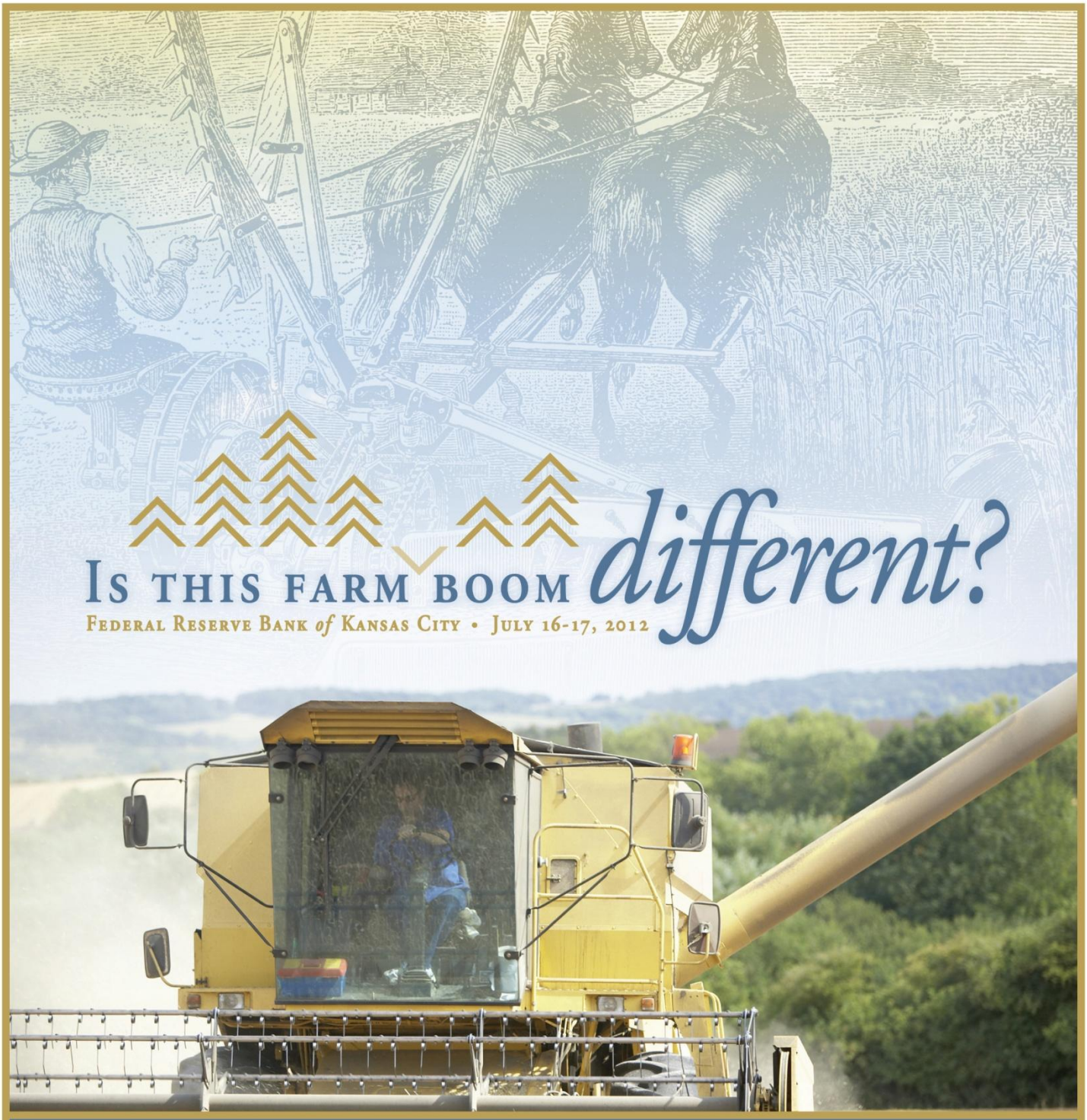

Is this farm boom different?

Federal Reserve Bank of Kansas City • July 16-17, 2012

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July 16-17, 2012

Session 2: What Lies Beyond the Horizon for Farm Income?

What Lies Beyond the Horizon for Farm Income?

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Corn Crop Situation and Outlook in 2012

The poor crop weather of 2012 has interrupted bankers' concerns about a "land price bubble," and replaced it with worries about commercial hedgers' risk exposure to smaller earnings and a (possibly) inverted futures market.

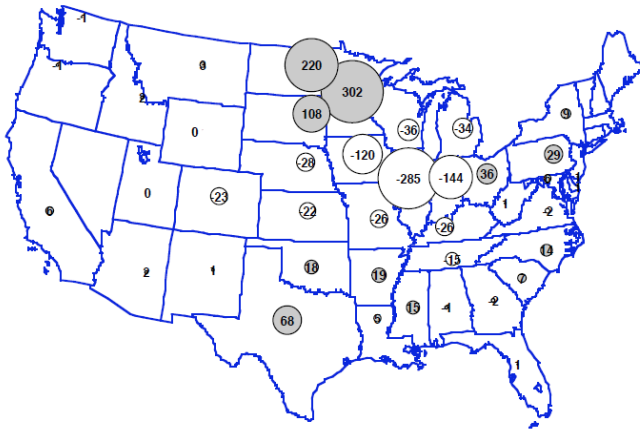
Corn and soybean farm prices have risen to historically high levels since 2010, with corn in the $6.00 range and soybeans above $12.00. Crop input costs have increased, but moderately. And, land prices, reflecting the sudden profitability of the two crops and the very low prevailing interest rates, have bolted up—by about 25 percent in each of the past two years.

As bankers this spring began to worry about a "farmland price bubble," the hot and dry conditions of June and early July intervened on center stage. Instead of a new record corn crop of 14,790 million bushels forecast by the United States Department of Agriculture (USDA) (May and June World Agricultural Supply and Demand Estimates), we will likely see about 2,000 million bushels less than this—barely above the size of old crop 2011, with its tiny carryout. How the USDA could have missed the target so badly is puzzling. But, the weather humbles us all.

The hot and dry conditions this year can be compared to a slightly reduced version of 24 years ago in 1988, or certainly to an expanded version of 2002—when the eastern Cornbelt took the brunt of the troubles by itself. The 2012 pattern is shown in the bubble map, with big losses from Indiana and Illinois west to Kansas, but with decent output still likely in Nebraska, Minnesota, and, especially, the Dakotas (Chart 1).

Chart 1:
Corn Production Change, 2012-13 vs Previous Year

Corn Production, Mil Bu			
State	2011	2012	Change
IA	2356	2237	-120
KS	449	427	-22
MN	1201	1504	302
MO	350	324	-26
ND	216	437	220
NE	1536	1508	-28
SD	653	762	108
WI	518	482	-36
WCB	7281	7680	399
IL	1947	1661	-285
IN	840	695	-144
KY	181	154	-26
MI	335	301	-34
OH	509	544	36
ECB	3811	3357	-454
NE	313	358	45
SE	164	183	19
SC	496	606	110
West	294	284	-10
US	12358	12467	109



PRX yield of 140.6 bu/ac means production of 12467 mil bu, down 2.3 bil bu vs. June USDA, down 0.5 bil bu vs. July USDA.

Table 1:
United States Corn Supply-Demand

Item	Unit	Crop year (Sep-Aug)										
		02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
Carry-in	mil bu	1596	1087	958	2114	1967	1304	1624	1673	1708	1128	752
Area planted	thou ac	78894	78603	80930	81779	78327	93522	85982	86382	88192	91921	96405
Area harvested	thou ac	69330	70944	73632	75117	70638	86520	78570	79490	81446	83981	88487
Yield	bu/ac	129	142	160	148	149	151	154	165	153	147.2	140.9
Production	mil bu	8967	10089	11807	11112	10531	13038	12092	13092	12447	12358	12467
Imports	mil bu	10	14	10	9	12	20	14	8	28	22	30
Supply (including imports)	mil bu	10573	11188	12775	13236	12508	14362	13730	14773	14182	13509	13249
Carry-out	mil bu	1087	958	2114	1967	1304	1624	1673	1708	1128	752	648
Disappearance (Use)	mil bu	9487	10230	10661	11269	11205	12737	12056	13066	13054	12757	12601
Feed/Residual Use	mil bu	5611	5795	6138	6153	5599	5946	5151	5242	4898	4800	4750
Food & Industrial Use	mil bu	2300	2537	2710	2975	3483	4355	5057	5839	6323	6355	6251
of which, Conventional ethanol	mil bu	1010	1190	1348	1648	2129	3001	3713	4474	4933	4956	4841
Production	mil gal	*2737*	*3233*	*3673*	*4501*	*5829*	*8261*	*10209*	*12250*	*13555*	*13690*	*13443*
Net exports	mil gal		*-208*	*-112*	*-501*	*-588*	*-353*	*-235*	*217*	*822*	*1158*	*1095*
Domestic use	mil gal		*3434*	*3835*	*4835*	*6392*	*8437*	*10439*	*12619*	*12980*	*12786*	*12600*
Advanced ethanol imports										*34*	*250*	*450*
Domestic Use	mil bu	7911	8332	8848	9128	9082	10301	10208	11081	11221	11155	11001
Exports (-)	mil bu	-1576	-1898	-1813	-2141	-2123	-2436	-1849	-1985	-1833	-1601	-1600
Carryout-to use ratio	pct	*11.5%*	*9.4%*	*19.8%*	*17.5%*	*11.6%*	*12.8%*	*13.9%*	*13.1%*	*8.6%*	*5.9%*	*5.1%*
US Farm Price	cts/bu	232	242	206	200	304	420	406	355	518	620	630

With dramatically reduced yield, demand rationing sets in. Lower exports likely, and fuel ethanol mandate will need to absorb surplus RINs rather than real corn.

