Who *Really* Benefits from Agricultural Subsidies? Evidence from Field-Level Data

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ABSTRACT

The idea that agricultural subsidies are fully capitalized into farmland values forms the foundation of the argument that subsidies are entitlements and removing them would drastically reduce farmland asset values. Surprisingly little evidence substantiates this claim. Using field-level data and explicitly controlling for potentially confounding variables we find that landlords only capture between 14 – 24 cents of the marginal subsidy dollar. The duration of the rental arrangement has a substantial effect on the incidence. Initially, landlords extract 44 cents of the marginal subsidy dollar, but the incidence falls by 1.5 cents with each additional year of the rental arrangement. This duration effect reveals that rental market frictions play an important role in the farmland rental market.

Introduction

In the twenty-first century, subsidized American farmers have gleaned, on average, $8,824 annually in subsidy payments, making agricultural subsidies one of the largest per-capita transfer programs in the U.S. Although originally motivated by equity concerns, farm subsidies today are generally considered entitlements.[1] According to conventional wisdom, since subsidies are fully capitalized into farmland values, the first generation of subsidy recipients reaped a windfall gain in the form of higher asset values, while all subsequent generations have purchased the "right" to agricultural subsidies by purchasing subsidy-inflated farmland.[2] Recent evidence from farm-level data, however, indicates that only 23 to 64 cents of the marginal subsidy dollar gets capitalized into farmland values (Goodwin et al 2005; Kirwan 2009). These estimates weaken, and at the low end of this range effectively eliminate, a primary rationale supporting transfer payments to American farmers.

[1] Agricultural subsidies began in 1933, when average farm income was 32% of average non-farm income (Gardner, 1992), and aimed to give "agriculture a fair share in the national income" (Nourse et al 1937). By 1970 farm and non-farm income had essentially converged.

[2] Orden, Paarlberg, and Roe (1997) provide a historical perspective on the evolving justification for farm subsidies, emphasizing the 'entitlement' argument.

The fundamental unit in the theory of agricultural subsidy incidence is the plot of land being transacted, i.e., the field. This paper augments recent farm-level analysis focused on subsidy capitalization by using nationally representative *field-level* data to test the theory at the ultimate level of analysis. These unique field-level data pair a field's subsidy rate with its rental rate. Farm-level analysis, in contrast, pair the farm-average rental rate to the farm-average per-acre subsidy. Although previous analysis (Roberts et al 2005, Kirwan 2009) used farm-level longitudinal data to control for farm-level unobserved heterogeneity, the incidence question fundamentally calls for field-level data to relate changes in the subsidy per acre to changes in the per-acre rental rate. The farm-level incidence estimate may be biased downward if farmers own most of their subsidized acres and rent unsubsidized acres. In the extreme case where no subsidized acres are rented, but the farmer owns subsidized acres, a farm-level analysis would estimate no relationship between subsidy changes and rental rate changes, even if the implicit rental rate of subsidized acres rises one-for-one with the marginal subsidy dollar.

This paper overcomes the farm-level aggregation issue by bringing field-level data to bear on the question. Using a nationally representative sample of soybean and rice fields, we find, similar to Kirwan (2009), that landlords extract less than one-quarter of the marginal subsidy dollar through higher rental rates. These findings provide further evidence that subsidies are not fully capitalized into the land values and, consequently, are not entitlements. The findings also restore confidence in the usefulness of farm-level data to address important policy questions.

This paper also attempts to explain why theory and evidence diverge substantially by examining the institutions surrounding the farmland rental market. We find evidence

that landlords are typically retired and often depend heavily on the income stream provided by the farmland, as if it were an annuity. Evidence of thin rental markets, i.e., few tenants, combines with landlords' inelastic demand for tenants to provide the marginal tenant with substantial bargaining power.

The paper is structured as follows. First, we search the historical literature for clues to answer the incidence question, and we highlight the importance and novelty of this approach by contrasting it with the previous research. We explain the advantages of farm-level data in the context of past research. Next we examine the available evidence on the institutional structure of the farmland rental market. We then develop our empirical model and perform the analysis, and finally we interpret the results in light of the institutions surrounding the farmland rental market.

