractual terms on the seller. The buyer has this leverage over the seller because the seller has invested in specific assets that are costly to redeploy.

² Governance costs can be any number of items related to managing a relationship. Examples may be searching out buyers, negotiation contracts, monitoring and enforcement of contracts, etc.

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A higher value of θ has a greater cost reducing consequence for asset specificity: $C_{k\theta} < 0$ and $C_{x\theta} < 0$.

Assume that governance costs are given by:

$$G_i = \bar{c} + V(k); \text{ and}$$

$$G_m = W(k)$$

where $\bar{c} > 0$ is the bureaucratic cost parameter and $V_k > 0$ and $W_k > 0$. Further, it is assumed that $W_k > V_k$ for all common k , or the marginal cost of governance with respect to asset specificity is greater for spot markets than for any type of contract. It is clear from this that output will be chosen to equalize marginal revenue with marginal production cost, while optimal asset specificity will be chosen to minimize joint production and governance costs.

Examining profit as a function of asset specificity yields a central hypothesis (Figure 1). It is assumed that the level of output chosen is optimal for each level of asset specificity. There is only one profit function for spot sales, but a family of profit relations for contracts of different types depending on the bureaucratic cost parameter \bar{c} . The choice of mode of production depends on the profit relation with the highest peak. For example, with a relatively low bureaucratic cost, \bar{c}_1 , contracting would be chosen. By contrast, spot sales would be chosen when the bureaucratic cost parameter, \bar{c}_2 , is relatively high. Clearly, then, it is the relative transactions cost between spot sales and contracting that determines the mode of production. Thus, important variables to examine are variables that relate to

transactions cost.

The above model also has bearing on the impact of asset specificity on the contracting decision. By the envelope theorem:

$$\begin{aligned} \frac{\partial V^m}{\partial \theta} &= \frac{\partial C^m(X^m; k^m; \theta)}{\partial \theta}; \text{ and} \\ \frac{\partial V^i}{\partial \theta} &= \frac{\partial C^i(X^i; k^i; \theta)}{\partial \theta} \end{aligned}$$

The first order conditions from profit maximization from above suggests that $X^i > X^m$ and $k^i > k^m$. Given the assumption that production cost between i and m are equal, then $\frac{\partial V^i}{\partial \theta} > \frac{\partial V^m}{\partial \theta}$. Therefore, as asset specificity has a greater cost-reducing impact, contracting will be preferred to spot sales. Viewed from another direction, asset specificity can lead to “hold-up” problems and appropriation of rents. To avoid this rent appropriation, producers are more likely to contract as asset specificity increases. Thus, this model also suggests that examining asset specificity is also important.

2.2 Risk and Risk Shifting

Much emphasis has been placed on the role of risk in contracting and vertical integration (Allen and Lueck, 1995). Risk matters in economic organization from an expected utility framework as has been shown by Stiglitz. Attention has been paid to the risk shifting properties of contracts (Sheldon) and at least some researchers hypothesize that risk affects contracting decisions in agriculture (Hobbs; Kleibenstein and Lawrence).

Risk averse producers are assumed to be willing to forgo some level of income, called

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a risk premium, in order to have some assurances about minimum income. Thus, the expectation is that, holding risk aversion constant, increases in risk will lead to a greater use of contracting. Similarly, holding risk constant, increases in the level of risk aversion will lead to a greater use of contracting. Despite the theoretical arguments, little support for the effects of risk (specifically, yield risk) on contracting have been found in agriculture (Allen and Lueck; Leifer and Rucker). Nevertheless, the apparent importance of risk from a theoretical perspective implies the need to at least examine the role of risk.

Another factor related to risk is income diversification. An increasing percentage of farm household income is derived from off-farm sources. This diversification of household income may lead to decreased risk exposure and, therefore, lead to an increased willingness to take on additional risk in the farming enterprise. Similarly, crop diversification also has overall risk reducing properties, and is thus, another variable of interest in understanding contracting decisions.

3 Mississippi Producer Survey

To gain some perspective on the variables important to contracting from a cross-commodity perspective, a survey of agricultural producers in Mississippi was conducted. Mississippi was chosen because it has a diverse set of agricultural producers ranging from traditional row crops to livestock to fruits and vegetables. The questionnaire was designed to elicit basic information on several factors: farm size, crops grown, primary and secondary crop price expectations, level of autonomy in decision-making, involvement of lender in decision-making,

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perceptions about contracting, demographics, and contracting activity (type and provisions of contracts). The questionnaire was pretested on several producers and Extension personnel and revised according to their suggestions.