The supply-demand table shows that with the small carry-in from 2011-2012, the new crop 2012-2013 supply will be no greater than old crop, and so the pressure will remain and intensify for price rationing of demand (Table 1). In the present table, we have reduced exports and also fuel ethanol usage. The idea is that motor fuel refiners and blenders in the next year will use their carry-over of Renewable Identification Number

(RIN) certificates to comply with the Renewable Fuel Standard (RFS) mandate, as opposed to blending more physical gallons of ethanol.

Some grain merchandisers are talking about the desirability of the Environmental Protection Agency's (EPA) waiving the RFS in view of the poor corn yield, but this is unlikely. EPA has already refused a waiver request from the state of Texas in 2008, based on high corn prices causing "severe economic harm." At that time, EPA said that it had interpreted the waiver provision as providing only narrow waiver authority. EPA would have to determine, with a high degree of confidence, that the implementation of the mandate itself would severely harm the economy; it is not enough to determine that implementation of RFS would contribute to such harm. Obviously, the RFS did not cause the poor weather.

But if EPA remains steadfast in this stated policy, there is the definite chance that Congress could intervene, and possibly invoke some sort of legislative "off-ramp" from the mandate in years of poor corn yields. It is difficult to see this happening rapidly.

It is still too soon to forecast risk management conditions ahead into harvest, but grain elevator earnings often suffer with small crops and weaker spreads in the futures market.

Future Corn Yield Trend and Deviation

The poor yield of 2012 forces us to adopt the long-term trend of 1974-2012, with a considerably lower yield in 2020 than previously modeled—and high corn and soybean prices if demand stays strong.

Three years ago, forecasters looking ahead had considerable optimism. The corn yield trend of 1996-2009 was on a much higher slope than the 35-year trend of 1974-2009 (Chart 2). The new trend, being driven perhaps by the continuing technology of genetically modified organism (GMO) seeds, promised yields by the year 2020 that were on the order of 10 bushels per acre higher than the 35-year trend. This would make the job of providing for domestic feed, exports, and the fuel mandate look fairly easy. In fact, some corn growers worried about the return of surplus corn and low prices.

But now, after below trend yields in 2010, 2011, and 2012, such optimism has completely faded. In the 140-year record of U.S. corn yields, instances of *three or more*

consecutive years below trend are rare. Perhaps two or three times, depending on the method used for the arithmetic—though surely in 1932-1935 and 1974-1977.

No arrangement of atmospheric patterns—such as El Nino/La Nina, the Arctic Oscillation, or any other of dozens of indexes—has been found to explain the warm-dry spring and June-July drought in the middle U.S. cornbelt, leaving 97 percent of the rest of the world's surface to proceed normally. So we must assume that the odds for next year's cornbelt weather is the same as always, but also we must assume that the remarkable lack of volatility to the yield trend in the last 15 years or so is over. In other words, there is little choice but to revert to the longer term trend, let's say 1974-2012, as our "normal." This gives us a much smaller yield in 2020, and this makes the job of jointly satisfying domestic feed use, (growing world) exports, and the fuel mandate look much more challenging.

Chart 2:
U.S. Corn Yields

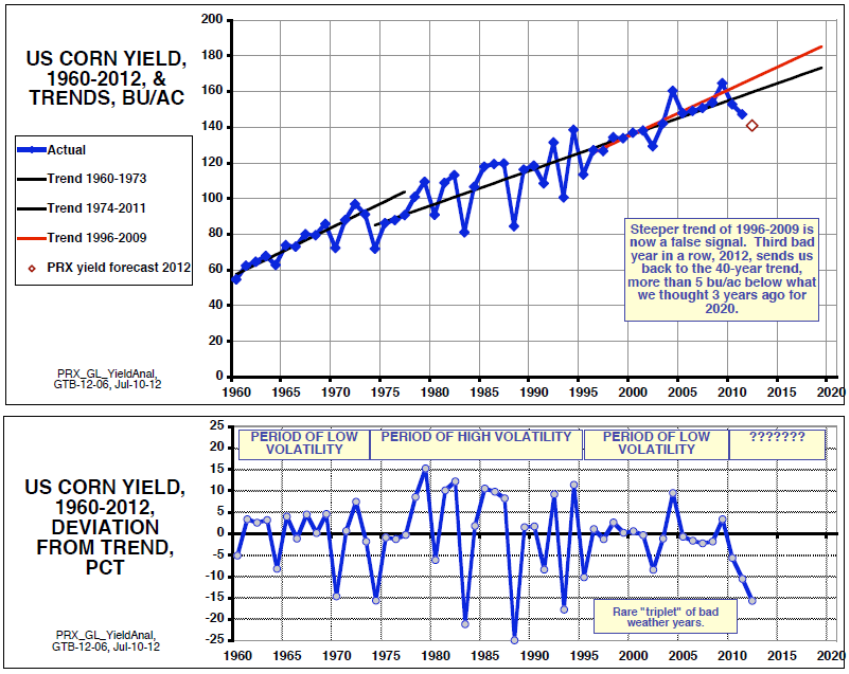


Table 2:
PRX Blue Sky Model #28 Implications for
Input Costs and Net Returns of U.S. Corn and Soybean Sector

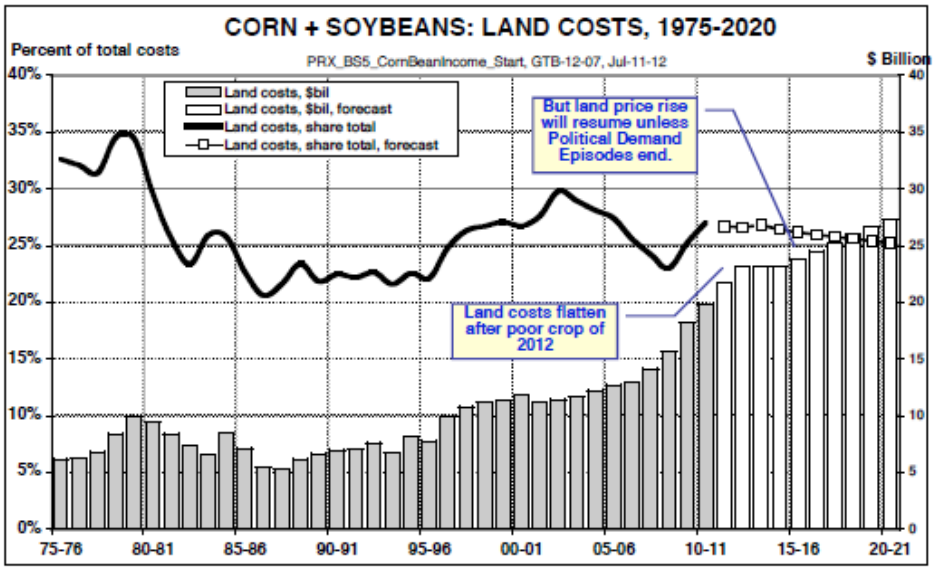
Item	Unit	Crop Year								
		08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	20-21
US corn farm price	$/bu	4.06	3.55	5.18	6.20	6.30	5.01	4.66	4.71	4.73
Corn + Soybeans gross value	$bil	78.7	78.7	102.1	114.5	120.9	108.9	101.9	104.6	114.5
Seed cost	$bil	8.1	10.6	11.3	11.6	12.7	12.8	14.1	15.3	21.6
Fertilizer cost	$bil	13.4	12.7	9.9	13.5	14.3	13.3	13.0	13.5	16.0
Chemicals cost	$bil	3.2	3.6	3.5	3.6	3.8	3.8	3.8	3.7	3.2
Other variable costs	$bil	9.0	7.2	8.4	9.5	10.2	10.1	10.0	10.5	13.0
Total variable costs	$bil	33.7	34.1	33.2	38.2	41.0	40.0	40.9	43.0	53.8
Gross return over variable costs	$bil	50.1	44.2	53.4	65.7	68.7	58.8	61.0	61.6	60.8
Land costs	$bil	15.6	18.2	19.9	21.6	23.2	23.1	23.1	23.8	27.3
Machinery & oth overhead costs	$bil	18.5	19.7	20.5	21.4	22.9	23.0	23.5	24.1	27.1
Total overhead costs	$bil	34.1	37.8	40.3	43.0	46.1	46.1	46.6	47.9	54.4
Total Costs	$bil	67.9	71.9	73.5	81.2	87.1	86.1	87.5	90.9	108.2
Net return over Total Costs	$bil	10.8	6.8	28.6	33.3	33.8	22.8	14.4	13.7	6.4
CCC Expenditures	$bil	2.3	2.8	2.5	2.7	2.0	2.0	1.9	1.8	1.3
Net return with CCC	$bil	13.1	9.5	31.1	36.0	35.8	24.8	16.3	15.5	7.7
Share of total costs										
Seed cost	pct	12.0%	14.7%	15.4%	14.3%	14.6%	14.9%	16.1%	16.9%	20.0%
Fertilizer cost	pct	19.8%	17.6%	13.5%	16.6%	16.4%	15.5%	14.9%	14.8%	14.8%
Chemicals cost	pct	4.7%	5.0%	4.8%	4.4%	4.4%	4.4%	4.3%	4.1%	3.0%
Other variable costs	pct	13.2%	10.1%	11.4%	11.7%	11.7%	11.7%	11.4%	11.5%	12.0%
Total variable costs	pct	49.7%	47.4%	45.1%	47.0%	47.1%	46.5%	46.7%	47.3%	49.7%
Land costs	pct	23.0%	25.3%	27.0%	26.7%	26.6%	26.8%	26.4%	26.2%	25.2%
Machinery & oth overhead costs	pct	27.3%	27.3%	27.9%	26.3%	26.3%	26.7%	26.9%	26.5%	25.1%
Total overhead costs	pct	50.3%	52.6%	54.9%	53.0%	52.9%	53.5%	53.3%	52.7%	50.3%

Point. Forecasting Input Costs requires more than a "cost plus" approach. With high crop prices, input suppliers are ahead of their own costs and will compete for share of the available Net Return Value for corn + soybeans. The Input Costs above in $billions can be seen as "indexes" of potentially achieveable average gross input prices.