The Incidence Question

A common weakness of the literature is the inability to identify the effect of subsidies. This identification problem arises from estimating a fundamentally unidentified system. Consider the standard workhorse model of farmland value determination: the present value model (e.g., Melichar, 1979; Robison et al., 1985). Many unknowns characterize the present value model. The unknowns of greatest concern are the expected subsidy stream, the discount rate, and the proportion of the subsidy that becomes capitalized into the land value, i.e., the incidence. The present value model, however, is a single equation. As a system, the present value model of land price determination is underidentified. No parameter of this system can be identified without further information or restriction on the other unknown parameters. Typically, investigators assume (often implicitly) that the entire subsidy dollar gets capitalized into the land value, thereby

restricting the incidence parameter to equal one.

Ultimately, investigators have left unanswered the most policy-relevant question: what proportion of the marginal subsidy dollar is capitalized into land values? The answer to the question confirms or repudiates the conventional wisdom that the landowner primarily benefits from agricultural subsidies; it clarifies who benefits from agricultural subsidies and how much they benefit; and it supports or discredits the contention that subsidies are entitlements. The incidence question lays the groundwork for welfare analysis of agricultural subsidies and illustrates the distribution of subsidies. Knowing the incidence of the marginal subsidy dollar enlightens our understanding of the political process by illuminating the value transferred to key benefitting constituencies.

To study the incidence question, one must appropriately deal with expected subsidies and the discount rate. Roberts et al. (2003) and Kirwan (2009) demonstrate how to do this by focusing on the farmland *rental* market. Because rental rates are per-period prices reflecting the productive value of agricultural land, this approach avoids making assumptions about expectations or the discount rate over future periods. By focusing on farmland rental rates, these investigators can cleanly estimate the incidence without relying on strong assumptions about other key parameters.

The Farmland Rental Market

In the U.S., farmers rent 360 million acres of farmland, an area equal to 38 percent of all farmland and comparable to all the farmland in the 13 Corn Belt states.[3] Table 1 reports statistics on the farmland rental market from the 1992, 1997, and 2002 Censuses of

[3]According to the 2002 Census of Agriculture, there are 361.7 million acres of farmland in Iowa, Indiana, Illinois, Ohio, South Dakota, Nebraska, Kansas, Minnesota, Wisconsin, Michigan, Missouri, Kentucky, and North Dakota.

Agriculture. In 2002, farmers paid $8.7 billion in cash rent, a 47% increase from 1992. This expense accounted for 11.3 percent of total production expenditures by renters. At the same time the number of tenants dropped 25 percent while their farm sizes increased 11 percent. The importance of the farmland rental market cannot be overstated.

The farmland rental market is also an important market for subsidized land. The 1999 Agricultural Economics and Land Ownership Survey (AELOS) reveals that farmers rent a majority of cropland acres, which are the only type of land that is subsidized. Data from the 1996 Agricultural Resource Management Survey (ARMS) demonstrate that 45 percent of subsidized acres are rented.

According to the conventional wisdom, landowners are the primary beneficiaries of agricultural subsidies. In the U.S., non-farmer landlords own 87 percent of rented farmland.[4] Since the vast majority of rented, subsidized land is likely owned by non-farmers, the conventional wisdom implies a significant share of agricultural subsidies leaves the agricultural sector and accrues to non-farmer landlords.

A New Approach

This paper overcomes the shortcoming of previous work by using novel, acreage-level data to estimate the incidence of agricultural subsidies on farmland rental rates. In 2006, the USDA's Agricultural and Resource Management Survey (ARMS) phase II survey of soybean and rice fields elicited information on rent paid and subsidy payments received on all cash-rented parcels of land. The survey also obtained information on expected yields and historical rotations, which serve as powerful controls for land quality. The data are

[4] The 1999 AELOS data reveal that non-farmer landlords also own 55 million farmland acres that are not rented out and, presumably, are left unfarmed.

unique in that they link subsidies to the specific cash-rented parcels to which the subsidies are tied. Table 2 contains summary statistics from these data.