A random sample of 1,000 producers was drawn by the Mississippi Agricultural Statistics Service and stratified by major crops grown in the state: field crops, fruits, vegetables, nuts, cattle, and other livestock. The breakdown of the population and sample sizes are shown in Table 2. To insure an adequate sample size for vegetables, fruits, and nuts, these groups were oversampled. The livestock sample was somewhat complex. First, the sample did not target poultry producers because the characteristics of their contracts were already generally known. For the same reason, the sample did not target hog producers that were known to be contract growers. Several of the responding hog producers were producing under either resource providing or production management contracts, but most were selling their hogs on cash forward contracts or in spot markets.

The sample of cash producers was restricted to those with \$500,000 in annual sales or more, and cattle producers were restricted to those with 1,000 head or more. These restrictions were introduced to insure that responding producers were commercial producers and not "hobby" farmers. Inclusion of hobby farmers might introduce a significant heterogeneity of motivations for farming, thereby masking important results for those producers who produce the preponderance of the product.

The survey was conducted by mail during the Spring of 2001. A cover letter explaining the benefits of participation and assurances of information confidentiality was included

to increase response rates (Pennings, Irwin and Good). A Dillman three-wave survey technique was used to mitigate non-response bias: the first wave included a questionnaire and cover letter; the second wave consisted of a reminder card; the third wave another copy of the questionnaire and a second cover letter.

4 Results

4.1 Descriptive Statistics

Out of the original 1,000 surveys mailed, 56 were returned due to an incorrect address, leaving an effective sample of 944. An additional 67 were returned as out of business and 16 were returned as out of scope (prison farms, research farms, etc.), leaving a final viable sample of 861. A total of 361 responses were returned, giving a response rate of 38%. After accounting for incomplete responses, there were 265 usable responses or a usable response rate of 31%.

The descriptive statistics of the relevant variables for the full sample are shown in Table 3. The CVP variable is the coefficient of variation of price for the primary product produced. The coefficient of variation is a measure of price risk, which was derived from the respondents' expectations of price (Keefer and Bodily). Thus, the CVP is an expected price risk variable for the primary crop produced. On average, respondents expected prices to vary by 20.41%. HOURS represents the number of hours per week spent gathering and analyzing market information, which is a transactions cost. Respondents reported spending an average 1.17 hours per week on this task. The measure of diversification used in this survey was off-farm income (OFFINC). On average, respondents reported that 53.89% of

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their household income was derived from off-farm sources. Asset specificity (ASSETSP) measures the percentage of total farm assets that can be used in the production of only one product. Respondents reported that an average 41.06% of assets were of this type.

A primary variable of interest was the respondent involvement in contracting. A producer was considered to engage in contract production if that producer sold a crop on cash forward contracts or through a pool, or was engaged in production under a resource providing or production management contract. On average, 14% of the respondents reported being engaged in contract production under that definition (CONTRACT1). However, one could argue that inclusion of marketing pools in a definition of contracting is questionable because: (1) the marketing pool is just a simple extension of cash marketing that involves joint marketing and (2) the motivations for participation in a pool may be different than those for participating in other forms of contracting. The CONTRACT2 variable reflects the percentage of responding producers who participated in any other form of contracting except marketing pools. As can be seen, this percentage is much smaller at 7.9%.

Little can be deduced from Table 3 about the effects of these variables on contracting or the differences in these variables across commodities. The means of the relevant variables were computed for different groups of commodities and these results are presented in Table 4. The first group only includes cotton producers. This group was isolated because of its relative importance to Mississippi. The "Field Crops" group includes all corn, soybean, rice, wheat and sorghum respondents. The "FNVO" group includes all fruit, nut, vegetable and ornamental horticultural producers. The "Livestock" group includes all cattle, hogs,

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and catfish producers. Finally, the “Unclassified” represents the respondents who did not provide their primary product name, and the “Other” group includes all those respondents who reported “Other” as their primary product.

