

Rent Dissipation in the U.S. Agricultural Insurance Industry

by

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Key Questions

1. What determines which entities within the agricultural insurance sector (private insurance companies or insurance agents) obtain the government subsidies and economic rents associated with the federal crop insurance program?
2. What is the impact of reducing government subsidies to the industry on the allocation of those rents?
3. If government subsidies to the agricultural insurance sector were substantially reduced, would the sector continue to provide the services required to make subsidized crop insurance available to farmers?

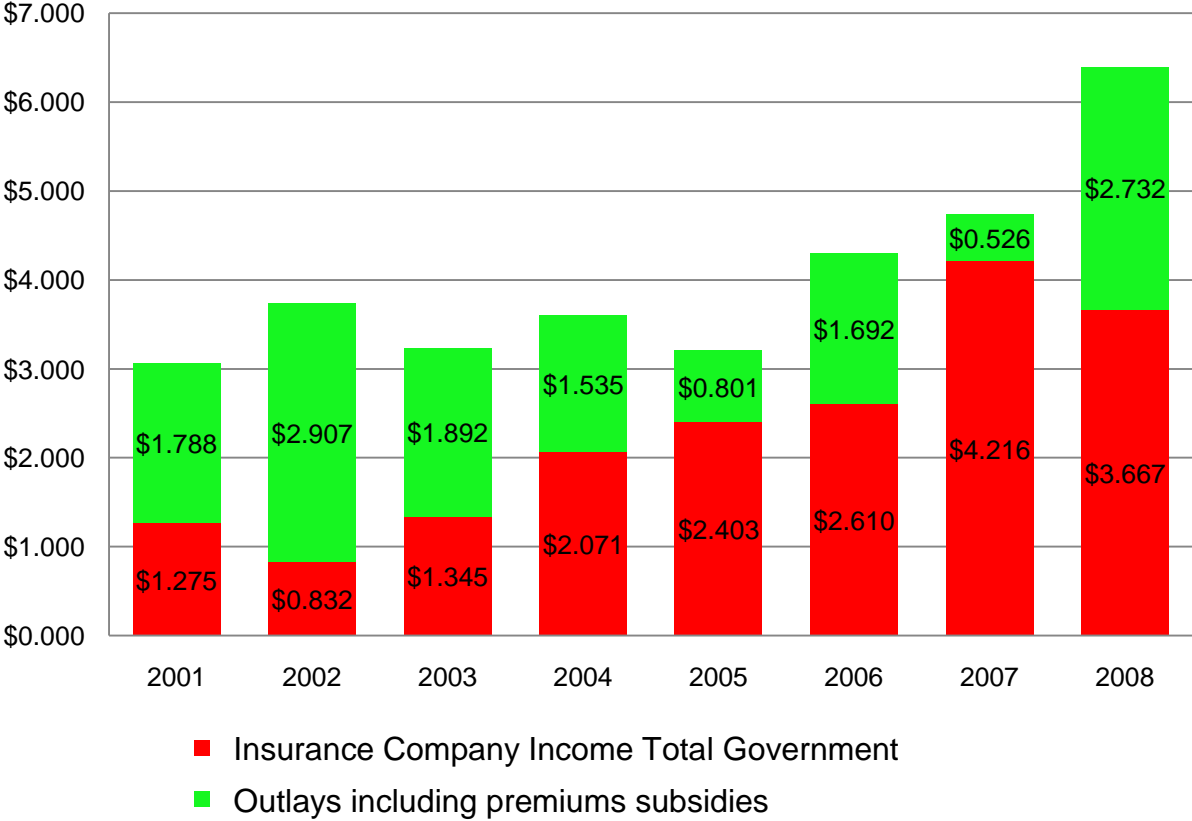
Outline

- A. Some Basic Facts about Agricultural Insurance and Agricultural Insurance Subsidies.
- B. Structure of the agriculture insurance industry and the relationship between private insurance companies and the insurance agents who sell those policies to farmers.
- C. A Simple Model of the Agricultural Insurance Industry and Some Comparative Static Analysis
- D. Empirical Hypotheses, Data and Econometric Estimation Issues
- E. Results
- G. Implications

A. Some Basic Facts about Agricultural Insurance and Agricultural Insurance Subsidies.

1. Subsidies for agricultural insurance currently run at about \$9 billion a year.
2. Currently, about 70% of those dollars go to farmers and 30% to the agricultural insurance industry. That is, just about two dollars of transfer to farmers costs about \$1 in delivery charges (not counting expenditures on the government agency managing the program).