With a downward revision of yield potential, it is difficult to project a substantial reduction in farm prices or in gross income to the average acre of U.S. corn-soybean cropland [Table 2]. What we get when we take this income (shown in the table as Corn + Soybean gross value) and then deduct estimated input costs is a picture of continued good "Net Return Over Total Costs," with no serious need of federal transfers (Commodity Credit Corporation or CCC).

As shown by chart 3, we expect land values to be flat for a few years, and then once again to increase—providing we are right in our assumption of continuing demand from (1) China, and (2) fuel ethanol (Chart 3). Our forecast of "flat" land values for a few years derives from a kind of "confidence shock" after the 2012 yield problem, even with 80 percent coverage of crop insurance).

Chart 3: Corn plus Soybean Land Costs, 1975-2020



Our forecast of "continuing demand" from the two big political episodes now underway is chancy—and our defense of this forecast will occupy the rest of this report.

Politics and the Structure of World Grain Demand

For the past 160 years, world grain demand has been dominated by about one dozen politically driven episodes, laid atop slow-moving trends, dominating commercial attention. Episodes typically come to peaks, mature, or collapse entirely.

Origins. In the 1840s, Britain led all nations in factory-made finished goods such as textiles. Factory owners wanted to extend this advantage, and they sought to repeal the country's tariff protection on wheat and other grains—so that cheap grain would lead to cheap bread in English cities, holding down the pressure for higher labor rates. After several years of debate, Parliament adopted a new "free trade" approach, and the first *episode* of intercontinental grain trade began.

Imported grain came to London from North and South America, Australia, the Black Sea, and elsewhere. The volume of the episode grew at about 4 percent per year for 68 straight years, benefiting from cheaper steam-powered vessels and transoceanic cable communications (Chart 4). But Germany and other European countries sought to compete

with Britain for control of factory goods markets, leading ultimately to the Great War, followed by a collapse of the grain demand episode.

Chart 4:
British Wheat and Feed Grain Imports 1840-1920

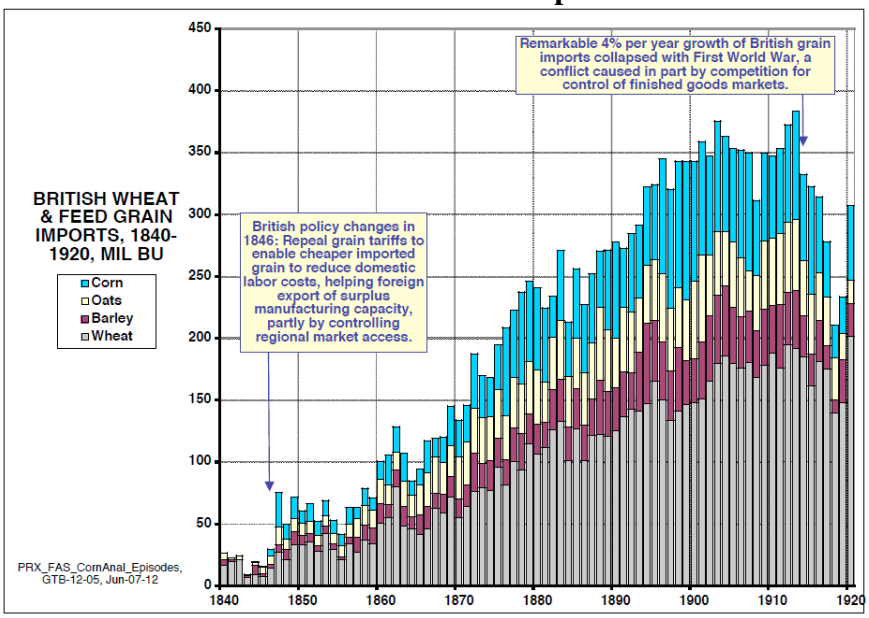
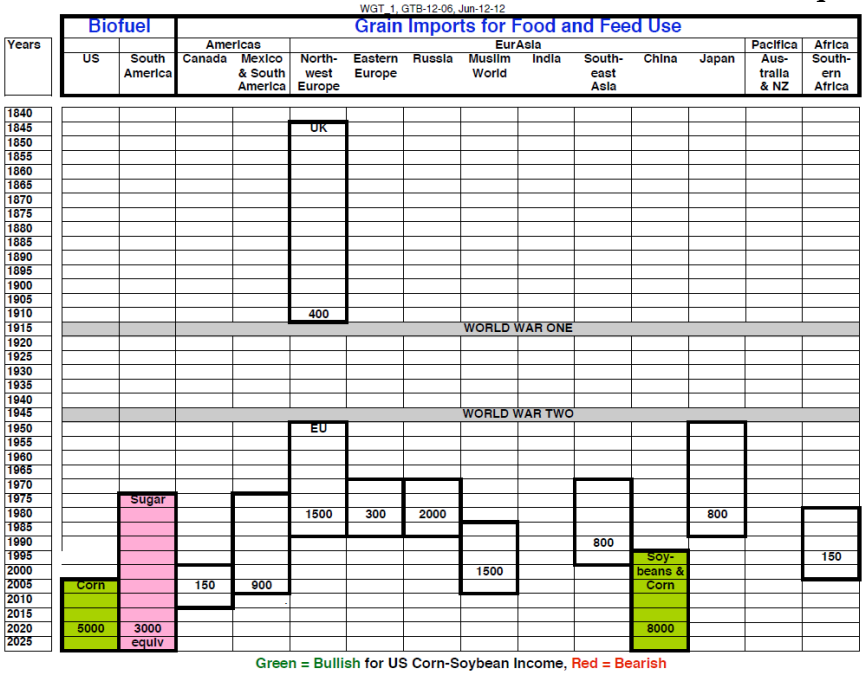


Chart 5:
Major Politically Driven World Demand Episodes, 1847-2025 by Region with Peak Grain Volume Estimated in Million bushels of Corn Equivalent



About One Dozen Political Episodes Since Second World War—the Latest the Greatest. Politically driven grain demand episodes sit atop slow-moving demographic and economic trends. These episodes command commercial attention because they emerge quickly and grow much more rapidly than the underlying fundamentals. But most of the political episodes are like shooting stars—they have beginnings, middles, and ends.

Three simultaneous episodes are at work today—the first of which is Brazilian sugarcane ethanol, then China's food/feed import demand (by far the largest in volume), and the third is the U.S. corn ethanol demand. The combination of China soybean imports and U.S. corn ethanol usage has driven income of the U.S. corn-soybean sector to new record highs. Brazilian sugarcane (and also expanded soybean and corn production in all of South America) competes with the U.S. for farm income.

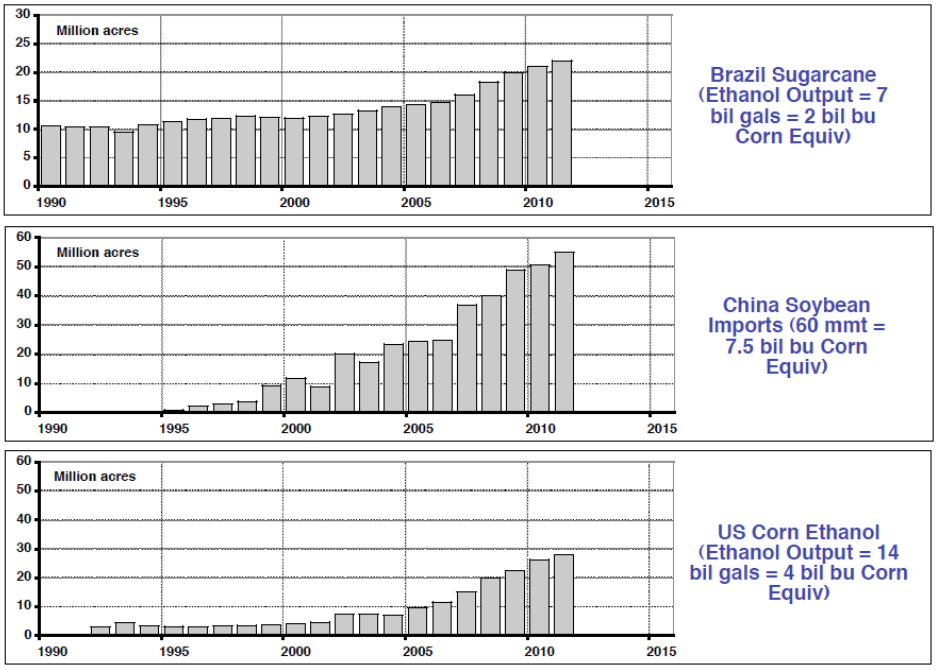
Question. Which of these three political episodes will last the longest—and how long will this be?

Three Political Episodes Driving Grain Markets Today

After about 2005, world grain and oilseed prices began to rise under the influence of the three political demand episodes already mentioned, and grain prices also began to display "covariance" with crude oil price. But any given crop, say corn, has its own life, including *flukes* of weather.

Relative Size and Speed of Three Episodes. The increasing acreages involved in today's three dominant political demand episodes are plotted in the chart below (Chart 6).