Table 2 illustrates some differences between soybean fields and rice fields. Notably, the average rice-field rental rate is 30 percent higher than that of the average soybean field. This reflects both the higher yield, 41.6 bushels/acre of soybeans versus 72.7 bushels/acre of rice, and an historically higher price. Rice acres receive substantially higher subsidies, too. At nearly \$60/acre, the average rice subsidy is 3½ times greater than the \$17/acre average soybean subsidy. Further contrasts are that the rice field is almost twice as likely to be harvested for seed, and the crop rotation for rice fields is evenly spread between a rice-soybean rotation, continuous rice, and a rice-fallow rotation. In contrast most soybean fields are in a corn-soybean rotation. Overall, the summary statistics suggest that rice and soybean fields are sufficiently distinct to warrant separate analysis.

Empirical Strategy

The model we use to estimate the incidence of agricultural subsidies on farmland rental rates is

(1) $$r_i = \alpha g_i + X_i\beta + f_j + \varepsilon_i$$

where r_i is the rental rate for field i. The per-acre Direct Payment subsidy is g_i,. X_i is a vector of observable covariates, including field-level costs and returns. Regional differences in production practices are accounted for by f_j, a fixed effect for region j.

In the U.S., agricultural subsidies and farmland rental rates are mechanically connected. Agricultural subsidies are a function of *program yield*, a parameter that reflects the underlying productivity of the subsidized field. Since more productive fields command a higher rental rate, the simple correlation between subsidies and rental rates not only

reflects the causal effect of subsidies, but it also incorporates a spurious, positive mechanical relationship, resulting in upwardly biased incidence estimates.

Typically, a field's underlying productivity is unobserved, and the econometrician has to resort to other methods to account for the spurious upward bias, e.g., fixed effects. The 2006 ARMS, however, explicitly asked farmers for their *expected* yield on the field. Presumably the farmer knows the field's underlying productivity and bases his answer on this, thus providing an explicit measure of each field's underlying productivity. Armed with this information, we account for the spurious mechanical relationship by explicitly controlling for each field's underlying productivity. We thereby isolate the causal effect of subsidies on farmland rental rates.

Results—Rental Rates Incidence

In light of the differences between rice and soybean fields illustrated in table 2, we initially perform the analysis separately for each crop. Results from this analysis are reported in tables 3 and 4. Table 3 contains the results using the sample of soybean fields to estimate equation 1. The first column reports the results of a simple bivariate regression of rental rates on subsidies. At the field level, before controlling for any field characteristics we estimate an incidence of 0.45; in other words, rental rates increase by 45 cents with the marginal subsidy dollar. Even the simple correlation rejects the conventional wisdom that the landlord extracts a substantial portion of the marginal subsidy dollar. Controlling for observable characteristics of the soybean fields lowers the incidence estimate to 0.25. Accounting for region-specific unobserved heterogeneity with region fixed effects lowers the estimate to 0.24. Interestingly, this estimate is nearly identical to that found by Kirwan (2009) using farm-level data.

Table 4 contains the results for the sample of rice fields. Here the story is very much the same. The bivariate relationship in column one is very different than the conventional wisdom, which posits the coefficient should equal 1. Here, the coefficient is 0.16, but it is statistically indistinguishable from zero. Adding covariates to control for field level observable characteristics provides a statistically significant estimate of 0.19. Including region fixed effects results in a still-significant 0.14. This estimate is substantially smaller than the soybean-subsidy incidence, suggesting that differences in the farmland-rental market structure could help explain the lower-than-expected incidence estimates.

Although the soybean and rice farmland rental markets appear to be somewhat different, both reveal that landlords capture a surprisingly low portion of the marginal subsidy dollar. Table 5 combines the two crops into a single analysis. The bivariate relationship reveals a 0.27 estimate; the estimate falls to 0.14 after controlling for observable field characteristics, and ultimately the combined analysis yields an incidence estimate of 0.08. In any case, the conventional wisdom that landlords extract a substantial share of the marginal subsidy dollar appears to be wrong.

Results—Net Returns

The analysis above establishes that 75 – 85 cents of the marginal subsidy dollar are not extracted by the landlord and are available for the tenant. Whether the remaining subsidy accrues to the tenant or another factor of production owner, however, is an empirical question. Following the identification strategy outlined above, we examine the effect of the marginal subsidy dollar on tenants' net returns, controlling for field quality and farming practices. Column 4 of table 4 reports the results for soybean fields. Sixty-three of the remaining 76 cents are retained by the tenant farmer. Contrary to

conventional wisdom and standard economic theory, the vast majority of the marginal subsidy dollar stays with the tenant farmer.

