An Empirical Investigation of the Linkages between Government Payments and Leasing Arrangements

Feng Qiu

Barry K. Goodwin

Jean-Philippe Gervais

Department of Agricultural and Resource Economics
North Carolina State University

fqiu@ncsu.edu

barry_goodwin@ncsu.edu

jp_gervais@ncsu.edu

Poster prepared for presentation at the Agricultural & Applied Economics Association 2010 AAEA, CAES, & WAEA Joint Annual Meeting, Denver, Colorado, July 25-27, 2010

An Empirical Investigation of Linkages between Government Payments and Farmland Leasing Arrangements

Feng Qiu, Barry K. Goodwin, and Jean-Philippe Gervais

Department of Agricultural and Resource Economics, North Carolina State University

ABSTRACT

This study investigates the impacts of decoupled and coupled support payments on farmland rental contract choices using a principal-agent model. It considers cash and share contracts as well as hybrid contracts, which are increasingly used in US agriculture. The conceptual framework suggests that restrictions on sharing payments between contracting parties are ineffective and induce an offsetting contractual rearrangement. Empirical results from a multinomial logit model confirm that government support programs have significant effects on contract choices and effects vary by types of subsidies.

BACKGROUND

Overview of the current U.S. farmland leasing market

- Farmland renting is a common practice in the US; about 45% of farmland is operated by tenants.
- Historically, contractual arrangements between landlords and tenants mostly included either cash payments or sharecropping. More recently, hybrid contracts have gained popularity. USDA/NASS (2001) defines a hybrid contract as one under which the tenant pays part of the rent in cash and part as a share of crops or livestock products.
- Hybrid contracts capture a growing share of leasing arrangements (see Figures 1, 2, and 3).

Generous subsidies

- Farm Bills and commodity-related program payments
- Three main programs: loan deficiency payments (LDP), direct decoupled payments (DDP), and counter-cyclical payments (CCP) (see Figures 4, 5, 6, and 7)
- Legislation requirements on benefit distributions
- Regions with large program payments usually pay high rental rates and tend to use more hybrid contracts

Benefit distribution between landlords and tenant operators

- Existing studies (e.g., Goodwin, Mishra, and Ortalo-Magné, 2010; Patton, *et al.*, 2008) find that landlords capture a share of program benefits through raising rental rates, given any specific types of contracts
- However, benefit redistribution may also be realized by changing/switching contractual arrangements

The Questions

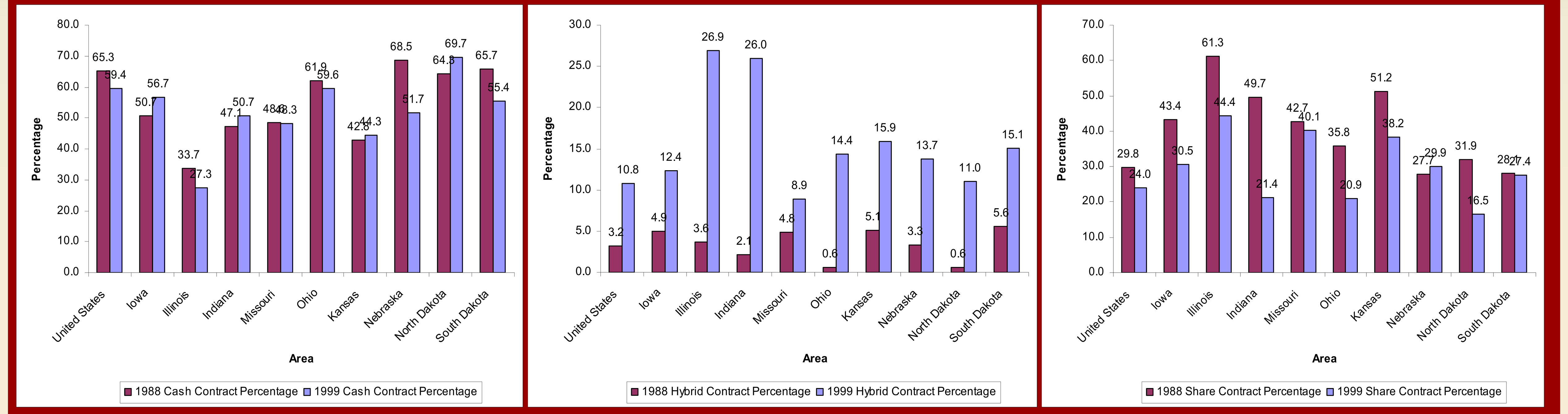
Do government subsidies impact the landlord-tenant farmland contract choices? Is the increasing use of hybrid contracts a result from the composition of farm programs and the related payments?