Figure 1. Total Government Subsidies and Income Received by Insurance Companies from A&O and Underwriting Gains: 2001-2008



A. Some Basic Facts about Agricultural Insurance and
Agricultural Insurance Subsidies (cont.)

3. Delivery costs have increased rapidly over the past nine years because of the way in which the government manages payments to insurance companies for delivering the program
4. Many players in the policy game (including farm groups, congressional delegations, and the USDA Risk management Agency) were concerned about the rents accruing to the insurance companies and insurance agents at the time of renegotiations between the insurance companies and the US federal government over the 2010 SRA

Figure 1(a). Total Crop Insurance Policies Sold and Total Premiums Paid by Farmers and the Federal Government: 2001-2009

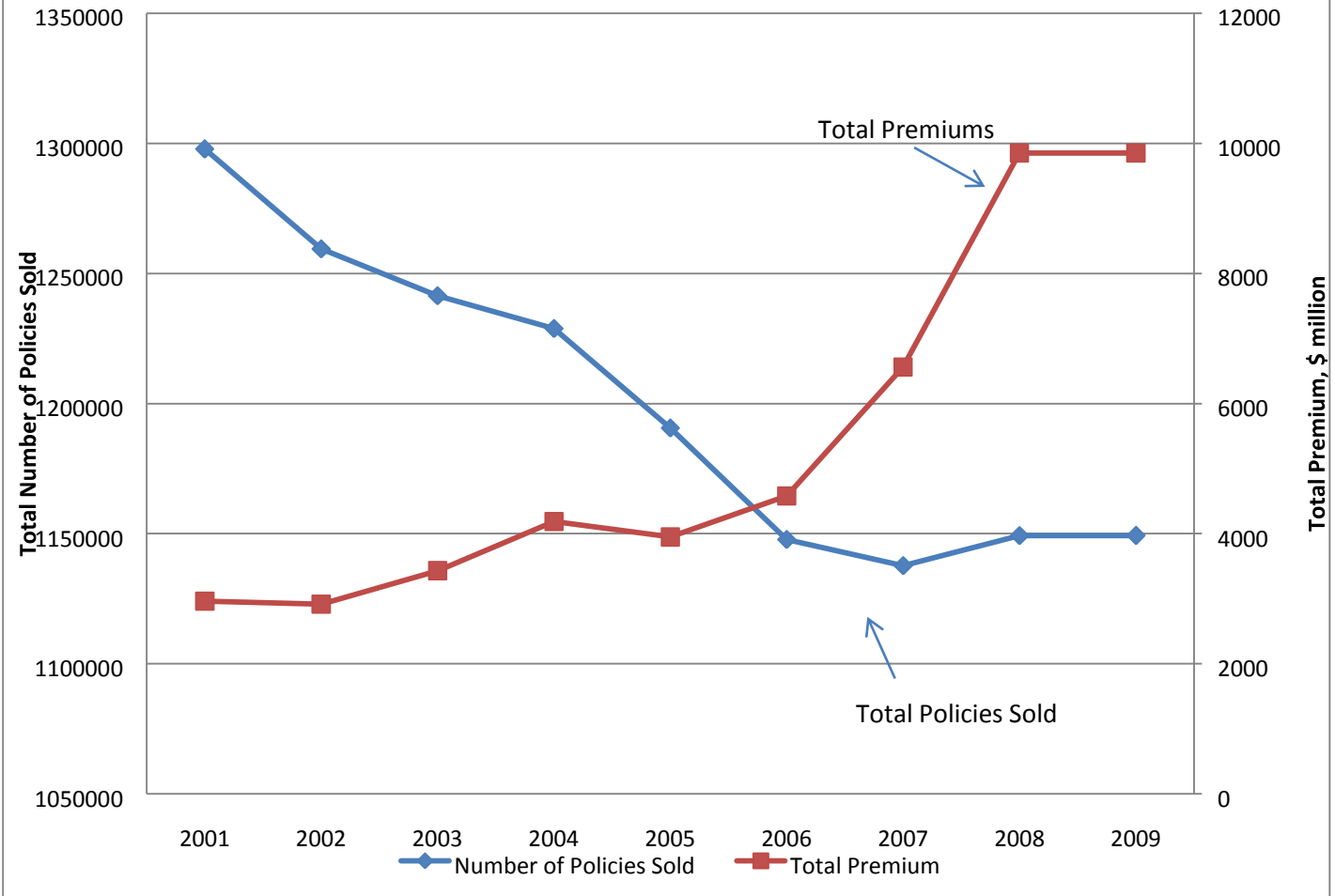
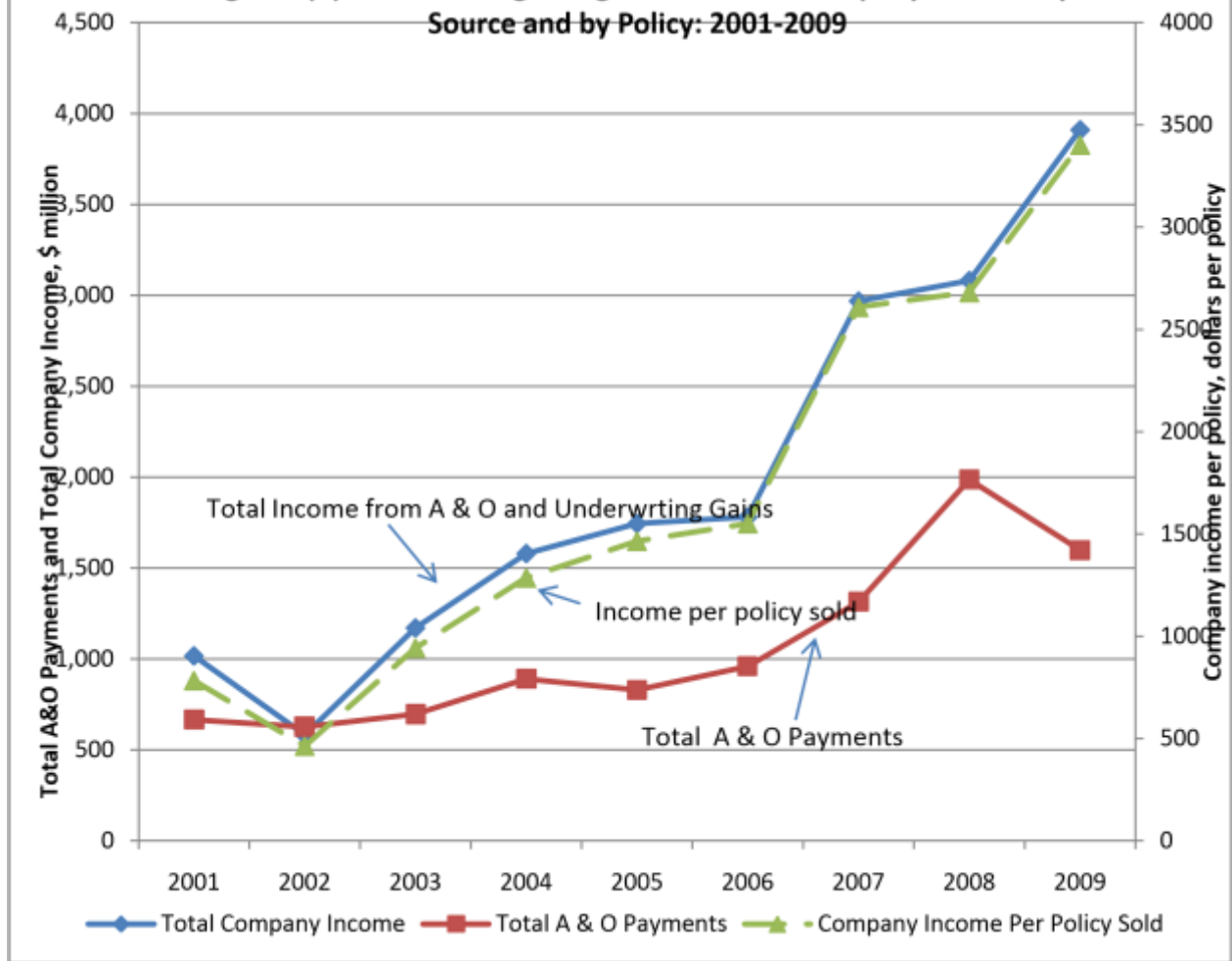