Price risk for traditional row crops is perceived to be generally lower than for the FNVO group.³ This likely stems from the fact that the markets for FNVO products are smaller and are subject to much larger potential changes in price over a growing season. It should be that these are perceived price risk measures, and are not derived from actual transactions price data. Purely from a risk perspective, then, we would expect to see higher levels of contracting in FNVO crops than in row crop agriculture. However, examination of the measures of contracting (CONTRACT1 and CONTRACT2) shows that contracting in row crops is much higher than contracting in FNVO or Livestock categories. Thus, while risk may be important, it certainly does not appear to be the most important factor. This result supports previous empirical findings by Allen and Lueck that suggest that risk is not an important factor in choosing to contract.

A second important factor is transactions cost, which is represented by HOURS. Here, it can be clearly seen that row crop producers spend more time gathering market information than either FNVO or Livestock producers. Higher transactions cost should lead to a greater use of contracting, which appears to be supported by the data. While the numerical values for the number of hours per week appear small, the data suggest that cotton

³ In what follows, the Unclassified and Other categories will not be discussed. The remaining discussion will be focused on drawing distinctions between the different crops grown by the producers. However, the regression analysis does contain the observations on these other groups because crop was not a variable in the model.

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producers, for example, spend over twice the time gathering market information as compared to livestock producers. Thus, while the absolute numbers appear to be inconsequential, the relative differences may help explain some of the differences observed in contracting.

There appear to be differences in the level of income diversification as well. Cotton producers have the lowest level of income diversification of the commodities analyzed. As such, one would expect this group to have the highest level of contracting. Again, this hypothesis appears to be supported by the data. In addition, the FNVO and Livestock groups have the highest levels of income diversification, and correspondingly have the lowest levels of contracting activity.

Finally, the level of asset specificity appears fairly constant across crops, with the exception of livestock. One would expect that higher levels of asset specificity would lead to more use of contracting. However, for livestock, the data do not support this hypothesis. It could be that other factors such as off-farm income are counteracting the effects of asset specificity. It is interesting to note, however, that only FNVO or Livestock producers responded as having participated in resource providing or production management contracts, which are closer to vertical integration than spot markets. Thus, perhaps asset specificity is important for these more complex forms of vertical integration. The regression model was used to control for these potential counter-vailing effects.

4.2 Regression Results

A logistic regression model was used to analyze the impacts of the variables above on the probability that a producer is engaged in contract production:

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$$\Pr(\text{CON} = 1) = f(\text{CVP}; \text{HOURS}; \text{PREF}; \text{EASE}; \text{ASSETSP}; \text{EDU}; \text{OFF INC}; \text{AGE});$$

where CON = 1 if the producer is engaged in contract agricultural production for their primary product; CON = 0 otherwise. In the first estimated model, contract production was assumed to be cash forward contracts, marketing pools, resource providing contracts, and production management contracts. The variables PREF and EASE are Likert scale questions.

² PREF – “I prefer to concentrate on farming/producing relative to marketing my products.”

² EASE – “Contracting is easier to do than sell my products in the open market.”

These variables were scaled as 1 being strongly agree to 5 being strongly disagree to these statements. EDU is the level of education of the respondent: EDU = 1 if respondent was a college graduate; EDU = 0 otherwise. Finally, AGE is the age of the respondent in years.

The results of the regression model are presented in Table 5. The results suggest that price risk is not an important factor in determining contract participation, which appears consistent with the results above. These results also lend further support to the hypothesis of Allen and Lueck that risk is not important in contracting. It is important to note that this does not mean that producers are risk neutral, it simply implies that other factors are more important than price risk in participation in contracting.

The coefficient on the HOURS variable is positive and statistically significant, sug-

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gesting that transactions cost are important in contract participation. The sign on this coefficient implies that as the amount of transactions cost increases, contracting increases. There may be some reason to believe that the number of hours used examining market information is simultaneously determined with whether or not to contract. However, one may also argue that examination of market information may reveal the complexities and difficulties in marketing, thus leading those producers to deduce that transactions cost are high and lead them to a greater use of contracting.