The purpose of this study is to quantify the effects of government program payments on leasing arrangements between landlords and tenants.

CONCEPTUAL FRAMEWORK AND DATA

- We first propose a principle-agent framework to investigate the impacts of decoupled payments on farmland rental contract choices. The model is extended to include coupled subsidies. This setting generates an ambiguous relationship between government payments and leasing arrangements that can only be resolved empirically. The conceptual analysis suggests that landlord-tenants adjust leasing arrangements to re-distribution government subsidies. Governmental and legal restrictions on benefit sharing between contracting parties are ineffective and induce offsetting contractual rearrangements. The increasing use of hybrid contracts on crop farms may be a form of this contractual rearrangement.
- Data used: the 1999 ARMS and the 1999 AELOS data; the 1988-1999 Regional Economic Information Systems (REIS) data; unpublished county level program payments from the USDA over the 1996-1999 period; county level farmland data from 1997 Census of Agricultural

Figures 1, 2, and 3: Percentage of types of leases in the US and Heartland: 1988 vs. 1999



Figures 4, 5, and 6: Historical county average commodity-related payments ($/acre) by programs: 1993-2007

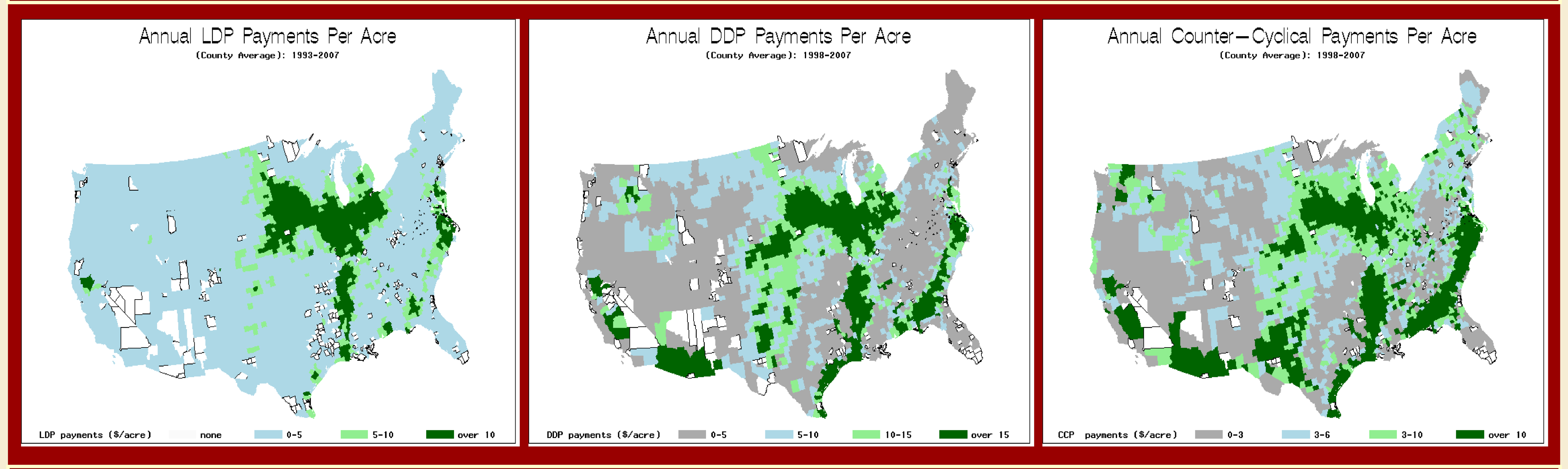
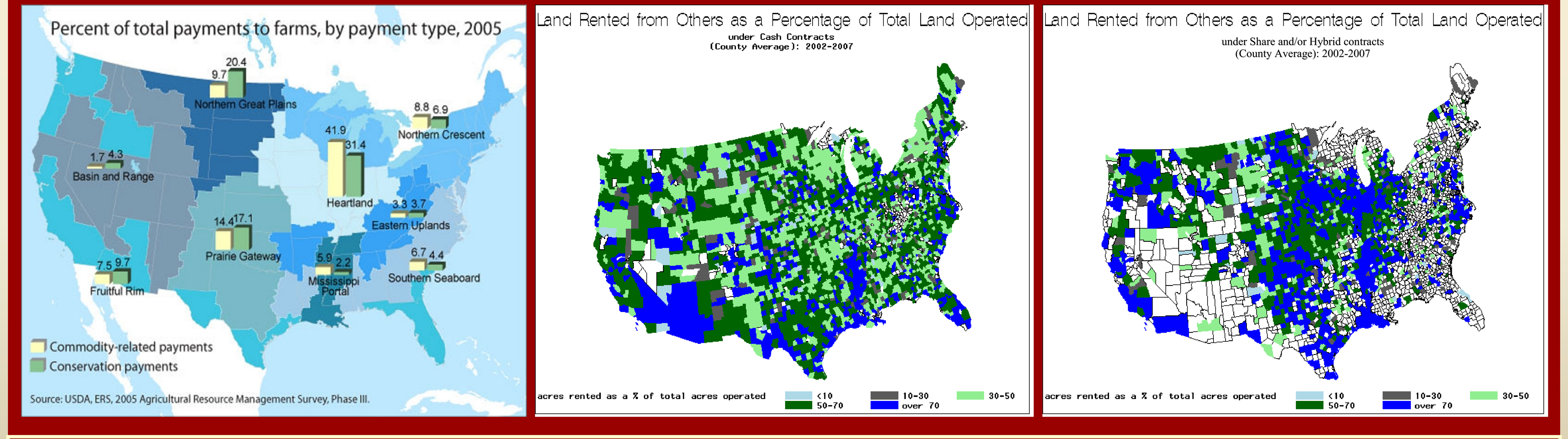