Figure 1(b). Total U.S. Agricultural Insurance Company Income by Source and by Policy: 2001-2009



B. Structure of the agriculture insurance industry and the relationship between private insurance companies and the insurance agents who sell those policies to farmers.

1. Agricultural insurance companies operate under separate Standard Reinsurance Agreements for each state in which they sell federally subsidized insurance, under which government serves as the reinsurer for much of the risk.
2. Each state constitutes a separate market
3. Under the 2005-2010 SRAs, companies had to accept any policies offered to them in a state, regardless of the quality of the policy
4. Companies can allocate funds into one of three separate pools or funds:
 - Assigned Risk Pool (little risk retained by companies)
 - Commercial Pool (more risk retained by companies)
 - Development Pool (new products for which little information is available on risk).
5. Companies earn revenues from two sources:
 - Statutorily determined payments for administration and operations (A&O), defined as a percentage (currently about 18.6%) of total premiums, which do not vary by state
 - Underwriting gains, which do vary by state.

6. Increase in premium subsidies (farmers now pay only 50% of the actuarially fair premium) since 2000 has reduced adverse selection problems as participation has jumped from about 50% to close to 90%. Underwriting gains have also generally increased.
7. Companies have to compete with one another for insurance agents' books of business but must accept policies if offered them by insurance agents.
8. Companies offer loyalty bonuses, incentives for obtaining most or all of the policies an insurance agent has acquired, and bonuses linked to the overall performance of their own (the companies) books of business.

Table 1: Agricultural Insurance Industry Indicators for Selected States in 2008

	Number of Companies Operating in the State ^A	Herfindahl Index (normalized to range from 0 to 1) ^B	Total Liability (millions of dollars) ^C	Total Premium (millions of dollars) ^D	State Wide Average Underwriting Gains: 2002-2008 ^E	State Wide Coefficient of Variation of Underwriting Gains: 2002-2008	State Wide Compensation Rates ^F
Corn Belt/Lake Region							
Iowa	14	0.148	11,656.5	914.6	31.4%	0.68	18.9%
Illinois	15	0.137	10,119.0	866.6	29.4%	0.29	18.7%
Indiana	15	0.114	4,617.7	449.2	18.8%	1.13	18.1%
Minnesota	14	0.193	7,823.2	845.0	27.7%	0.46	17.1%
Ohio	15	0.225	2,938.6	296.6	8.0%	4.72	18.0%
Central and Southern Great Plains							
Colorado	12	0.173	1,064.9	183.0	-5.9%	3.21	15.1%
Kansas	14	0.164	3,987.9	664.5	4.6%	50.63	16.1%
Nebraska	14	0.146	6,622.4	678.5	23.0%	1.25	18.5%
Texas	12	0.156	3,327.2	604.4	10.9%	2.52	13.6%
Northern Great Plains							
Montana	12	0.287	1,044.4	191.5	12.6%	1.76	13.6%
North Dakota	12	0.198	5,792.3	1,065.6	11.4%	1.68	16.0%
South Dakota	14	0.192	4,101.8	685.1	16.1%	3.89	17.2%
Wyoming	10	0.165	136.9	18.5	4.5%	7.94	14.7%
South West and West							
Arizona	8	0.242	154.3	9.5	14.7%	0.51	13.6%
Utah	6	0.280	21.6	3.1	4.5%	64.2	11.4%
Nevada	4	0.869	13.3	0.9	3.7%	13.82	9.1%
California and Florida							
California	9	0.222	3,912.1	198.0	29.0%	0.27	16.3%
Florida	8	0.244	3,210.2	122.4	4.1%	7.77	15.1%

C. A Simple Model of the Agricultural Insurance Industry

The Primary Market for Insurance Coverage:

$$f = (1 - s) p$$

f = premium rate paid by farmers

p = total premium rate paid per \$ of liability to insurance companies

s = federal subsidy rate

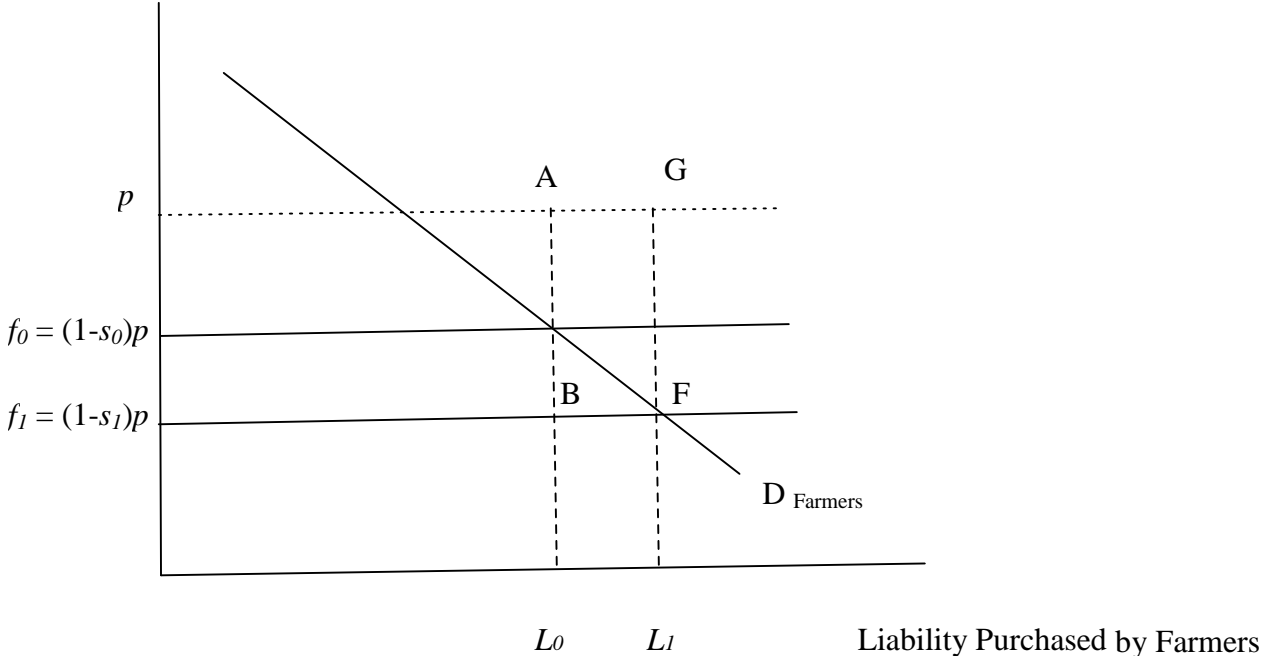
sp = subsidy paid by government per dollar of total premium