This hypothesized relationship may also be reflected through the attitudinal variable EASE. In this case, producers who strongly disagreed that contracting was easier to do than selling in spot markets were significantly less likely to participate in contracting. Conversely, those that agreed with the statement were significantly more likely to participate in contracting. This result suggests that perceptions about ease of contracting compared to spot marketing, which can be construed as a transactions cost (opportunity cost on the producer), significantly influences contracting decisions. There is no clear reason for the positive sign on the coefficient for the PREF variable. On one hand, one might expect that those respondents who prefer to concentrate on farming (strongly agree to the statement) might simply contract the crop to simplify marketing decisions. However, one might also argue that those who prefer marketing are more inclined to spend significant time and money searching out buyers and information, and would therefore be more likely to contract. Neither story is particularly compelling, but the results suggest that producers' preferences for farming versus marketing significantly influences contracting decisions.

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Asset specificity does not appear to be significantly influencing contracting decisions. However, with a p-value equal to 0.13, one may argue that it does play some role. The sign on the coefficient for ASSETSP is as expected. Increases in the level of asset specificity tend to increase the probability of contracting, but the level of statistical significance is weak. College graduates are significantly more likely to contract and older producers are less likely to contract.

A second logistic regression model was also estimated. In this model, the definition for contracting was conformed to include cash forward contracts, resource providing contracts, and production management contracts. Marketing pools were not considered contracting in this model because it may be argued that the motivations for participating in marketing pools is somewhat different than the motivation for participation in other contract types. The results of the second regression model are shown in Table 6.

As with the previous model, price risk does not significantly affect contracting decisions. Thus, even with a more restrictive definition of contracting, price risk does not appear to play a significant role. Also similar to the previous model, transactions cost as reflected by HOURS, as well as attitudinal variables significantly affect contracting decisions. Unlike the previous model, asset specificity appears to significantly influence contracting decisions. Thus, under a more restrictive definition of contracting, asset specificity appears to influence producer decisions. It should be noted that asset specificity was marginally statistically significant in the full model, so this result only strengthens the conclusion that asset specificity is important.

Restricting the definition of contracting appears to diminish the importance of education, but increase the importance of off-farm income. Education was weakly significant in the previous model, so the fact that education is not significant in the second model is not surprising and suggests that education is only a marginal indicator of contracting decisions. In contrast, restricting the definition of contracting appears to increase the importance of off-farm income. This may mean that diversification is not a factor that influences participation in marketing pools, but does play a role in other forms of contracting.

5 Conclusions

Overall, this analysis suggests that the predictions of transactions cost economics appear robust in a cross-commodity setting. That is, prior evidence from other studies have shown transactions cost variables to be important within a given commodity. The results in this study suggest that these variable are generally important across commodities as well, which provides strong evidence of the effects of transactions cost on contracting decisions.

A second important conclusion of this study is that price risk does not appear to be a significant factor in contracting decisions. This is consistent with the findings of Allen and Lueck. However, this does not mean that price risk does not affect individual decision-making (or equivalently, it does not mean that producers are risk neutral). Rather, it simply means that risk does not influence the decision of whether or not to contract.

Finally, while these results are important in establishing the role of transactions cost in contracting decisions, they are not particularly useful in answering policy questions

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related to contracting such as what are the costs and benefits of contracting and vertical integration. To accomplish this, we will need to establish the value that producers place on different attributes of contracts, such as the degree of risk shifted, the value of asset specificity, the value of autonomy in decision-making. This will be the subject of future research in this area.

6 References

Allen, D. and D. Lueck. "Risk Preferences and the Economics of Contracts." *American Economic Review*, 85(1985): 447-451.

Drabenstott, M. "Agricultural Industrialization: Implications for Economic Development and Public Policy." *Journal of Agricultural and Applied Economics*, 27(1995): 13-20.

Gillespie, J. and V. Eidman. "The Effect of Risk and Autonomy on Independent Hog Producers' Contracting Decisions." *Journal of Agricultural and Applied Economics*, 30(1998): 175-188.

Goodhue, R., G. Rausser, and L. Simon. "Understanding Production Contracts: Testing An Agency Theory Model." Paper presented to the 1998 American Agricultural Economics Association Annual Meeting, Salt Lake City, UT, August.

Hennessey, D. and J. Lawrence. "Contractual Relations, Control, and Quality in the Hog Sector." *Review of Agricultural Economics*, 21(1999): 52-67.

Hobbs, J. "Measuring the Importance of Transaction Costs in Cattle Marketing." *American Journal of Agricultural Economics*, 79(1997): 1083-1095.