Chart 6:
Three Simultaneous Politically Driven Demand Episodes

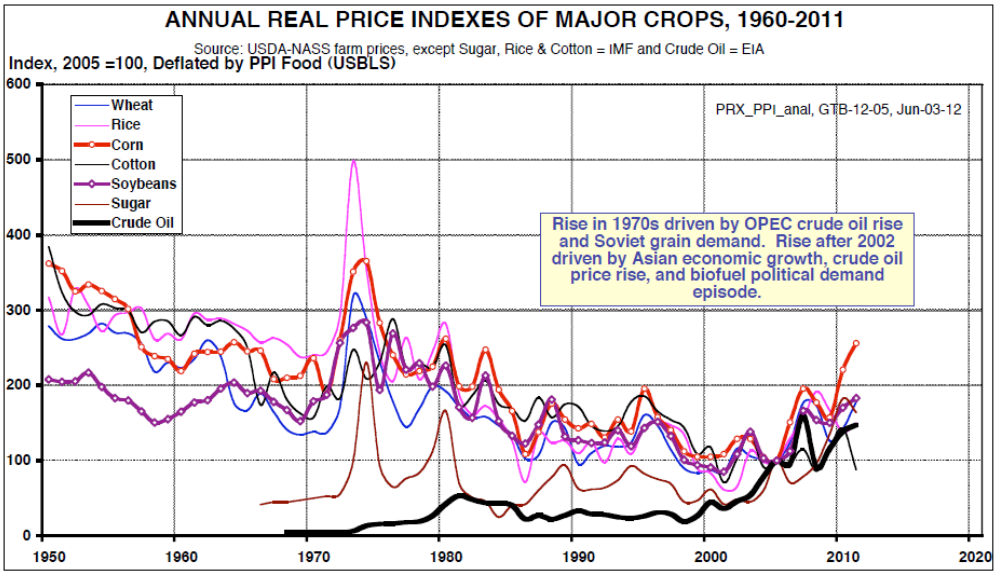


The acreage scales for China and the United States are the same, topping at 60 million acres, emphasizing that China's soybean imports require *twice* the area (somewhere in the Americas) as does corn ethanol, adjusted for the corn feed value of dried distiller grain (DDG).

The acreage scale of Brazil sugarcane is set at half that for China and the U.S. However, it should be noted that production per acre of sugarcane is double the tons per acre of either soybeans or corn (that is, corn seeds, not including the stover). Thus, from a visual standpoint, the three charts as stacked give a fair representation of scale and rate of growth for all three episodes now at work together in affecting market prices.

One reason why today's market action is difficult to follow is indeed this overlapping and interacting of three very different supply-demand tables: (1) The 5-year perennial sugarcane; (2) the China soybean situation, in which beans are not rotated with corn but domestically remain a limited kind of "specialty food crop" (for soy sauce and tofu), and (3) the giant U.S. corn table, with the other triple uses of domestic feed, foreign exports, and RFS-directed ethanol.

Chart 7:
Annual Real Price Indexes of Major Crops, 1960-2011



Not Only Episodes but Statistical "Flukes." The price chart shows the long decline in real prices of the major commodities until about 2005, when the grains began a *covariance* with crude oil price (and propelling the biofuel age) [Chart 7].

But note the situation with corn price for 2010 and 2011, increasing in real terms well above crude oil and the "rest of the family." This independent rise is due to the happenstance of two mediocre yield years in the US (2010 down 4 percent from trend, and 2011 down 9 percent).

There is thus no getting away from the obvious: Political episodes are at risk of being overturned by flukes of crop weather as much as changes in elections or economics. —We now face an almost unprecedented *third* mediocre yield year that transpires in 2012.

World Row Crop Acreage Increasing, but Not in United States

Over the past decade, world acreage of the ten major row crops increased by 184 million acres, of which only 8 million were in the US. The two other major export hubs, South America and the Black Sea, increased 90 million acres, accounting for half the world increase. But, the two political demand episodes of U.S. corn ethanol and China soybean and corn imports accounted for 52 million acres, or 28 percent of the world

increase—and their rate of growth was 13.3 percent per year, dwarfing everything else. Brazil sugarcane, a perennial crop, grew at 6.1 percent per year.

The purpose of giving the full USDA-FAS table on the next page is to place our concept of today's three politically driven demand episodes in a convincing context [Table 3]. Please study the table and observe carefully the following eight things about world and regional crop acreage:

1. Over the past 10 years, 2003-2012, the total acreage of the world's ten major row crops has increased by 184 million acres, a growth rate of about 1 percent per year.
2. Only 8 million acres of the increase has been in the U.S., where corn has grown but other row crops have declined.
3. The total growth of 176 million acres in the rest of the world is roughly equivalent to the world having added an entire other "cornbelt," though with about two-thirds the yield.
4. About 99 of the 184 million acre total world increase occurred in the three "major export hubs," namely the U.S., South America, and the Black Sea. This was a 2.2 percent rate of growth for South America and a 2.7 percent growth for the Black Sea. (Lines 27-29.)
5. The major importers grew by only 86 million acres, led by China (yes!) at 31 million acres (mainly corn), altogether only a 1 percent per year rate of growth. (Lines 31-34.)
6. By type of grain, growth in meatstuffs led with 69 million acres, and foodstuffs followed with 59 million acres. (Lines 35-38.) It should be emphasized that the role of US corn and soybeans is the production of meat for those with the money for it—not for "food" to feed the poorest.
7. Note especially the two politically driven demand episodes shown in lines 39 and 40. U.S. corn for ethanol grew by 18 million acres, and China corn and soybean imports by 34 million acres. Together the two episodes represented growth of 52 million acres, or 28 percent of the total world increase. And the rate of growth over the decade of the two episodes dwarfs everything else at 13.3 percent.
8. Brazil sugarcane (a perennial crop), shown in line 43 separately from the annual row crops, grew by 9.4 million acres, a growth rate of 6.1 percent.

Acreages, of course, represent different qualities of land, and thus different yields. For instance, the usable biomass from sugarcane acreage is roughly twice that of feed grain acreage. Oilseed crops have half or less the yield in bushels as feed grains, but their protein and oil content is much higher— and thus, too, their price per bushel. *But the raw acreage numbers give a useful overview of the structure of the growth in world agriculture over the past ten years.*

Table 3:
World and US Area Harvested of Ten Major Row Crops 2003-2012

PRX_WorldAYPanel_Start, GTB-12-05, May-2012

	Reg-ion	Row Crop	Northern Hemisphere Crop Years										12-13 minus 03-04		
			03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	AH	Share	Rate
			mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	share	pct
	WORLD														
1		Barley	144	143	137	140	139	137	134	118	123	126	-18	-10%	-1.5%
2		Corn	351	359	360	369	397	392	389	402	417	431	80	44%	2.3%
3		Sorghum	107	97	104	102	105	103	95	96	94	98	-9	-5%	-1.0%
4		Major Feedgrains	602	599	601	612	640	631	618	615	635	655	53	29%	0.9%
5		Wheat	513	534	540	524	537	555	558	540	548	547	33	18%	0.7%
6		Peanuts	56	53	54	50	52	53	51	53	52	53	-3	-2%	-0.6%
7		Rapeseed	63	66	67	65	70	77	78	83	82	82	19	10%	3.0%
8		Soybeans	218	230	230	233	224	238	252	254	253	263	45	24%	2.1%
9		Sunflower	57	52	57	59	52	59	57	57	64	65	8	4%	1.5%
10		Major Oilseeds	394	401	407	407	398	427	438	448	450	463	69	37%	1.8%
11		Rice	369	375	380	382	383	391	386	390	393	395	26	14%	0.8%
12		Cotton	80	88	86	85	81	76	74	82	89	84	4	2%	0.5%
13		Major 10 Row Crops	1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	UNITED STATES														
14		Barley	4.7	4.0	3.3	3.0	3.5	3.8	3.1	2.5	2.2	2.9	-2		-5.3%
15		Corn	70.9	73.6	75.1	70.6	86.5	78.6	79.5	81.4	84.0	89.1	18		2.6%
16		Sorghum	7.8	6.5	5.7	4.9	6.8	7.3	5.5	4.8	3.9	5.1	-3		-4.5%
17		Major Feedgrains	83.5	84.2	84.1	78.5	96.8	89.6	88.1	88.7	90.1	97.2	14		1.7%
18		Wheat	53.1	50.0	50.1	46.8	51.0	55.7	49.9	47.6	45.7	49.2	-4		-0.8%
19		Peanuts	1.3	1.4	1.6	1.2	1.2	1.5	1.1	1.3	1.1	1.4	0		0.7%
20		Rapeseed	1.1	0.8	1.1	1.0	1.2	1.0	0.8	1.4	1.0	1.5	0		3.9%
21		Soybeans	72.5	74.0	71.3	74.6	64.1	74.7	76.4	76.6	73.6	73.0	0		0.1%
22		Sunflower	2.2	1.7	2.6	1.8	2.0	2.4	2.0	1.9	1.5	1.7	0		-2.7%
23		Major Oilseeds	147.3	150.1	145.2	151.4	130.6	151.9	154.6	155.9	149.4	148.8	2		0.1%
24		Rice	3.0	3.3	3.4	2.8	2.7	3.0	3.1	3.6	2.6	2.5	0		-1.9%
25		Cotton	12.0	13.1	13.8	12.7	10.5	7.6	7.5	10.7	9.5	10.5	-2		-1.5%
26		Major 10 Row Crops	228.6	228.4	228.0	219.5	229.6	235.4	228.9	231.8	225.2	236.9	8	5%	0.4%
	Three Major Export Hubs														
27	UNITED STATES		229	228	228	219	230	235	229	232	225	237	8	5%	0.4%
28	SOUTH AMERICA		193	201	198	202	211	205	210	219	226	235	42	23%	2.2%
29	BLACK SEA (FSU)		179	196	203	205	201	225	224	204	227	227	48	26%	2.7%
30	Subtotal		600	625	629	627	641	665	663	655	678	699	99	54%	1.7%
	Major Importers														
31	CHINA		252	260	265	268	269	274	280	282	283	284	31	17%	1.3%
32	Others		1107	1112	1120	1115	1128	1141	1131	1137	1152	1161	54	29%	0.5%
33	Subtotal		1359	1372	1385	1383	1397	1415	1412	1419	1436	1445	86	46%	0.7%
34	World Total		1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	Meatstuffs (Feedgrains + Oilseeds), Foodstuffs (Wheat + Rice), &Cotton,														
35	Meatstuffs ex China		972	971	975	984	990	1002	993	994	1008	1041	69	38%	0.8%
36	Wheat and Rice Total		882	909	921	906	920	946	944	929	940	942	59	32%	0.7%
37	Cotton Total		80	88	86	85	81	76	74	82	89	84	4	2%	0.5%
38	Subtotal		1934	1969	1982	1975	1991	2024	2012	2006	2037	2066	132	72%	0.7%
	Politically Driven Demand Episodes														
39	US Corn Fuel Ethanol		6.6	6.4	8.8	10.5	13.9	18.1	20.6	24.2	25.5	24.4	18	10%	15.7%
40	China Corn + Beans Imp		18.4	22.4	24.2	24.6	33.3	38.0	42.4	44.5	50.9	52.7	34	19%	12.4%
41	Subtotal		25.0	28.8	33.0	35.1	47.2	56.1	63.0	68.8	76.4	77.1	52	28%	13.3%
42	Total		1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	Sugarcane														
43	Brazil Sugarcane		13.3	13.9	14.3	14.7	16.1	18.3	19.9	21.0	22.0	22.6	9.4		6.1%
44	Others		37.7	36.2	34.7	36.6	40.3	41.5	38.8	37.9	36.9	37.4	-0.3		-0.1%
45	Total World Sugarcane		51.0	50.1	49.1	51.2	56.4	59.7	58.7	58.8	58.9	60.0	9.0		1.8%