L = total quantity of insurance, measured as total liability.

$pL = P$ = total premium paid to insurance companies.

Figure 2. Primary (Farmers) Market for Insurance

Premium Rate



The Market for Insurance Agent Services

$$(1). \quad \pi(P) = g(P) + aP - cP - h(P),$$

a = A & O rate

$g(P)$ = underwriting gains; $g' > 0$, $g'' < 0$.

c = agent compensation rate

$h(P)$ = other insurance company costs; $h' > 0$, $h'' <$

0 .

$$(2). \quad g' + a - h' = c.$$

Equation 2 implicitly defines the companies' derived demand for agent services as decreasing in c , increasing in g' (marginal expected and actual underwriting gains), and decreasing in h' (marginal other insurance company costs).

**Figure 3. Independent Insurance Agency Services Market:
separate shifts in total premium and expected
underwriting gains**

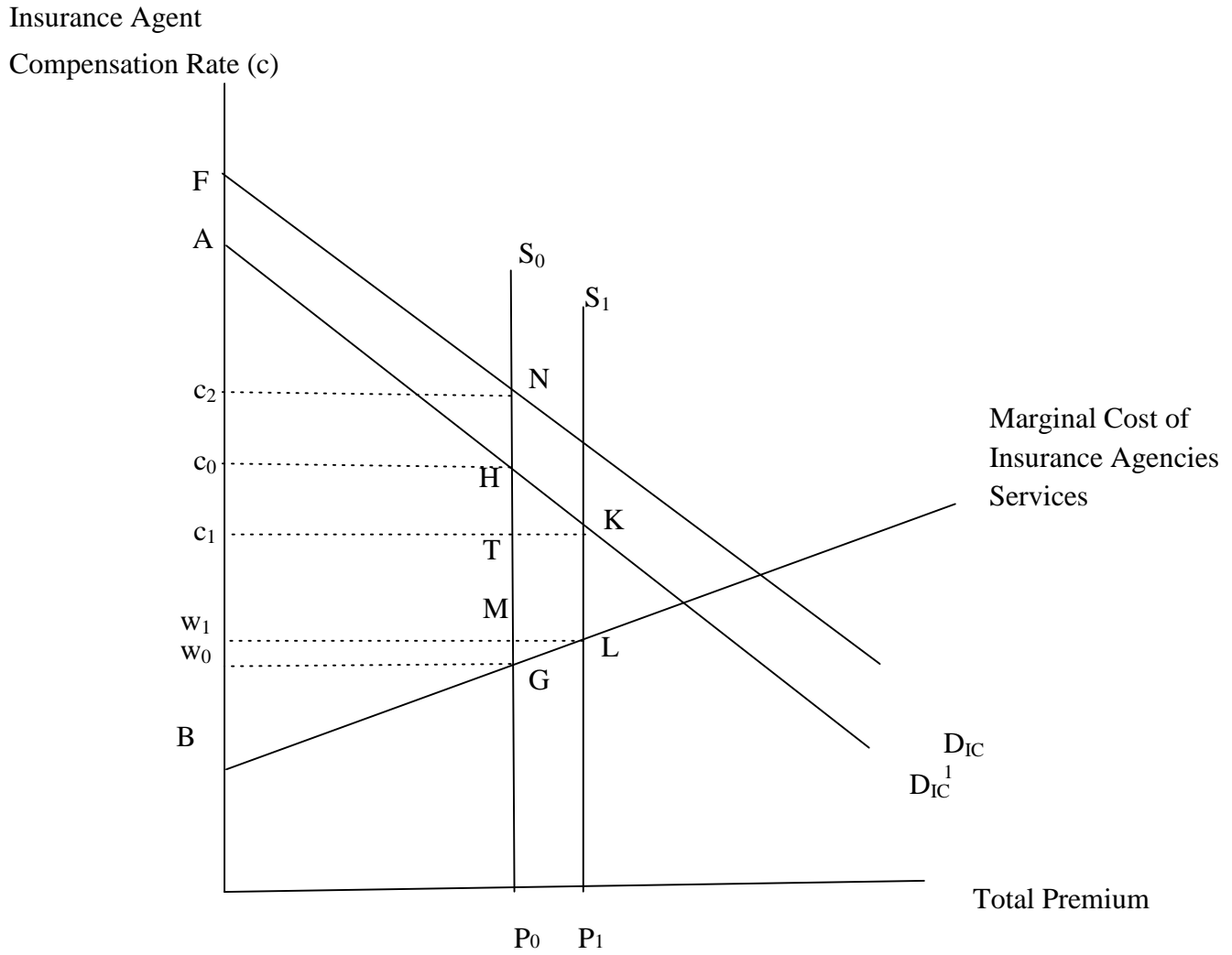


Figure 4. Insurance Agency Services Market: An Increase in the Premium Subsidy Rate.

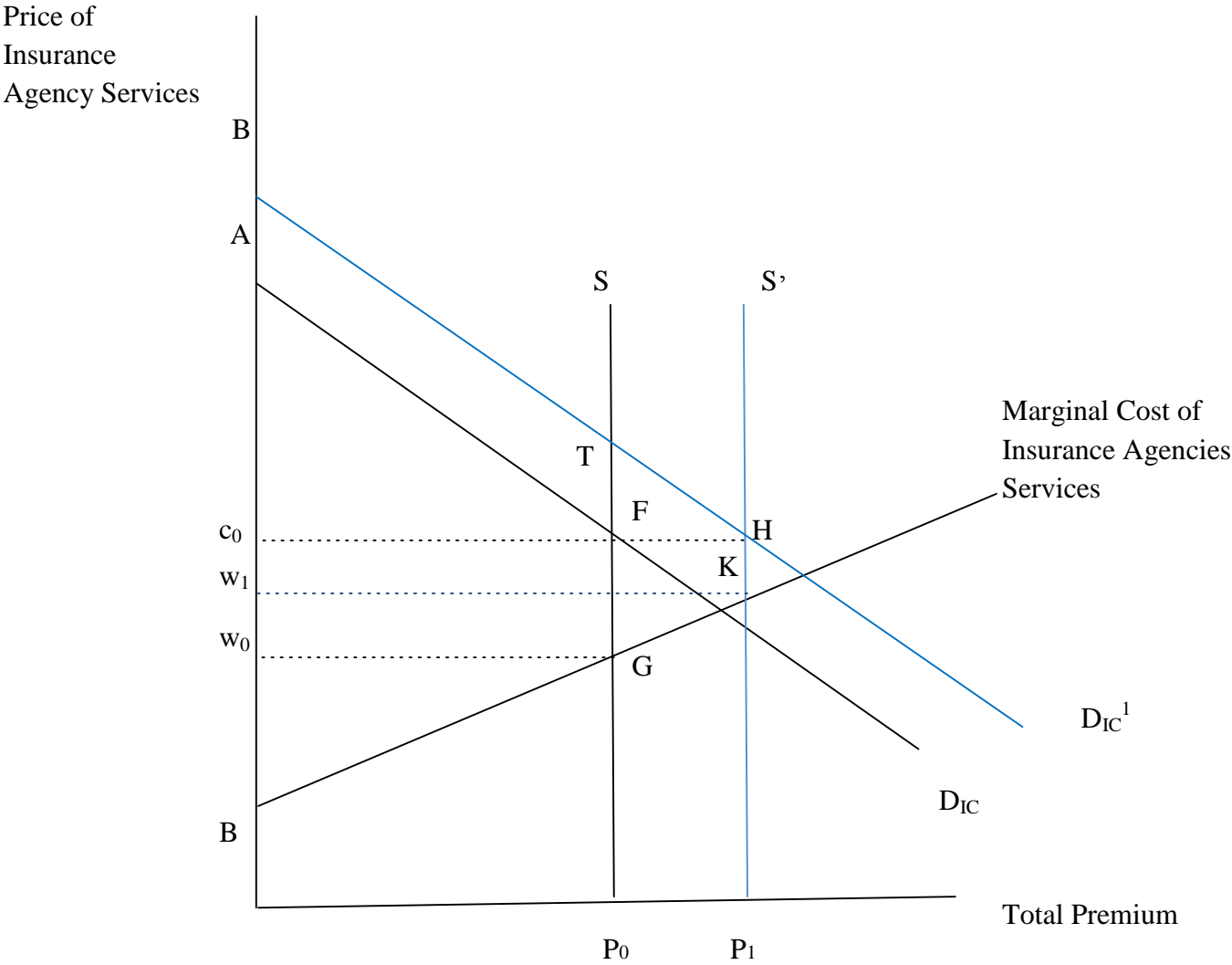
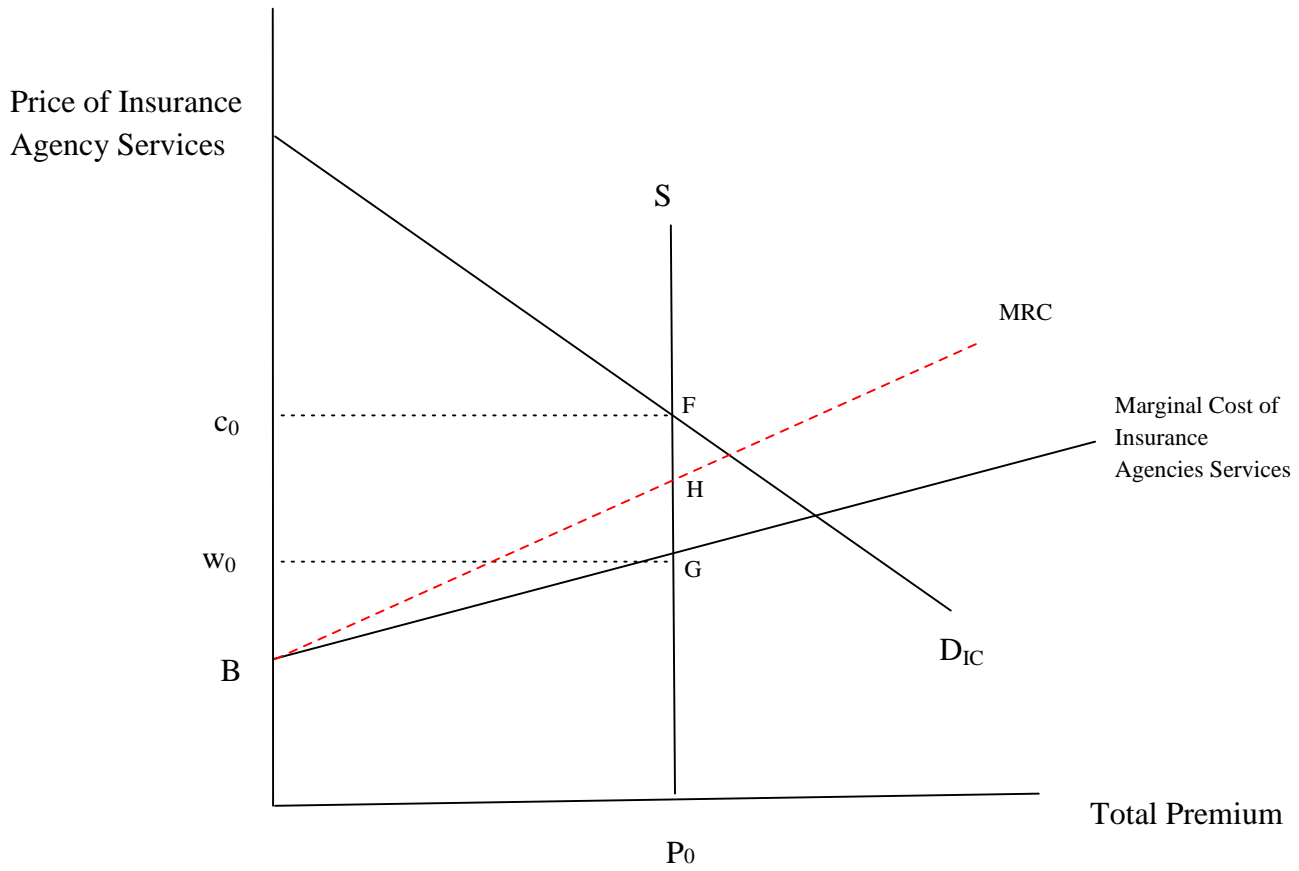