Hueth, B., E. Ligon, S. Wolf, and S. Wu. "Incentive Instruments in Fruit and Vegetable Contracts: Input Control, Monitoring, Measuring and Price Risk." *Review of Agricultural Economics*, 21(1999): 374-389.

Johnson, C. and K. Foster. "Risk Preferences and Contracting in the U.S. Hog Industry." *Journal of Agricultural and Applied Economics*, 26(1994): 393-405.

Joskow, P. "Contract Duration and Relationship-Specific Investments: Empirical Evi-

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dence from Coal Markets." *American Economic Review*, 77(1987): 168-185.

Keefer, D. and S. Bodily. "Three-Point Approximations for Continuous Random Variables." *Management Science*, 29(1983): 595-609.

Kleibenstein, J. and J. Lawrence. "Contracting and Vertical Integration in the United States Pork Industry." *American Journal of Agricultural Economics*, 77(1995): 1213-1218.

Leifer, K. and R. Rucker. "Transactions Cost and the Efficient Organization of Production: A Study of Timber Harvesting Contracts." *Journal of Political Economy*, 99(1991): 1060-1087.

Levy, D. "The Transactions Cost Approach to Vertical Integration: An Empirical Examination." *Review of Economics and Statistics*, 67(1985): 438-445.

Martin, L. "Production Contracts, Risk Shifting, and Relative Performance Payments in the Pork Industry." *Journal of Agricultural and Applied Economics*, 29(1997): 267-278.

Sheldon, I. "Contracting, Imperfect Information and the Food System." *Review of Agricultural Economics*, 18(1996): 7-19.

Slater, G. and D. Spencer. "The Uncertain Foundations of Transactions Cost Economics." *Journal of Economic Issues*, 34(2000): 61-87.

Stiglitz, J. "Incentives and Risk Sharing in Sharecropping." *Review of Economic Studies*, 41(1974): 219-255.

Williamson, O. "Transactions Cost Economics: The Governance of Contractual Relations." *Journal of Law and Economics*, 22(1979): 233-261.

Williamson, O. "The New Institutional Economics: Taking Stock, Looking Ahead." *Jour-*

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Journal of Economic Literature, 38(2000): 595-613.

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Table 1. Use of Contracting by Agricultural Producers

Commodity	% Value Under Contract	
	1993	1998
Corn	12.3	13.1
Soybeans	12.4	12.2
Wheat	6.8	N/A
Cotton	32.7	50.6
Vegetables ^a	47.4	45.5
Fruits		56.7
Cattle ^a	18.4	25.3
Hogs		42.9
Poultry	89.4	94.9

^aVegetables and Fruits were reported together in 1993; Cattle and Hogs were reported together in 1993.

Source: USDA and Perry and Banker.

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Table 2. Population and Sample Sizes, Contracting Survey, Mississippi, 2001.

Strata	Population Size	Sample Size
Vegetables	89	60
Fruits	288	120
Nuts	403	120
Hogs and Cat...sh	1,566	200
Cattle	17,537	200
Cropland	5,168	300
Total	25,051	1,000

Source: Mississippi Agricultural Statistics Service

Table 3. Descriptive Statistics of Relevant Variables, Contracting Survey, Mississippi, 2001.

Variable	Mean	Standard Deviation
CVP	20.41	9.08
Hours	1.17	1.06
OFFINC	53.89	36.36
ASSETSP	41.06	25.74
Contract1	0.14	0.35
Contract2	0.08	0.27

CVP is the coefficient of variation in expected price for the primary product, Hours is the number of hours spent collecting and analyzing market information, OFFINC is the percentage of total household income that is derived from off-farm sources, ASSETSP is the percentage of total assets that can be used in the production of only one output, Contract1 is the proportion of respondents that utilized either forward contracts, marketing pools, resource providing or production management contracts, and Contract2 is the proportion of respondents that utilized either forward resource providing, or production management contracts.

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Table 4. Means of Relevant Variable by Product Categories, Contracting Survey, Mississippi, 2001.