Discussion

One of the fundamental assumptions behind the standard model of economic incidence is perfect competition. Yet the farmland rental market might not be perfectly competitive. Kirwan (2009) found evidence that tenants have some market power. Market power may arise as farms grow larger and distance between parcels embodies transactions costs that could limit local competition. Additionally, Young and Burke (2001) hypothesize that social norms may play a role in share-rent contracts, and they find evidence supporting this hypothesis. Examining the available data on the farmland rental market and the tenant-landlord relationship could inform us of the degree of market competition and the reasonableness of Young and Burke's social norms hypothesis.

Farmland Rental Market Frictions

The empirical results demonstrate the failure of the standard economic model to explain the farmland rental market. As with many other markets, the perfect-information, frictionless-markets assumptions appear untenable. Explaining the incidence results requires a closer look at the how the farmland rental market functions. One exceptional characteristic of the farmland rental market is the longevity of tenant-landlord relationships. Allen and Lueck (2002) report an 11.5-year average tenant-landlord relationship duration in Nebraska and South Dakota. In Illinois, Sotomayer, Ellinger, and Barry (2000) report the mean tenant-landlord relationship duration to be 14.4 years. According to the 2006 ARMS data, the average rental duration among soybean producers is 13 years, and the median duration is 10 years.

Long-lived contracts may be indicative of several rental-market frictions. For instance, heterogeneous land and farmer quality might result in a matching problem. Once tenants and landlords find a suitable match, the likelihood of separation will be low and decreasing with longer matches. Alternatively, transactions costs could explain long-lived contracts, but the separation likelihood would increase with contract length as fixed transactions costs are spread over a longer period.

We explore the role of rental arrangement duration in the incidence findings introducing the duration of the landlord-tenant relationship into the model and interacting it with the subsidy measure. Table 6 contains the results of this analysis. Column 1 repeats the results from column 3 of table 3. The rental duration has a substantial direct effect—reducing the rental rate by 32 cents for every year of rental arrangement. Adding only the rental duration, however, has no effect on the incidence estimate. Interestingly, interacting the rental duration with the subsidy results in a substantial change to the direct incidence estimate, which nearly doubles to 0.44. The direct effect of the rental duration becomes insignificant, while the interaction term is marginally significant with a p-value of 0.105. According to these estimates, the rental rate incidence falls by about 1.5 cents for every year of rental duration. At the median duration (10 years) the rental rate is 15 cents (roughly 33 percent) lower than in the first year of a the rental arrangement.

The Tenant-Landlord Relationship

The tenant-landlord relationship is an important, yet relatively unstudied aspect of the farmland rental market. Allen and Lueck (2002) report simple contractual arrangements, often "sealed with a handshake." Typically, rental contracts are renegotiated annually (Allen and Lueck, 2002), but, as noted above, tenant-landlord

relationships appear to be quite long-lived. Little more, however, is known of the representative tenant-landlord relationship. Nationally representative data do not exist to answer fundamental questions such as the following: "How do tenants and landlords match?"; "Why are tenant-landlord relationships so long-lived?"; and "Do rental rates adjust annually, or only when there is a new tenant-landlord match?"

Understanding tenant and landlord characteristics can facilitate a better understanding of tenant-landlord relationships. As reported in Kirwan (2009), the average tenant appears to farm about 30 percent more land than the typical subsidized-crop producer. Tenants are more profitable on average, earning 6 percent more per acre than the average farm, and they are 8 percentage points more likely to receive subsidies.

Generally, farmland rental contracts are between a farmer and a non-farmer landlord; the 1999 AELOS, which surveys every landlord associated with a random sample of farm operators, gives a glimpse at the characteristics of non-farmer landlords. As reported in table 2, the median non-farmer landlord is retired (52 percent are), and nearly half (42 percent) of the retired landlords are retired farmers. The median age among retired landlords is 74. Figure 1 illustrates the importance of rental income as a share of total income by landlord type. As illustrated in figure 1 and reported in table 2, rental income comprises more than half of total income for 11 percent of non-farmer landlords. Retired farmer landlords are particularly dependent on rental income; 29 percent of them derive over half of their income from renting out farmland.