Figure 6. Monopsony Power in the Market for Insurance Agent Services



D.**Empirical Hypotheses, Data and Econometric Estimation Issues**

$$CR_{t,i,j} = f(EUG_{t,i,j}, DIFF_{t,i,j}, HI_{t-1,j}, GRPP_{t,i,j}, ASF, NEW, NEWC, u_{t,i,j}).$$

Variable Name	Variable Definition	Combined Data: 2007-2008 (878 Observations)		
		Average	Minimum Value	Maximum Value
CR	Compensation Rate (Percent of Gross Premium)	15.614	0.929	42.952
EUG ^A	Expected Underwriting Gains (Percent of Gross Premium)	14.331	-58.813	41.619
DIFF	Difference between actual underwriting gains and expected underwriting gains in year t	-0.265	-63.980	71.462
HI	Herfindahl Index in Year t-1	0.266	0.119	1.000
GPR	Company Gross Premium (\$ million)	18.656	0.0002	318.692
CVSUG	Coefficient of Variation for State Underwriting Gains	5.184	0.247	64.204
ASF	Average Value of Crop Sales per Farm in a State (\$ thousand)	92.678	4.027	374.141
NEWC	Dummy Variable =1 if Company is a new entrant in a state	0.050	0	1
NEW	Dummy Variable =1 if a state has at least one new company in 2008	0.397	0	1

Data Issues

HI and GPR appeared to be endogenous (Hausman tests). HI lagged, GPR predicted with selected region and company dummies.