Variable	Unclassi...ed	Cotton	Field Crops	FNVO	Livestock	Other
CVP	20.92	14.98	18.51	27.22	20.39	19.31
HOURS	0.85	2.55	1.25	1.03	1.05	0.82
OFFINC	60.17	42.82	49.11	59.69	52.14	61.27
ASSETSP	37.65	38.96	38.62	36.42	43.18	49.54
CONTRACT1	0.07	0.56	0.21	0.09	0.07	0.12
CONTRACT2	0.00	0.26	0.18	0.03	0.06	0.04
No. Obs.	43	27	33	32	105	25

CVP is the coefficient of variation in expected price for the primary product, Hours is the number of hours spent collecting and analyzing market information, OFFINC is the percentage of total household income that is derived from off-farm sources, ASSETSP is the percentage of total assets that can be used in the production of only one output, Contract1 is the proportion of respondents that utilized either forward contracts, marketing pools, resource providing or production management contracts, and Contract2 is the proportion of respondents that utilized either forward resource providing, or production management contracts.

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Table 5. Regression Results, Full Sample, Mississippi, 2001.

Variable	Estimate	Standard Error	\hat{A}^2 value
Intercept	-0.477	1.3105	0.1329
CVP	-0.017	0.0259	0.4106
HOURS	0.633	0.1585	15.9410 ^a
PREF	0.585	0.2086	7.8505 ^a
EASE	-0.494	0.2098	5.5518 ^{aa}
ASSETSP	0.012	0.0079	2.3057
EDU	0.777	0.4306	3.2538 ^{aaa}
OFFINC	-0.006	0.0058	1.1584
AGE	-0.043	0.0163	6.8594 ^a
Log-likelihood \hat{A}^2	58.576		
No. Obs.	264		

^aStatistically significant at 0.01 level.

^{aa}Statistically significant at the 0.05 level.

^{aaa}Statistically significant at the 0.10 level.

Cross-Commodity Perspective on Contracting: Evidence from Mississippi

Table 6. Regression Results, Restricted Sample, Mississippi 2001.

Variable	Estimate	Standard Error	\hat{A}^2 value
Intercept	-1.854	1.6656	1.2385
CVP	-0.030	0.0365	0.6867
HOURS	0.467	0.1904	6.0096 ^{***}
PREF	0.707	0.2513	7.9176 ^{**}
EASE	-0.681	0.2513	6.9115 ^{**}
ASSETSP	0.021	0.0099	4.6386 ^{***}
EDU	0.620	0.5452	1.2927
OFFINC	-0.016	0.0077	4.4550 ^{***}
Age	-0.017	0.0208	0.6681
Log-likelihood \hat{A}^2	39.624		
No. Obs.	264		

^{*} Statistically significant at the 0.01 level.

^{**} Statistically significant at the 0.05 level.

^{***} Statistically significant at the 0.10 level.

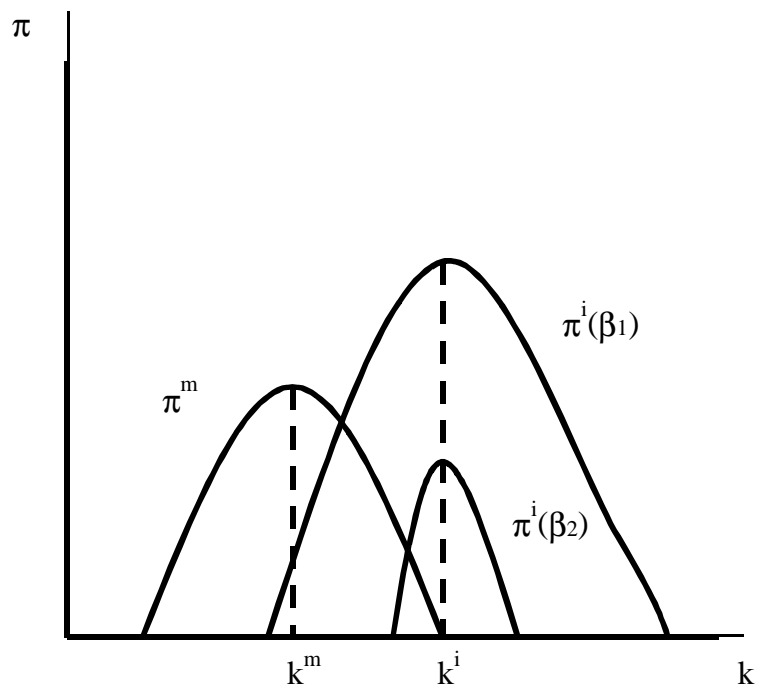


Figure 1: The Impacts of Governance Costs on the Choice of Contracting.