China's Soybean Imports Require Twice the Acreage as Corn Ethanol

China's soybean imports, and now probably increasingly its corn imports as well, is the largest demand episode underway today—and one which should continue despite a shift in China's economy away from export growth and towards consumer demand.

Chart 8 shows China's imports of all grains, oilseeds, and food oils since 1985. The boom in soybean imports began in the late 1990s with a few million tons, and today in 2012 will exceed 60 million tons.

Three points about this vast tonnage of soybeans should be made: (1) China now accounts for about 40 percent of all world trade in soybeans and soymeal; (2) China imports about three-fourths of all its consumption of food oil, through soybeans and palm oil; and (3) China's imports of soybeans requires over 50 million acres of quality cropland in the Americas, land that could deliver over 7.5 billion bushels of corn. Thus, in terms of overall world grain demand, China is twice as important as fuel ethanol—and especially to the combined corn-soybean sector of the US.

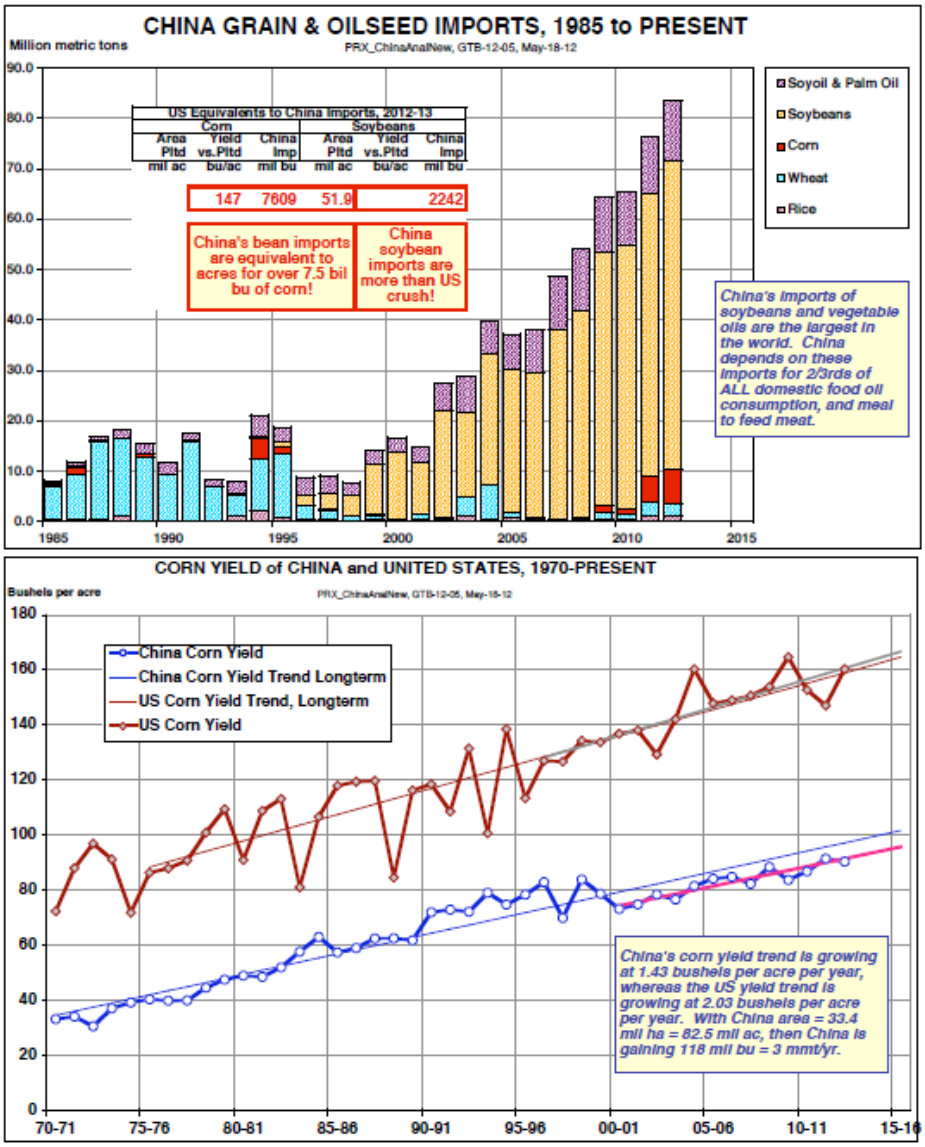
Could Economic Slowdown = Soybean Import Slowdown? We think not, and we cite the former Soviet Union's grain demand episode of the 1970s and 1980s as a precedent. In other words, a slowing of China's export economy, and a shifting towards a consumer economy, argues that a leadership with money (China) would make even greater grain purchases, to keep its urban meat-eaters happy. Finally, China's corn yield is half that of the U.S., and not rapidly increasing—and branded genetic seeds are not a possibility without full protection of intellectual property rights. So it makes sense, as shown in Table 4, to project growing corn imports as well as continued soybean imports.

Table 4:
China Meat Production vs. Corn and Soybean Import Demand

Cal Year of Prdn	Meat Production				China Corn				China Soybeans				
	Beef	Pork	Poultry	Total Meat	Dmstc Prdn	Im-ports	Feed use	Fed per mt meat	Dmstc Prdn	Im-ports	Crush	Meal use	Beans Fed per mt meat
	mmt	mmt	mmt	mmt	mmt	mmt	mmt	mt	mmt	mmt	mmt	mmt	mt
2000	5.1	39.7	9.3	54.1	106.0	0.1	92.0	1.70	15.4	13.2	18.9	15.1	0.35
2001	5.1	40.5	9.3	54.9	114.1	0.0	94.0	1.71	15.4	10.4	20.3	16.2	0.37
2002	5.2	41.2	9.6	56.0	121.3	0.0	96.0	1.71	16.5	21.4	26.5	21.2	0.47
2003	5.4	42.4	9.9	57.7	115.8	0.0	97.0	1.68	15.4	16.9	25.4	20.4	0.44
2004	5.6	43.4	10.0	59.0	130.3	0.0	98.0	1.66	17.4	25.8	30.4	24.3	0.51
2005	5.7	45.6	10.2	61.4	139.4	0.1	101.0	1.64	16.4	28.3	34.5	27.6	0.56
2006	5.8	46.5	10.4	62.6	151.6	0.0	104.0	1.66	15.1	28.7	36.0	28.8	0.57
2007	6.1	42.9	11.3	60.3	152.3	0.0	106.0	1.76	13.4	37.8	39.5	31.6	0.66
2008	6.1	46.2	11.8	64.2	165.9	0.0	108.0	1.68	15.5	41.1	41.0	32.8	0.64
2009	5.8	48.9	12.1	66.8	164.0	1.3	118.0	1.77	15.0	50.3	48.8	39.1	0.73
2010	5.6	51.1	12.6	69.2	177.2	1.0	128.0	1.85	15.1	52.3	55.0	44.0	0.79
2011	5.6	49.5	13.2	68.3	191.8	5.0	131.0	1.92	13.5	56.0	59.1	47.3	0.87
2012	5.5	51.6	13.7	70.9	193.0	7.0	137.0	1.93	13.1	61.0	63.4	50.7	0.89
Annual Growth of Imports Implied at Current Meat Growth Trend													
				1.4		2.6		1.86		1.2			0.88
Annual Growth of Imports Implied (2012-2020) at Likely Future Meat Growth Trend (PRX)													
				2.5		5.0		2.00		2.5			1.00

PRX Forecasts. (1) China corn imports to increase at 2 mmt/yr (the other 3 mmt/yr from China's increasing yield trend. (2) China soybean imports to increase at about 2 mmt/yr.

Chart 8:
China Grain and Oilseed Imports and Corn Yields



China and US Biofuel Policy Combine to Drive Record Farm Income

The two political demand episodes have pushed combined soybean and corn area planted to a new record, absorbing the former paid land diversions. Whether the income boom will last depends on our assessment of the two simultaneous political episodes causing it.

Unlike most of the United States' economy, the country's corn-soybean sector is fully employed, expanding, and profitable. Chart 9 shows the area planted of corn and soybeans, which together has grown to a record above 170 million acres. Corn area has

been driven by the federal mandate for fuel ethanol—the acreage that completely absorbs the former "surplus area" that required paid set-asides as recently as the 1990s. Soybean area has been simultaneously driven by China's imports— a demand equivalent to over 50 million acres in the US, Brazil, and Argentina.