EUG computed in several ways:

- i. Average of previous five years underwriting gains
- ii. Geometrically declining weights truncated in year 5 and normalized to sum to unity
- iii. Estimate using Almon lags (third order polynomial generally preferred)
- iv. Results were basically invariant to the measures used. We report results where EUG estimated using methods (i) and (ii).

HI normalized to range between 0 and 1 to address concerns with extreme outliers if the HI runs from its minimum possible value of 667 (given 15 companies with equal shares) to 10,000.

Estimation Issues

All models estimated assuming company fixed effects in Stata. Regional and state dummies are highly collinear with expected underwriting gains and not included.

E. Results

Table 3: Fixed Effect Models Estimated with Robust Standard Errors using Observations from all 50 States.^A

Explanatory Variables	Model 1	Model 2
Constant	16.4326*** (0.5031)	16.7062*** (0.4967)
EUG	0.0661*** (0.0125)	
EUG1		0.0579*** (0.0112)
DIFF	0.0158*** (0.0065)	0.0159*** (0.0064)
HI	-6.3847*** (0.8997)	-6.5971*** (0.9001)
ASF	0.0003 (0.0018)	0.0005 (0.0018)
CVSUG	-0.0205** (0.0089)	-0.0243** (0.0088)
GPRP	0.0113 (0.0208)	-0.0017 (0.0214)
NEW	2.2493*** (0.6455)	2.3204*** (0.6509)
NEWC	-0.7884*** (0.2480)	-0.7233*** (0.2512)

R2	0.34	0.34
N	878	878

Table 4: OLS Estimates with Robust Standard Errors using Observations from 34 States (excluding 14 underserved states, Alaska and Hawaii).

Explanatory Variables	Model 1	Model 2
Constant	16.8612*** (0.7717)	17.3136*** (0.7187)
EUG	0.0817*** (0.0136)	
EUG1		0.0701*** (0.0117)
DIFF	0.0209** (0.0072)	0.0197** (0.0072)
HI	-7.58162*** (1.7832)	-8.2879*** (1.7556)
ASF	-0.00137 (0.0019)	-0.0001 (0.0019)
CVSUG	-0.0014 (0.0019)	0.0022 (0.0094)
GPRP	0.00048 (0.0256)	-0.0139 (0.0189)
NEW	2.73444*** (0.8239)	2.7789*** (0.8409)
NEWC	-1.03064***	-0.9612***

	(0.2747)	(0.2766)
R2	0.35	0.35
N	760	760

Implications

1. Compensation Rates and Agent Compensation:

$$c = C/P = A + b \text{ EU}/P \text{ and } C = AP + b \text{ EU}$$

If $b > 0$, then the share of total premium paid to insurance agents increases as expected underwriting gains increase.

Lowering expected underwriting gains will lower payments to insurance agents more quickly than earnings to companies. Implicitly, lowering A&O payments is likely to have the same effect.

2. Market Power

Less competition in a market results in lower payments to insurance agents and, *ceteris paribus*, more rents for the insurance companies.

3. New Entrants

New entrants pay higher compensation rates to insurance agents, presumably to obtain business, but (implicitly) appear more likely to enter markets in which, on average, agent compensation rates are lower.

4. Policy issues

- i. Reductions in insurance company compensation will reduce agent compensation rates. However, given companies and agents were willing to sell policies for about one quarter to one third of what they currently (in real terms) in 2000-2002, it is unlikely that they would stop serving markets (and they do serve some markets in which compensation rates are much lower than in other markets).
- ii. Insurance companies were successful in lobbying for caps on agent compensation rates which are likely to be binding in large market, highly competitive states. Clearly this is an (apparently successful) attempt to establish a buying cartel in high revenue states like Iowa and Illinois and shift rents from agents to companies.
- iii. The current delivery system for a farm subsidy program is extremely costly. Assuming the subsidies for farmers will be retained, perhaps the current system should be canned. The rationale for a private sector delivery system was to have companies bear risk and, therefore, monitor moral hazard behavior by farms. If there is almost no risk for the insurance companies (because of federal stop-loss reinsurance and high participation rates), then perhaps public delivery would be cheaper.