Another important characteristic of non-farmer landlords is their proximity to the rented land. A majority (51 percent) of non-farmer landlords live within 5 miles of the land they rent out. Nearly 70 percent live within 25 miles, and only 13 percent live more than

150 miles away. Although landlords generally live near their farmland, not all landlords are rural residents. Forty-eight percent of all landlords live in a non-rural setting. Thirty-eight percent of all landlords live on a farm.

These data provide some insight into the workings of the farmland rental market and the landlord-tenant relationship. They indicate that landlords are close enough to their land and, since they are retired, have enough time to monitor the tenants' use of the land. Landlords also might be subject to social norms as Young and Burke (2001) suggest. Since most landlords are local, they likely interact with their tenants in other settings. Because rental income can be a large share of landlord income, it is important for landlords to find a tenant rather than leave their land idle. These characteristics suggest that tenants will have some bargaining power. That power derives from the landlord's social and search costs associated with breaking a relationship with a current tenant and establishing a relationship with a new one. While such costs are likely bi-lateral, it is not difficult to imagine how these departures from perfect competition could allow tenants to extract a share of subsidy benefits.

Conclusion

Economists have long suggested that agricultural subsidies become fully capitalized into farmland values, and that subsidies only benefit farmers inasmuch as they are landowners. This rationale has lead to the argument that current landowners bought the "right" to the stream of subsidy payments when they paid for their land at subsidy-inflated prices. In other words, by this line of thought, subsidies are entitlements. This paper refutes that notion by demonstrating that the landowner captures only 14 – 24 cents of the

marginal subsidy dollar. Since subsidies have such a minor effect on farmland prices, the entitlement argument for continued agricultural subsidies falls.

This paper improves on previous analysis by using data at the appropriate level of aggregation and explicitly controlling for each field's fundamental productivity, thereby overcoming omitted variable bias. Subsidies are a positive function of the subsidized land's underlying productivity, hence, failure to account for the land's fundamental productivity results in an upward biased incidence estimate. We explicitly control for the farmland's underlying productivity by using farmers' self-reported expected productivity of the field. Using field-level data, which is commensurate with the unit of analysis in standard incidence theory, we find that farmland rental rates for subsidized soybean fields increase by 24 cents with the marginal subsidy dollar, and subsidized rice field rental rates increase by only 14 cents.

To explain the low incidence estimate we look to the limited data on the farmland rental market. Available evidence on tenant-landlord relationships indicates that landlords have a relatively inelastic demand for tenants. Coupled with the increasing size of tenant farms, tenants appear to have substantial bargaining power, enabling them to extract most of the subsidy rents.

In spite of the volume of research on the relationship between farmland values and agricultural subsidies, investigators, hampered by conventional wisdom and poor data, have not adequately addressed one of the most fundamental questions of agricultural policy analysis: "how much of the marginal subsidy dollar accrues to the landowner?" This paper answers the question using unique data that overcome several endogeneity

concerns. We also highlight the need for more data on the farmland rental market to adequately explain the severe departure from economic theory.

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Figure 1 - Rental Income's Share of Total Landlord Income