Chart 9:
US Corn & Soybean Area Planted with
Corn Area Set-Aside for Government Programs

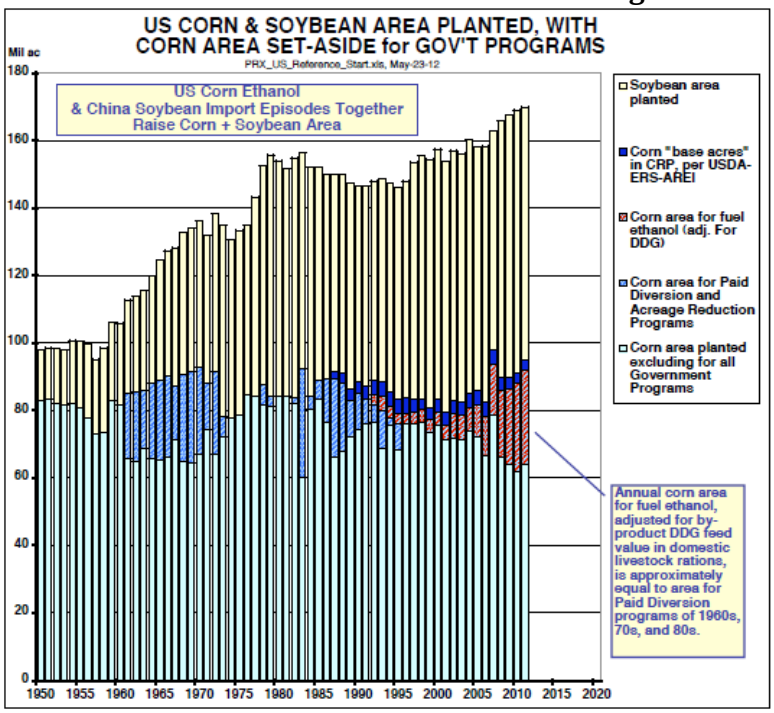


Chart 10:
Corn plus Soybeans: Gross Revenue Minus Costs, 1975-2020

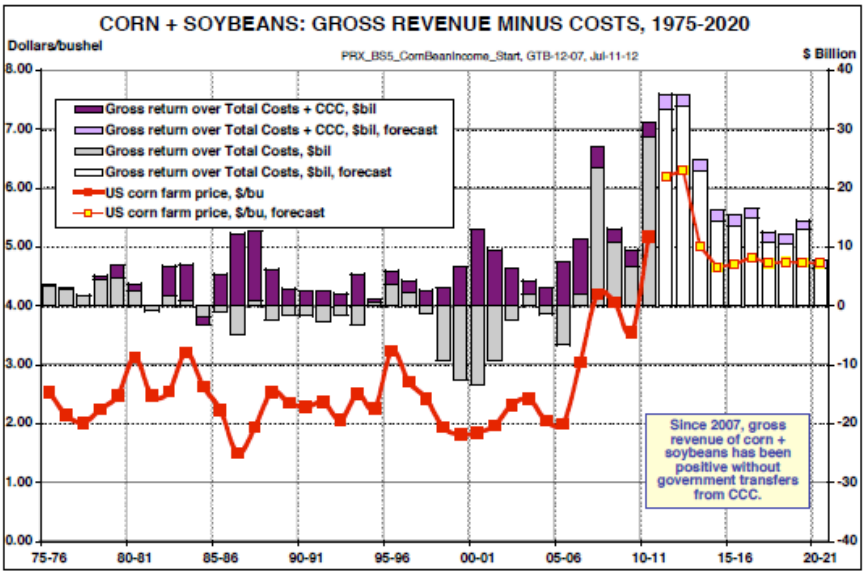


Chart 10 plots the extent of prosperity in the U.S. corn-soybean sector—from three previous decades of financial loss (made good only by government transfers via the CCC) to the present five years of record net profits.

Farmland Price Bubble? The price of good corn-soybean land has risen 20 percent or more for two straight years. Purchases, however, have been helped by very cheap credit—and the increasing land costs are reflected in the net earnings above. The projection, of course, is no better than the joint assumption being made in our current Blue Sky Model—that both the China import episode and the U.S. corn ethanol episode will continue, and not come to sudden collapse.

The purpose of this essay is to bring into our intellectual view the whole family of past political episodes, and to make a call. Our own conclusion is that there is a better than 50-50 chance that China's imports will not go bust, and that US ethanol policy (as complex and contradictory as it certainly is) will muddle through.

What Starts Political Demand Episodes?

Politicians respond to "clear and present dangers" with schemes designed to help their economies cope and to stay in power. Dozens of policy mechanisms have been employed. There is no one guaranteed approach.

As shown below (and in a different format previously on page 7), there are about one dozen political demand episodes making up world grain demand—apart from the underlying domestic grain demand in every country of the world, each of which moves along slowly with income growth. Our thesis here is that it is the large, rapid growing political episodes which mainly drive world grain prices. The main political features of these episodes are shown in Table 5. What usually initiates an episode is a "clear and present danger" to the country involved. The politicians are neither professional economists or strategic planners—they are leaders seeking to find ways and means of preserving their power and making their economies work under the perceived conditions which threaten them. They select political schemes they think will work and on which they can achieve enforceable consensus. The mechanisms employed are diverse. Each episode has unique initial conditions, longevity, and final outcome.

The three main episodes affecting world grain demand today—China, U.S. corn ethanol, and Brazil sugarcane—are shown in table 5, color coded green for bullish to the U.S. corn-soybean sector and red for bearish.

Chart 11:
World Corn Imports 1960-2012

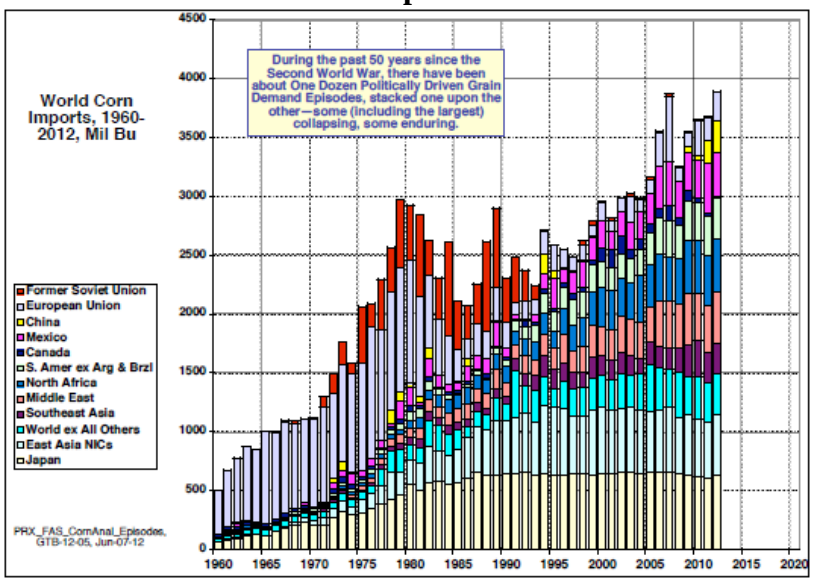


Table 5:
Major Politically Driven Grain Demand Episodes, 1846-2012+
and Impact on U.S. Corn-Soybean Income
Grey = Ended; Green = Bullish; Red = Bearish

Episode	Goal	Main Policy Features
British Grain Imports, 1846-1914	Alternative Food & Feedstuffs	Repeal grain tariffs to enable cheaper imported grain to reduce domestic labor costs, helping foreign export of surplus manufacturing capacity, partly by controlling regional market access.
EU Grain Imports, 1960-1985	Supplement Food & Feedstuffs	Unify and raise tariffs and domestic prices to enable imports of cheap US feed stuffs, with initial help from US Marshall Plan (helping US bolster defense against FSU)
Japan Grain Imports, 1960-2012+	Supplement Food & Feedstuffs	Keep domestic prices high, enabling imports of cheap US feed stuffs, with initial help from US Marshall Plan (helping US bolster defense of Asia)
FSU Grain Imports, 1973-1990	Supplement Food & Feedstuffs	Use windfall profits from rising crude oil price after Arab Embargo to purchase cheap feed stuffs from Americas, to increase meat supply, contain discontent.
China Corn Exports, 1990-2007	Export Earnings	With change to controlled market economy, rural grain stocks became surplus, easier to export until growth of urban meat demand caught up.
Asian NICs Grain Imports, 1970-2012+	Consumer Food & Meat Demand	With rapid income growth (sometimes assisted by US defense interests), but small agricultural capacity, imports of food & feedstuffs fill consumer demand.
N. Afr, M. East, & SE Asia, 1970-2012+	Consumer Food & Meat Demand	With rapid income growth (sometimes assisted by US defense interests), but small agricultural capacity, imports of food & feedstuffs fill consumer demand.
China Soybean Imports, 1995-2012+	Alternative Food & Feedstuffs	Import cheaper imported grain to increase meat and food oil production for new urban consumer base, helping foreign export of surplus labor/manufacturing capacity, partly by controlling currency.
US Corn Use for Ethanol, 2005-2012+	Alternative Fuels	Mandate domestic blending of corn ethanol to reduce petroleum imports, using surplus feed grain acreage, mainly by compliance trading system to pass costs of Alternative Fuel directly to public at retail pump.
Brazil Sugar Use for Ethanol, 1975-2012+	Alternative Fuels	Mandate domestic blending of sugar ethanol to reduce petroleum imports, using surplus cane acreage, mainly by enabling flex fuel auto fleet so that petroleum and ethanol could compete at retail pump.

How Long Do Political Episodes Last?

