Lecture XXVII: Asymmetric Information and Moral Hazard

Charles B. Moss [1]

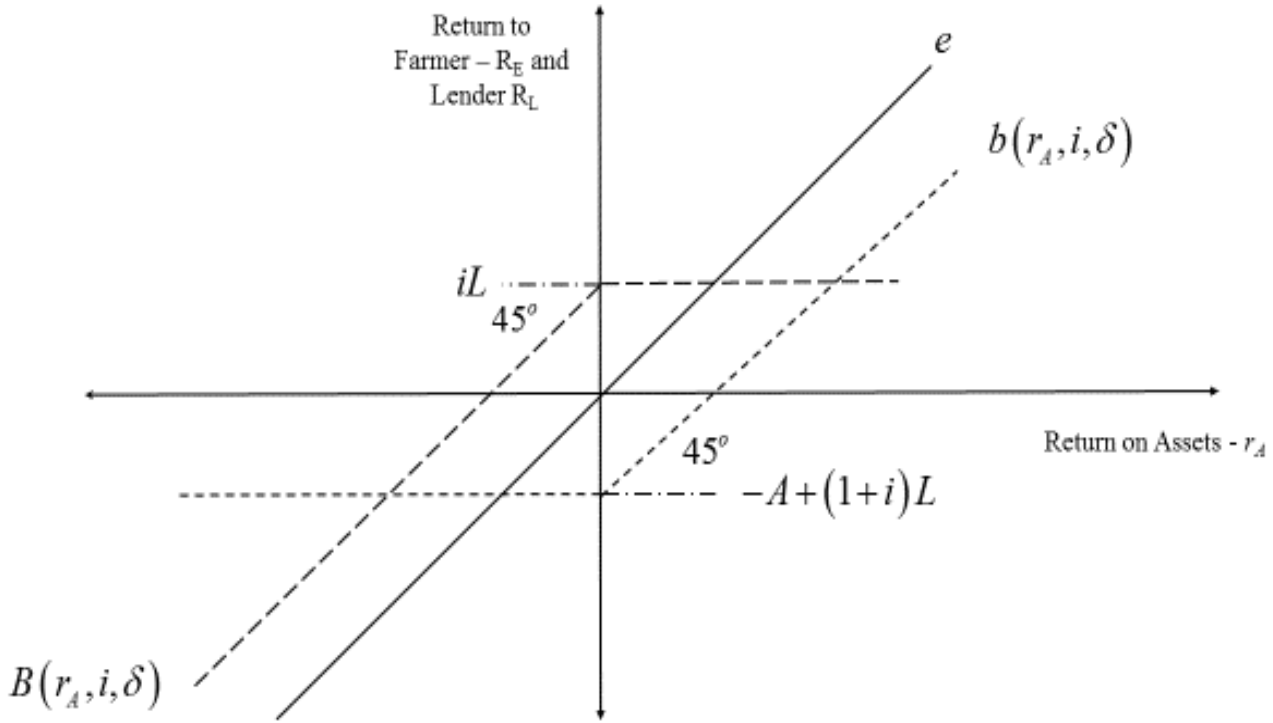
[1] University of Florida

November 13, 2018

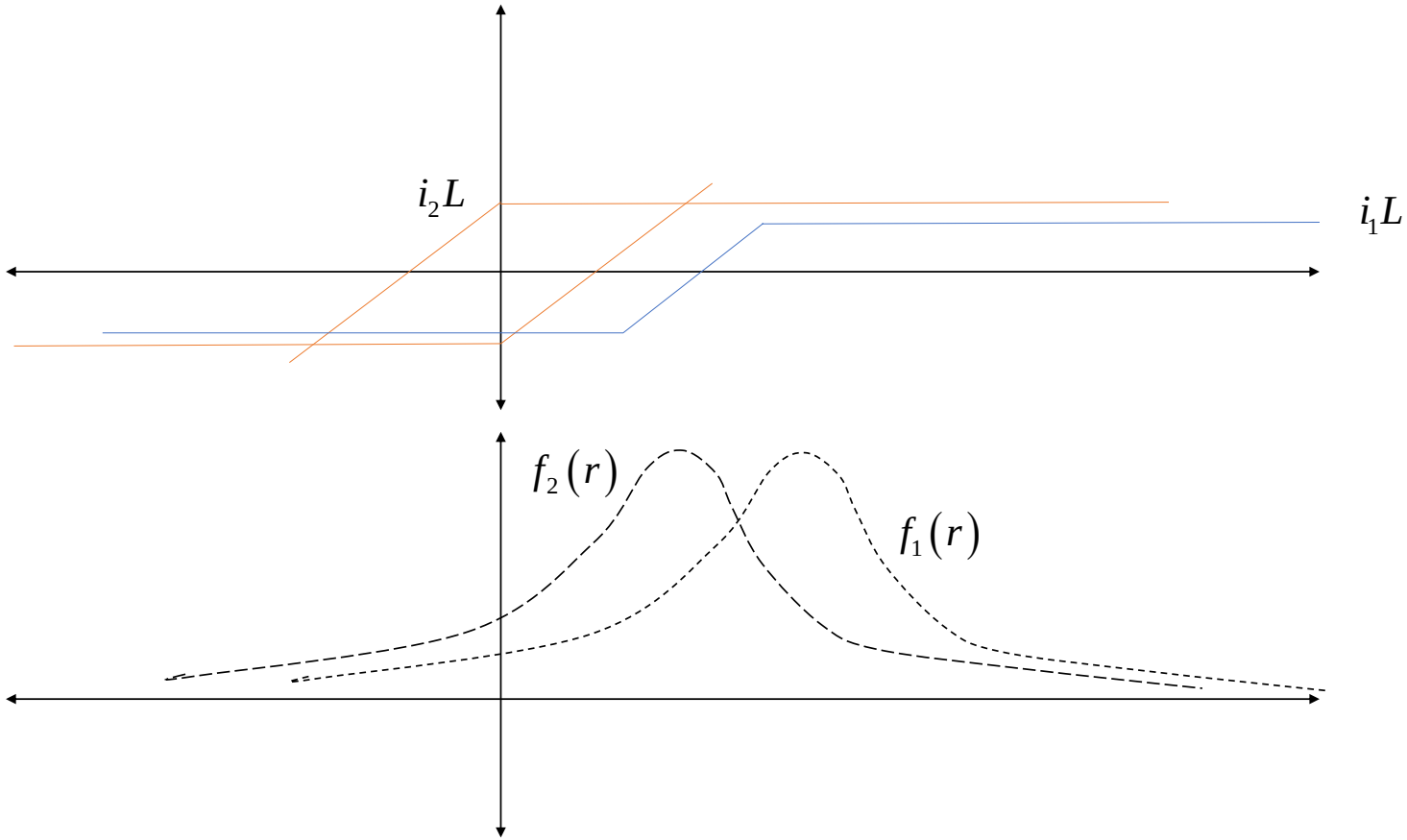
Reinsurance by State

State	Fund	Gross Liability	Gross Premium	Gross Indemnity	Retained Liability	Retained Premium	Retianed Indemnity	Net Gain/Loss
AL	OA	81,121,252	12,351,761	11,123,641	15,169,673	2,309,780	1,797,025	74,342
AL	OC	485,384,127	60,769,737	27,417,615	453,834,159	56,819,704	25,625,746	20,987,911
AR	OA	272,238,292	28,630,258	49,234,877	50,908,560	5,353,860	5,616,290	-262,430
AR	OC	1,319,885,104	105,696,364	106,425,792	1,234,092,572	98,826,100	92,714,658	4,702,843
CA	OA	968,131,693	74,369,626	101,616,562	181,040,627	13,907,120	13,807,422	-278,939
CA	OC	7,521,377,899	341,992,088	219,458,309	7,032,488,336	319,762,602	205,043,102	99,205,754
FL	OA	186,747,232	22,148,628	34,753,325	34,921,734	4,141,793	4,144,521	-138,104
FL	OC	2,580,569,178	86,870,832	290,312,144	2,412,832,181	81,224,228	111,209,439	-30,388,244
IA	OA	833,404,596	52,980,494	26,773,720	155,846,660	9,907,354	4,853,549	826,845
IA	OC	10,966,474,982	642,705,876	138,191,927	10,253,654,108	600,929,994	129,209,452	202,362,701
ID	OA	375,734,715	20,220,334	17,747,214	70,262,392	3,781,204	3,016,922	115,719
ID	OC	759,679,946	45,166,355	34,135,991	710,300,750	42,230,542	28,994,979	9,131,887
IL	OA	525,193,361	40,379,813	14,920,111	98,211,160	7,551,026	2,790,061	738,650
IL	OC	9,679,346,707	656,966,398	164,102,226	9,050,189,171	614,263,582	153,435,581	205,743,870
IN	OA	249,881,849	19,946,287	9,939,771	46,727,907	3,729,955	1,815,612	335,416
IN	OC	4,602,264,255	363,238,040	110,754,692	4,303,117,078	339,627,567	103,555,637	112,842,801

Credit Rationing Models – Stigltz and Weiss



Credit Rationing – Selection Problem



- http://www.charlesbmoss.com:

Avg	Std Dev	Insur Price	With Insur	Without Insur	Insur Gain	Insur Price	With Insur	Without Insur	Insur Gain
172.5	6.325	3.1379	77.8624	90.2881	-12.4257	4.7068	76.2934	90.2881	-13.9946
172.5	6.519	3.7403	76.7612	84.3843	-7.6231	5.6104	74.8911	84.3843	-9.4932
172.5	6.708	4.3741	75.7431	78.1929	-2.4498	6.5611	73.5561	78.1929	-4.6368
172.5	6.892	5.0328	74.8054	71.7691	3.0363	7.5492	72.2890	71.7691	0.5199
172.5	7.071	5.7097	73.9502	65.1844	8.7657	8.5645	71.0953	65.1844	5.9109
172.5	7.246	6.3975	73.1829	58.5215	14.6614	9.5963	69.9841	58.5215	11.4626
172.5	7.416	7.0891	72.5118	51.8679	20.6439	10.6336	68.9673	51.8679	17.0994
175.0	6.325	2.7780	84.4590	98.7820	-14.3230	4.1670	83.0700	98.7820	-15.7120
175.0	6.519	3.3443	83.1704	92.8680	-9.6976	5.0165	81.4983	92.8680	-11.3697
175.0	6.708	3.9446	81.9738	86.6561	-4.6822	5.9169	80.0015	86.6561	-6.6545
175.0	6.892	4.5728	80.8655	80.1966	**0.6688**	6.8593	78.5791	80.1966	**-1.6176**
175.0	7.071	5.2224	79.8457	73.5565	6.2891	7.8336	77.2345	73.5565	3.6780
175.0	7.246	5.8863	78.9185	66.8151	12.1034	8.8295	75.9754	66.8151	9.1603
175.0	7.416	6.5576	78.0908	60.0580	18.0328	9.8364	74.8120	60.0580	14.7540
177.5	6.325	2.4524	91.1713	107.2770	-16.1058	3.6786	89.9451	107.2770	-17.3320
177.5	6.519	2.9827	89.6918	101.3550	-11.6628	4.4741	88.2004	101.3550	-13.1542
177.5	6.708	3.5494	88.3130	95.1251	-6.8121	5.3241	86.5383	95.1251	-8.5868
177.5	6.892	4.1465	87.0302	88.6343	-1.6041	6.2198	84.9570	88.6343	-3.6774
177.5	7.071	4.7679	85.8424	81.9446	3.8978	7.1519	83.4584	81.9446	1.5138
177.5	7.246	5.4069	84.7522	75.1315	9.6207	8.1104	82.0487	75.1315	6.9172
177.5	7.416	6.0567	83.7651	68.2786	15.4866	9.0850	80.7368	68.2786	12.4582
180.0	6.325	2.1587	97.9965	115.7730	-17.7768	3.2380	96.9172	115.7730	-18.8562
180.0	6.519	2.6535	96.3233	109.8440	-13.5204	3.9802	94.9966	109.8440	-14.8471
180.0	6.708	3.1865	94.7592	103.5990	-8.8400	4.7798	93.1659	103.5990	-10.4333
180.0	6.892	3.7524	93.2985	97.0810	-3.7825	5.6285	91.4223	97.0810	-5.6586
180.0	7.071	4.3451	91.9394	90.3468	**1.5926**	6.5176	89.7669	90.3468	**-0.5800**
180.0	7.246	4.9583	90.6832	83.4686	7.2146	7.4375	88.2040	83.4686	4.7354
180.0	7.416	5.5855	89.5341	76.5271	13.0070	8.3782	86.7414	76.5271	10.2142

Moral Hazard

- **Moral Hazard** refers to the phenomenon whereby a farmer may alter is or her farming practices after insuring his crop.
- Two ways that dryland farmers can alter input decisions to affect indemnity payments:
  - A farmer can apply less than the optimal non-insured input level – the level used in the absence of crop insurance.
  - If drought is expected the farmer may increase the number of acres insured by planting more acres of an insured crop

Profit with Insurance

- Going back to Lecture 26 the insurance payoff plus the revenue from production

$$f(x)\,p_y + \phi(x, p_y) = \begin{cases} f(x)\,p_y + (y^* + f(x))\,p_y = y^* p_y \text{ if } f(x) < y^* \\ f(x)\,p_y + 0 = f(x)\,p_y \text{ if } f(x) > y^* \end{cases} \tag{1}$$

- The firm's profit function then becomes

$$\begin{aligned} \pi = \max_x 0.5\left[\max\left[4.5097x - 0.0407x^2, 125\right] 3.50 - 0.125x\right] + \\ 0.5\left[\max\left[4.4258x - 0.0338x^2, 125\right] 3.50 - 0.125x\right] - \psi \end{aligned} \tag{2}$$

  where ψ is the price of insurance.
- If the price of insurance is constant, the optimum level of nitrogen becomes $x^* = 64.471$ and the profit before insurance increases to 653.21 .