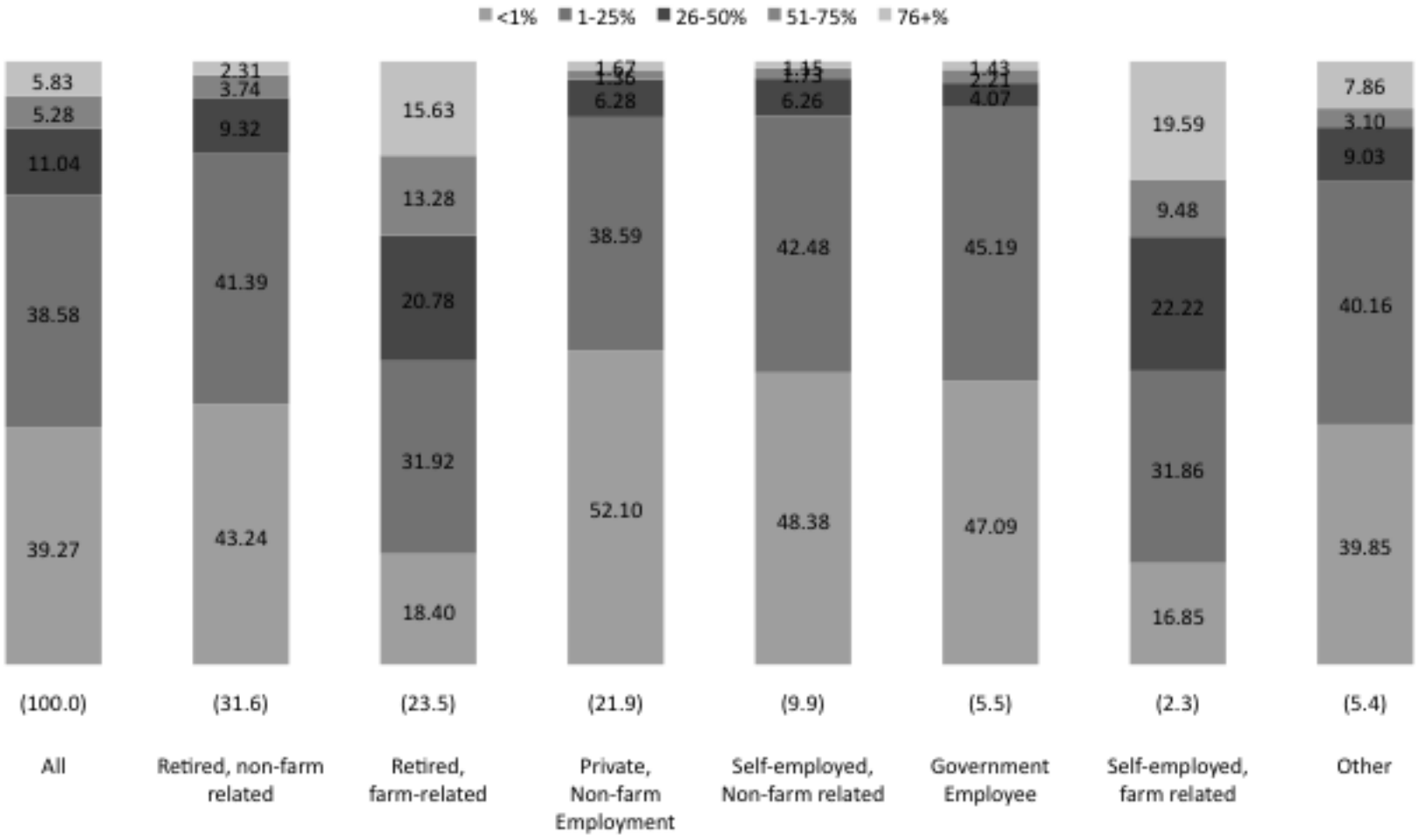

Table 1 - Farmland Rental Market Descriptive Statistics

		1992	1997	2002
Number of Renters	Total	813,814	763,493	648,147
Number of Farms	Total	1,919,432	1,905,803	1,856,138
Farmsize (acres)	Mean	491	482	491
	Median	128	120	108
Farmsize of Renters (acres)	Mean	795	794	886
	Median	290	280	300
Acres Rented by Renter	Mean	502	493	540
	Median	160	150	150
Proportion of Farm Rented	Mean	65.31%	64.94%	62.65%
	Median	70.41%	69.81%	66.25%
Cash Rent Expenditures	Total (millions)	5.94	6.9	8.71
	Proportion of Total Cash Expenditures	8.89%	9.32%	11.28%
Number of Rented Acres	Total (million)	409	377	350
Proportion of Farmland Rented		43.4%	41.0%	38.4%

Notes: Data are from the Censuses of Agriculture. Weights used in 2002 constructed to be comparable with 1992 and 1997 weights.