A careful look at the entire catalog of grain demand history arrives at an obvious conclusion: There is no way to say how long *any* politically driven grain demand episode will last. Episodes usually have beginnings, middles, and ends—but some can extend in a "flat" condition well beyond their peak.

The longest running political episode on record was the British grain import episode at 4% per year for 68 years—beginning with "free trade" in 1846, and ending with the First World War in 1914 [Chart 12]. Of the episodes after the Second World War, the European Union (EU) grain import episode lasted over 20 years; the Soviet grain import episode lasted a little less than 20 years; and the China corn *export* episode also lasted less than 20 years. The Japan grain import episode began and peaked after 30 years, and has remained flat another 20 years—as the country's economic growth has

continued while the country's agricultural resources are obviously small. The same pattern is true for the East Asia newly industrializing countries (NICs) (South Korea, Hong Kong, Singapore, and Taiwan).

Chart 12:
European Union, Former Soviet Union and Japan Corn Imports

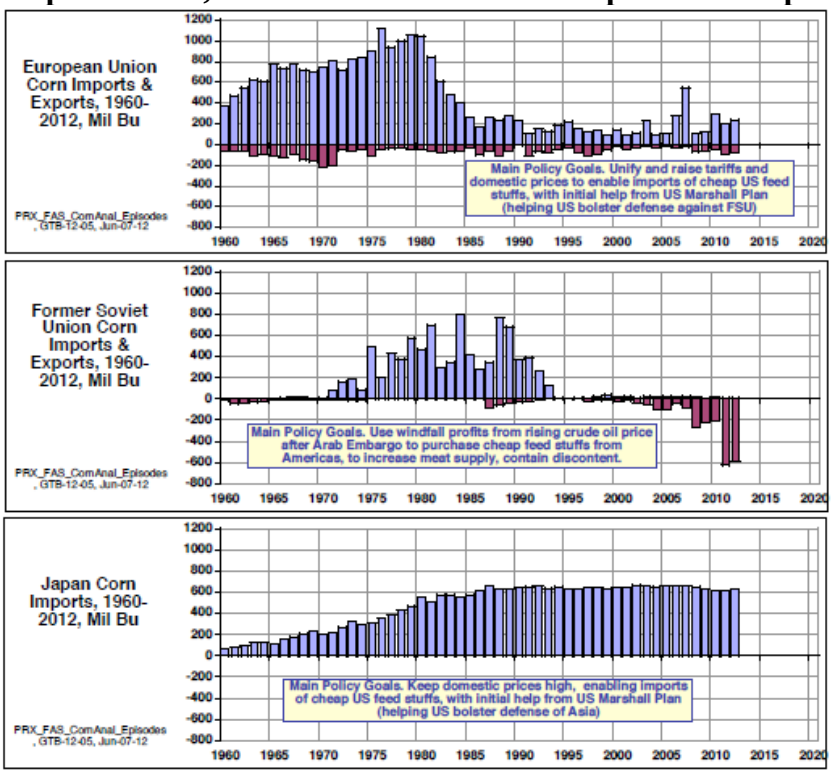
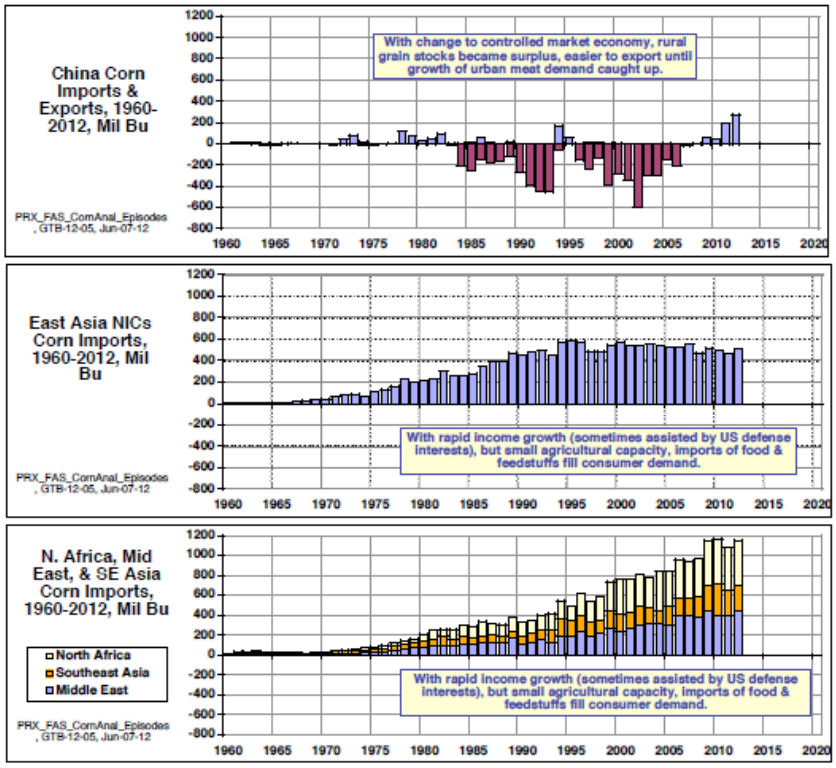


Chart 13:
China East Asia, and North Africa, Middle East and South East Asia Corn Imports



The growth patterns of North Africa, the Middle East, and Southeast Asia are less "politically driven" and more "economic growth driven," although one can find plenty of politics in Western assistance to all of these regions (especially "security" assistance to the Persian Gulf) [Chart 13]. Nonetheless, the plots in the bottom chart above are much more along the lines of what economists consider fundamentals than are displayed by all the other in our family of "political episodes."

Second Winds. Perhaps it can be said that no episode can last more than a generation (or some long period of time) without a "second wind." This was true of the British grain import episode, in the application of steam power to ocean cargo vessels in the 1870s, the laying of trans-oceanic cables for improved market communication (and thus better risk management/lower prices), and the full opening of the U.S. prairie lands (the cornbelt) after the Civil War—using British railroad technology to move grain to the U.S. east coast and onto steam vessels to Europe.

Future of US Corn Ethanol Demand

The odds favor that EPA will "muddle through" the problems and (probably before 2015) provide a reasonable new RFS3 for future required renewable fuel volumes. After the poor weather of 2012, however, there is a fair chance that Congress will attempt to provide an "off-ramp" to the RFS.

Five years ago, when the Energy Act of 2007 was being debated, the price of crude oil had risen to $140 per barrel and represented a "clear and present danger"—driving politicians to agree on a new Alternative Energy program of vast scale.

But today, that danger seems in the distant past. The price of crude oil has dropped to $85 per barrel and may continue down even more. The Organization of Petroleum Exporting Countries (OPEC) has a glut of oil, and new supplies of domestic oil and natural gas abound. The ideological question of humanity's need (immediately) to adopt alternative fuels in place of fossil fuels is much more difficult politically than the $140 price amidst hot war in the Middle East.

Another dramatic change from 2007 is the federal budget, which after the financial crisis of 2008-09 is now in perilous deficit. Happily, the RFS of the Energy Act of 2007 does *not* require subsidies from the Treasury. The RFS is a straightforward mandate for refiners to blend greater and greater volumes of certain alternative fuels, the cost of which is passed on directly to the public at the retail gas pump.

From the Washington point of view, what could be better? In other words, the RFS is not costing the government anything, and without it there would be no Alternative Energy program at all!

A further change from 2007, however, is that the degree of "organized combat" among stakeholders affected by the Act (and/or by any other of our laws) has sharply intensified. Every side of every law and regulation is noisily argued, and political agreement seems virtually impossible. In the case of the RFS, stakeholders who see themselves harmed by the higher grain prices (such as domestic livestock feeders) argue for repeal of the entire rule. So, too, do defenders of free enterprise and advocates of limited government. And add to this some environmentalists, who say that biofuels do not strongly contribute to reducing GHG emissions, and/or that today's corn-soybean agriculture is not sustainable.

But these political positions lack a "clear and present danger." Unless, of course, such a condition arises from the poor crop weather of 2012.

Could EPA waive the RFS in response to conditions? No, probably not, here is what the agency said in refusing such a request from the State of Texas in 2008:

- Section 211(o)(7) of the Clean Air Act allows the Administrator of EPA, in consultation with the Secretaries of Agriculture and Energy, to waive the requirements of the national renewable fuel standard, in whole or in part, if the Administrator determines, after public notice and opportunity for public comment, that implementation of the RFS requirements would severely harm the economy or environment of a State, a region, or the United States.
- EPA interpreted the waiver provision as providing only narrow waiver authority: EPA would have to determine (with a high degree of confidence) that the implementation of the mandate *itself* would severely harm the economy; it is not enough to determine that implementation of RFS would *contribute* to such harm.

The difficulties facing EPA in executing the RFS are well known. These problems include (1) The E10/E15 Blend Wall; (2) The lack of cellulosic biofuel production; and (3) The coming contradictions between the RFS rules and the new Corporate Average Fuel Economy (CAFÉ) rules.

Simplified Forecast. We think the odds favor that EPA will "muddle through" these troublesome issues (and that Congress will not successfully change the Law). Dealing with the E10/E15 Blend Wall requires mainly a rise in the price of RINs, probably sometime in 2013, when the current surplus of D6 Conventional RINs diminishes. Dealing with the lack of cellulosic biofuel has so far led EPA to rule in favor of "other advanced biofuels" to fill the gap, but EPA has full authority to "waiver cellulosics *without* creating a gap" (that is, without incentivizing large imports of Brazil sugar ethanol that could displace corn ethanol). EPA is competent to recognize conditions in the world sugar market that support this route. Furthermore, the text of the 2007 Energy Act compels EPA—in the wake of significant waivers of cellulosics—to modify the Renewable Volume Obligations for 2016-2022. Upon review with the Department of Energy (DOE) and USDA, EPA can be expected to respond, we believe, with a *reasonable* new RFS3 rule for the future.