Figure 7: Distribution of commodity-related payments and conservation payments by regions: 2005
Figures 8 and 9: Farmland rented from others as a percentage of total land operated by contracts: 2002-2007



Source: Authors' compilation from USDA/AELOS 1988 and 1999 (Figures 1, 2, and 3), unpublished county level program payments from the USDA over the 1993-2007 period (Figures 4, 5, and 6), USDA/ERS 2005, and USDA/ARMS 2002-2007 (Figures 8 and 9).

METHODOLOGY

Model specification

- A generalized multinomial logit model with an alternative-specified constant has been used. The landlord-tenant pair chooses a contract among three alternatives: a cash contract, a share contract, or a hybrid contract, conditional on a set of independent variables which are specific to the landlord-tenant pair ***n***.

$$V_{n,i|b} = \alpha_{i|b} + \sum_{g=1}^{I_G} \beta_{g|b}^{G} GovP_{n,g} + \sum_{r=1}^{I_R} \beta_{r|b}^{R} Risk_{n,r} + \sum_{p=1}^{I_P} \beta_{p|b}^{P} EffP_{n,p} + \sum_{m=1}^{I_M} \beta_{m|b}^{M} Other_{n,m}$$

where $GovP_{n,g}$ are subsides ($\$/are$) received from government program g; $Risk$ are proxies to capture farming risk and risk preference; $EffP$ represent the tenant productivity; and $Other$ include other factors may have impacts on contract chices.

Empirical strategy

- Endogenous matching (Ackerberg 2002)
- Clustered standard errors
- IIA and tests for combining alternatives

RESULTS

Main results

- All five programs have significant impacts on contract choices
- Three commodity-related programs all have positive impacts on hybrid contract choice.
- Decoupled payments encourage the use of hybrid contracts while decrease the probability of choosing share contracts, as the conceptual framework predicted
- Impacts of coupled subsidies vary by types of programs. For example, The predicted probability of choosing a cash contract is 4.94% higher if disaster payments increase one unit.

Table 1. Marginal/Discrete Changes on the Predicted Probabilities

Variable			Marginal/Discrete Changes in Predicted Probabilities (100%)		
Receipt of program payments in 1999			Cash	Hybrid	Share
PFC/DDP	Direct decoupled payments	-+sd/2	2.61	1.12	-3.72
MLA/CCP	Market loss assistance payments	-+sd/2	-6.45	0.84	5.61
LDP	Loan deficiency payments	-+sd/2	0.63	2.34	-2.98
Disaster	Disaster payments	-+sd/2	4.94	-2.47	-2.47
CRP	Conservation reserve program payments	-+sd/2	0.17	-0.57	0.40
Other	Other payments	-+sd/2	3.35	-0.78	-2.57

Note: other factors, such as farming risk, degree of risk aversion, effort productivity are also included in the empirical model. Please contact the authors for more detailed results.

IMPLICATIONS

- First, the study shows that potential biases may arise when restricting the set of leasing arrangements to only cash contracts and sharecropping.
- Second, the analysis suggests that governmental and legal restrictions on benefit sharing between contracting parties are ineffective. The increasing use of hybrid contracts likely reflects a redistribution of program benefits between contracting parties.
- Third, most existing empirical research focuses on the cash rental contracts. However, Tenant farmers under share and hybrid contracts typically rented more than 70% of their operated land from others. The percentage is higher than under cash contracts (Figures 8 and 9). Future studies may find it helpful to consider different types of contracts when studying the incidence of agricultural subsidies.

Direct correspondence to **Feng Qiu** at Box 8109, North Carolina State University, Raleigh, NC, 27695
E-mail: fqiu@ncsu.edu