Table 2 - Summary Statistics
2006 Agricultural Resource Management Survey, Phase 2

	Soybean Fields		Rice Fields
Rental Rate	81.39		105.45
	(40.04)		(58.40)
Subsidy/Acre	17.20		59.69
	(15.08)		(64.52)
Expected Yield	43.76		--
	(13.05)		--
Actual Yield	41.58		72.73
	(14.86)		(11.53)
Proportion Irrigated	0.078		--
	(0.263)		--
Proportion of Acres Enrolled in a Conservation Program	0.083		0.119
	(0.277)		(0.325)
Proportion of Field Harvested for:			
Beans	0.979	Grain, First Crop	0.967
	(0.141)		(0.171)
Hay	0.002	Grain, Ratoon Crop	0.090
	(0.039)		(0.284)
Seed	0.014	Seed	0.023
	(0.116)		(0.148)
Crop Rotation:			
Corn-Soybeans	0.662	Rice-Soybean	0.313
	(0.474)		(0.465)
Soybeans-Soybeans	0.186	Rice-Rice	0.363
	(0.389)		(0.482)
Idle-Soybeans	0.037	Idle-Rice	0.281
	(0.188)		(0.451)
Other-Soybeans	0.116	Other-Rice	0.044
	(0.320)		(0.205)
Obs	660		160

Notes: Summary statistics reported are mean and, in parenthesis, standard deviation of variables from cash rented fields in Phase 2 of the 2006 Agricultural and Resource Management Survey. Soybean yield is bushels/acre; rice yield is hundredweight (cwt).

Table 3 - Field-Level Agricultural Subsidy Incidence
Soybeans 2006

Dependent Variable:	Rental Rate						Net Returns	
	Bivariate		Controls		Region FE		Region FE	
	(1)		(2)		(3)		(4)	
Government Payments	0.476	†††	0.250	†††	0.240	†††	0.627	***
	(0.116)		(0.091)		(0.088)		(0.192)	
Gross Value			0.147	***	0.121	***	--	
			(0.018)		(0.018)			
Costs			-0.035		-0.018		--	
			(0.024)		(0.024)			
Expected Yield			1.359	***	1.233	***	-1.733	***
			(0.191)		(0.184)		(0.434)	
Actual Yield			0.076		0.069		3.641	***
			(0.163)		(0.156)		(0.295)	
Corn-Soy Rotation			14.034	***	11.683	***	2.146	
			(4.12)		(3.70)		(9.76)	
Proportion Irrigated			7.77		14.66	*	-117.16	***
			(7.66)		(7.57)		(12.75)	

Notes: The data are from the 2006 Agricultural Resource Management Survey, Phase 2 and consist of cash-rented soybean fields on 580 distinct farms. The fixed effects specification controls for four region effects: <<names of regions>>. Regressions also control for proportion of field planted to soybeans and seed, continuous soybean rotation and a fallow-soybean rotation, as well as measure of the environmental sesitivity of the land, i.e., whether classified as highly erodible or as a wetland. Heteroskedasticity-robust standard errors are in parenthesis. ††† indicates significant difference from one at the 99th percentile. † indicates significant difference from one at the 90th percentile. * indicates significance at the 90th percentile. *** indicates significance at the 99th percentile.

Table 4 - Field-Level Agricultural Subsidy Incidence
Rice 2006

	Dependent Variable: Rental Rate					
	Bivariate		Controls		Region FE	
	(1)		(2)		(3)	
Government Payments	0.163	††	0.185	††	0.140	††
	(0.101)		(0.086)		(0.058)	
Actual Yield			1.12	**	0.49	**
			(0.38)		(0.21)	
Proportion of Field			81.39	**	-(5.23)	
Harvested for Seed			(22.88)		(15.30)	
Rice-Rice Rotation			53.52	**	37.88	
			(23.35)		(23.50)	

Notes: The data are from the 2006 Agricultural Resource Management Survey, Phase 2 and consist of cash-rented rice fields on 160 distinct farms. The fixed effects specification controls for region effects. Regressions also control for proportion of field harvested as first-crop rice, rantoon, or seed, rice-soybean rotation and a fallow-rice rotation, as well as measure of the environmental sesitivity of the land, i.e., whether classified as highly erodible or as a wetland. Heteroskedasticity-robust standard errors are in parenthesis. †† indicates significant difference from one at the 99th percentile. * indicates significance at the 90th percentile. ** indicates significance at the 95th percentile.