The new CAFÉ rules may incentivize electric vehicles and disincentivize flex-fuel vehicles, at the further loss of liquid fuel markets. But such an outcome is many years away; in the meantime, automakers are arguing in favor of joint designs of high compression engines and high octane liquid fuels that could lead to ultra-low emissions, and the possibility of wide-spread mid-level blends in the range of ~E30. No one knows how these additional rules will play out.

Our idea of just how the EPA's "muddling through" will look is shown below.

Table 6: Annual Applicable Volumes of the RFS

PRX_RFS2_DisplayREV_Start.xls, GTS-12-06, Jul-09-12

	1	2	3	4	5	6	PRX Blue Sky #28 Assumptions (with new RFS3)							
Cal Year	Total Renewable Fuel	of which Advanced Biofuel: Total	of which: Cellulosic Biofuel*	of which: Biomass-Based Diesel	of which: (leaving) Other Advanced Biofuel	(leaving) Conven-tional Biofuel	Total Renwbl Fuel	Total Ad-vanced	Cellu-losic Ethanol	Biomass Based Bio-diesel	Other Advncd Ethanol Imports	Corn Ethanol domstc use	Corn Ethanol exports	All Ethanol Inclsn rate
	at least -20% GHG	at least -50% GHG	at least -60% GHG	at least -50% GHG	at least -50% GHG	at most -20% GHG	PRX	PRX	PRX	PRX	PRX	PRX	PRX	PRX
	at least bil gals	at least bil gals	at least bil gals	at least bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	pct
2009	11.100	0.600	n/a	0.500	n/a	10.500								
2010	12.950	0.950	0.100	0.650	0.200	12.000	13.167	0.187	0.000	0.153	0.034	12.980	0.827	10.0%
2011	13.950	1.350	0.250	0.800	0.300	12.600	13.803	1.017	0.000	0.767	0.250	12.786	1.163	10.0%
2012	15.200	2.000	0.500	1.000	0.500	13.200	13.980	1.380	0.010	0.920	0.450	12.600	1.100	10.0%
2013	16.550	2.750	1.000	1.000**	0.750	13.800	14.971	1.771	0.016	1.280	0.475	13.200	1.100	10.5%
2014	18.150	3.750	1.750	1.000	1.000	14.400	15.725	1.965	0.075	1.390	0.500	13.760	1.095	11.0%
2015	20.500	5.500	3.000	1.000	1.500	15.000	16.125	2.205	0.150	1.530	0.525	13.920	1.090	11.2%
2016	22.250	7.250	4.250	1.000	2.000	15.000	16.300	2.410	0.300	1.560	0.550	13.890	1.085	11.3%
2017	24.000	9.000	5.500	1.000	2.500	15.000	16.435	2.575	0.400	1.600	0.575	13.860	1.080	11.3%
2018	26.000	11.000	7.000	1.000	3.000	15.000	16.570	2.740	0.500	1.640	0.600	13.830	1.075	11.4%
2019	28.000	13.000	8.500	1.000	3.500	15.000	16.705	2.905	0.600	1.680	0.625	13.800	1.070	11.4%
2020	30.000	15.000	10.500	1.000	3.500	15.000	16.840	3.070	0.700	1.720	0.650	13.770	1.065	11.4%
2021	33.000	18.000	13.500	1.000	3.500	15.000								
2022	36.000	21.000	16.000	1.000	4.000	15.000								

**Biodiesel to be minimum of 1 bil gals after 2012.
*Cellulosic Biodiesel subject to annual waiver.
"Nested" nature of volume requirements means that Conventional (corn starch) ethanol has a MAXIMUM of 15 bil gals — subject to the E10/E15 inclusion rate restriction.

Retail pumps offer E15 and/or E85, via RIN price increases.
No assumptions on adoption of other forms than ethanol, such as "drop-ins."
For 2020, EIA shows Total Renewable at 19.929, with E85 at 2.750, and non-ethanol, non-biodiesel at 1.073.

Future of US Competition with Other Grain Export Hubs

The U.S. share of world grain trade will likely gain slowly on the two other world export hubs. Substantial contingency, of course, surrounds all of our forecasts in this report.

The world market share of U.S. corn (and other grain) exports vs. the other two major export hubs has declined from the levels of the 1970s and 1980s, but the volume of U.S. exports has held constant. The advantages of the United States—in terms of consistent high quality product, year-around availability, and commercial finance and risk management options—will likely push the U.S. share slowly back up in the coming years. Both South America and the Black Sea have enormous infrastructure problems, and the Black Sea has an extreme northerly climate more fickle than its competitors.

Chart 14:
World Corn Exports, 1960-2012

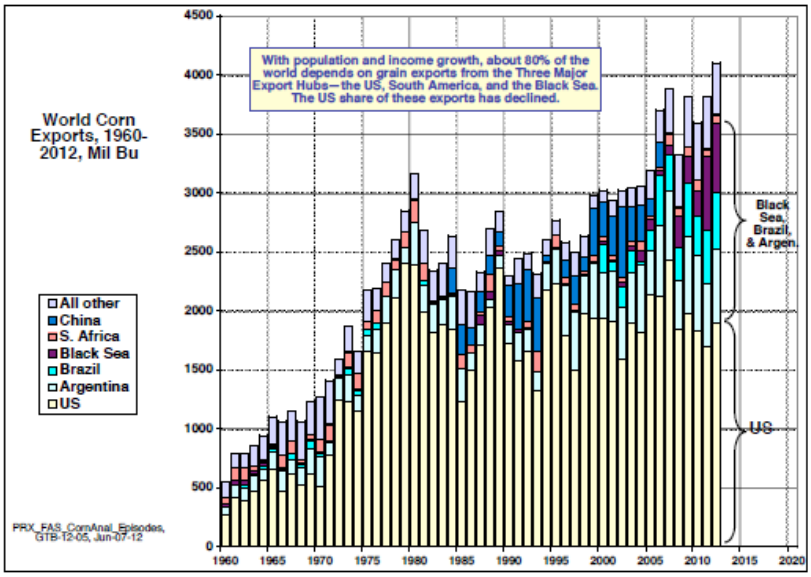


Chart 15:
Three Politically Conditioned Supply Responses

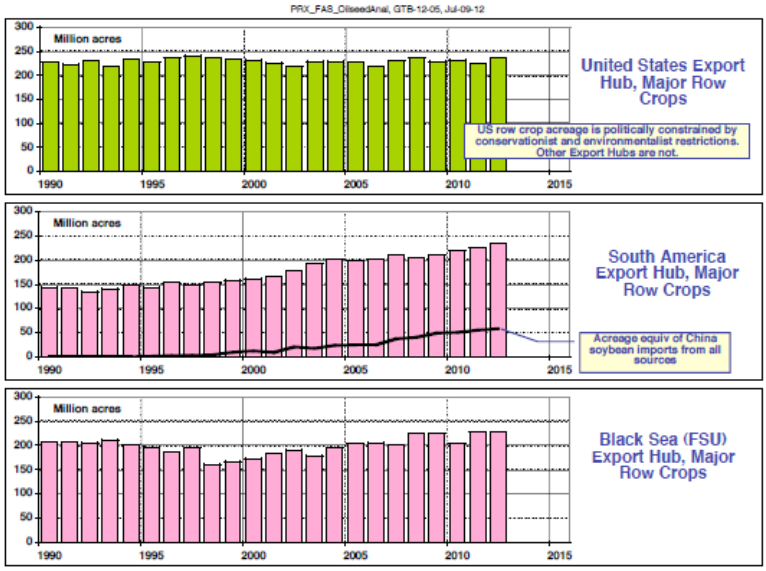


Table 7:
Current PRX Blue Sky 10-year Forecast and Contingencies

Green = bullish higher farm price & land prices, red = bearish

Factor	PRX Current Idea	Contingency
Weather volatility up	Crop prices up	????
	But land values flatter	????
China import demand episode	50-50+ to continue	World finance, economy, exchange rates ???
US competitiveness vs. other Export Hubs	2012 tough, but then gradual, small improvement	Greater foreign investment in infrastructures
Crude oil price	Range of $80-95/bbl	????
Ethanol Blend Wall	50-50+ with high RINs we'll reach 15 bil gals	RINs = untested mechanism
Congress revises RFS	Becoming more likely with the bad weather!	If Congress re-opens, trouble for corn
Ethanol imports and exports	50-50+ no huge sugar imports or 2-way vessels	For 2010-2012, EPA followed its own reason
Cellulosic waiver & "Other Advanced" biofuels	EPA must revise RVOs for 2016-2022, will be logical	EPA (w/DOE & USDA) may not be reasonable
RFS vs. CAFE	??? The two laws are not coordinated	If CAFE favors Electric vs FFV, negative corn
		But if CAFE = High Octane Engines, then ~E30?!

As happened in the drought of 1988, when the concept of Anthropogenic Global Warming (AGW) blossomed into one of the most powerful political ideas of modern times, there will be many claims that "The hot-dry conditions of 2012 are consistent with the AGW climate change models." Possibly so, but the conditions were not *predictable*, even a few weeks in advance. And next year will be unpredictable too, as will the following years, one by one. We have only history for guidance—and as previously mentioned, the 2012 conditions are very rare in the record.

Our assumption for 2013 yield will be "normal," right on trend. For the other years to 2020, we will use a deviation pattern typical of the past 40 years.

Strategic Caution. We observed that the EPA itself is not likely to waive the RFS in connection with the poor yield of 2012. But the possibility of Congress revising the RFS is higher. The 2007 mandate is remiss in essentially ignoring variations in annual crop weather, as though biofuels policy could rely every year on a guaranteed volume of biomass output. The odds are good that agriculturalist members of Congress will offer legislation (known as "off-ramps" to the mandate), but it is not foreseeable that such amendments will pass or in what form.