Table 5 - Field-Level Agricultural Subsidy Incidence
Rice and Soybeans 2006

	Dependent Variable: Rental Rate		
	Bivariate	Controls	Region FE
	(1)	(2)	(3)
Government Payments	0.266 ††	0.138 ††	0.079 †
	(0.062)	(0.056)	(0.042)
Actual Yield		0.534 **	0.280 **
		(0.093)	(0.081)
Proportion of Field		42.642 **	24.750 **
Harvested for Seed		(10.971)	(7.937)
Corn-Soy Rotation		33.623 **	27.250 **
		(4.232)	(4.003)
Rice-Rice Rotation		-2.511	-8.970
		(15.740)	(15.675)

Notes: The data are from the 2006 Agricultural Resource Management Survey, Phase 2 and consist of cash-rented soybean fields on 760 distinct farms. The fixed effects specification controls for four region effects: <<names of regions>>. Regressions also control for proportion of field planted to seed, continuous soybean rotation, a fallow-soybean rotation, a rice-soybean rotation, and a fallow-rice rotation, as well as measure of the environmental sesitivity of the land, i.e., whether classified as highly erodible or as a wetland. Heteroskedasticity-robust standard errors are in parenthesis. †† indicates significant difference from one at the 99th percentile. * indicates significance at the 95th percentile. **

Table 6 - Subsidies Interacted with Rental Duration
Soybeans 2006

Dependent Variable:	Rental Rate					
	(1)		(2)		(3)	
Government Payments	0.240	†††	0.243	†††	0.431	†††
	(0.088)		(0.087)		(0.150)	
Rental Duration			-0.320	***	-0.169	
			(0.114)		(0.141)	
Gov't Payments*Rental Duration					-0.015	
					(0.009)	

Notes: Full model with covariates and regional fixed effects.

Table 7 - Characteristics of Non-farmer Landlords by Occupation

	All	Retired, non-farm related	Retired, farm-related	Private, Non-farm Employment	Self-employed, Non-farm related	Government Employee	Self-employed, farm related	Other
Proportion of All Non-farmer Landlords	100.00	31.61	23.53	21.92	9.86	5.46	2.27	5.35
Median Age	67	73	77	52	56	53	57	63
Median Household Income	58,200	60,000	39,469	75,000	102,808	70,000	40,496	60,000
Median Total Rent Receipts	3,300	2,681	6,858	1,943	3,231	2,253	6,430	2,933
	Proportion of Landlords in Each Category							
Share of Household Income from Rent								
<1%	39.27	43.24	18.40	52.10	48.38	47.09	16.85	39.85
1-25%	38.58	41.39	31.92	38.59	42.48	45.19	31.86	40.16
26-50%	11.04	9.32	20.78	6.28	6.26	4.07	22.22	9.03
51-75%	5.28	3.74	13.28	1.36	1.73	2.21	9.48	3.10
76+%	5.83	2.31	15.63	1.67	1.15	1.43	19.59	7.86
Type of Residence								
On-farm	30.09	24.50	41.04	29.55	21.52	27.36	43.63	30.03
Rural Off-farm	25.46	24.10	21.84	29.99	27.80	28.40	27.09	22.92
Non-rural/Urban	44.45	51.40	37.12	40.47	50.68	44.23	29.28	47.05
Proximity of Residence to Rented Land								
0-5 miles	53.13	47.64	62.12	56.90	44.11	48.71	59.61	49.04
6-25 miles	19.66	20.24	23.47	15.28	21.39	14.47	24.77	17.45
26-50 miles	5.90	5.69	4.70	6.01	8.27	7.90	4.62	6.10
51-150 miles	7.29	8.28	3.60	8.31	8.21	12.08	5.35	7.64
151+ miles	14.02	18.15	6.10	13.51	18.02	16.84	5.65	19.77

Notes: Data from the 1999 Agricultural Economics and Land Ownership Survey. Median household income is imputed using total rent received and a question categorizing the share of rent in total household income in five categories: 0-1%, 1-25%, 25-50%, 50-75%, and 75-100%. Imputed income is based on category midpoints.