The Role of Actively Traded Multiyear Futures Contracts in Price Discovery

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The Missing Multiyear Futures Market

Long History in the Literature

- **Hendrik S. Houthakker** (1967), suggests expanding futures markets 2-3 years.
    - Introduce government involvement in distant delivery months.
    - Purpose: provide a stable environment for hedging related to production and storage.
- **Newbery & Stiglitz** (1981), "the absence of futures markets (stretching sufficiently far into the future) is an obvious market failure."
    - Recognize the gains and costs required extending these markets.
    - Changed the emphasis from price controls to the implications of **missing contingency markets.**
- **Bullock** (1984), expands on Houthakker's idea
    - Introduce specialists to keep distant prices in line with expected market fundamentals.
- **Dobson** (1984), rejects Bullock's proposal
    - Questions the ability of trained professionals to ensure the distant price reflects expected market fundamentals. Can a market mechanism be expected to achieve this?
- **Gardner** (1989), how significant is this missing market?
    - "seems clear unobserved prices would be related to nearby prices as spreads between different months are currently"

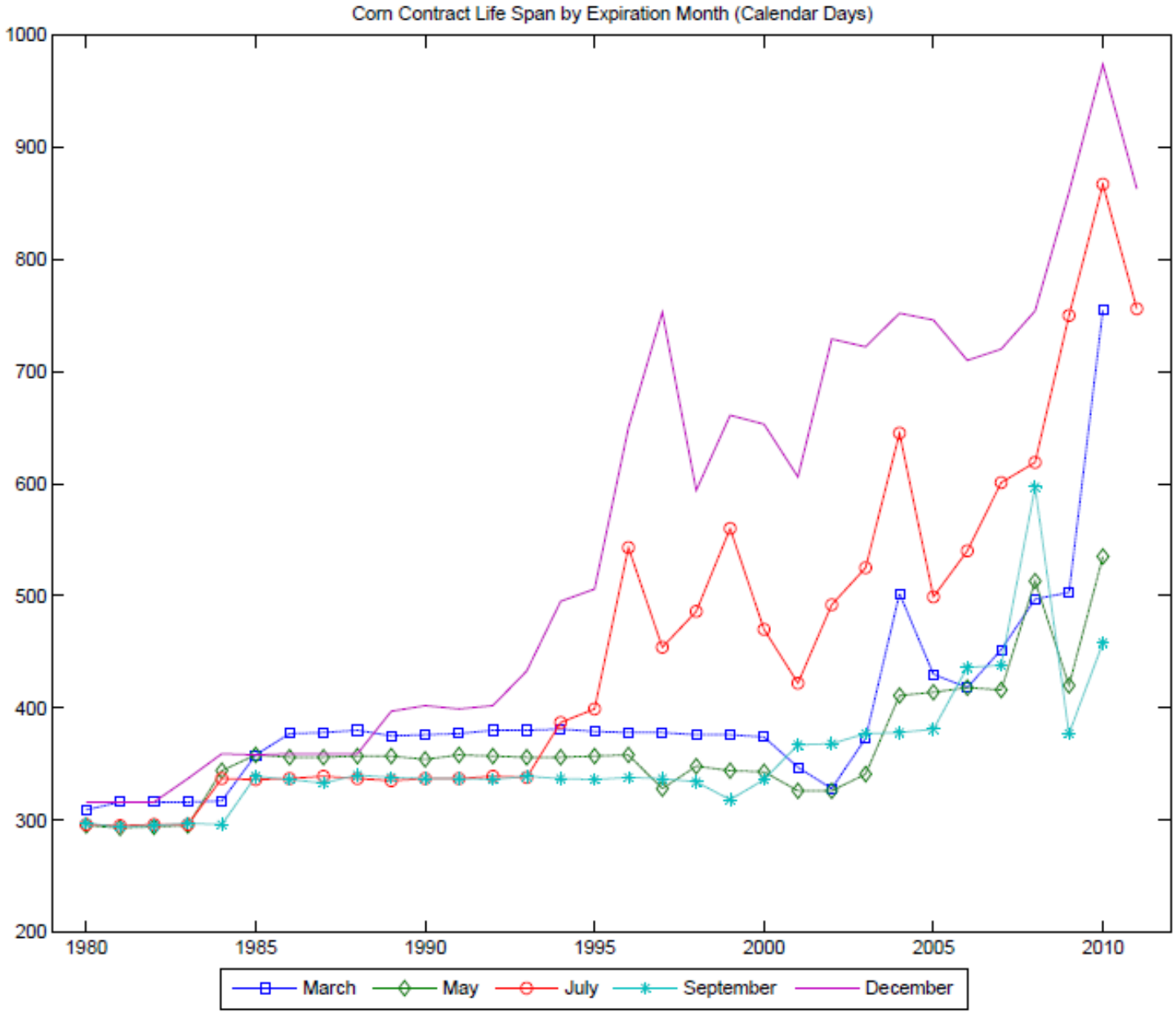
The Missing Multiyear Futures Market

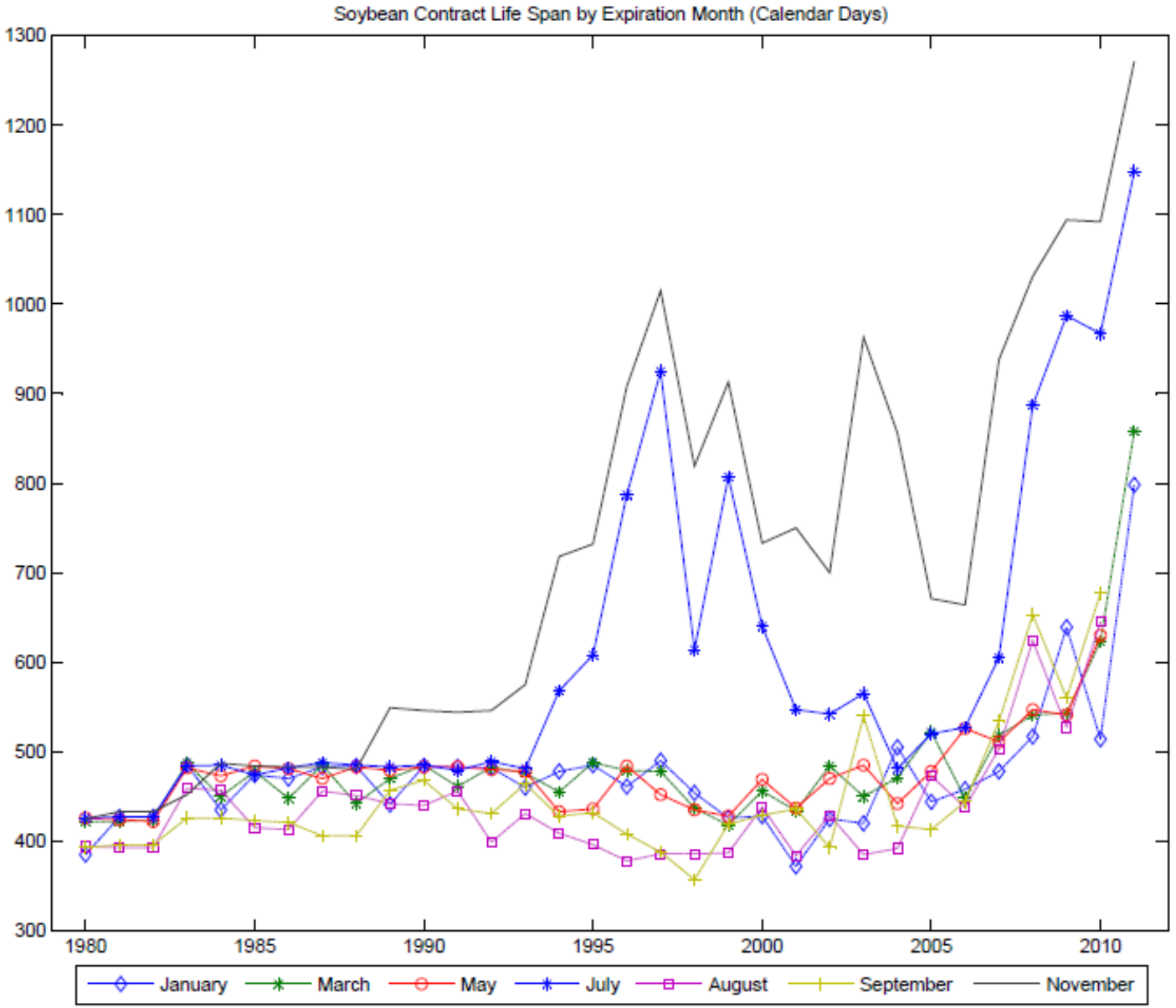
Research Focused on Understanding the Impact

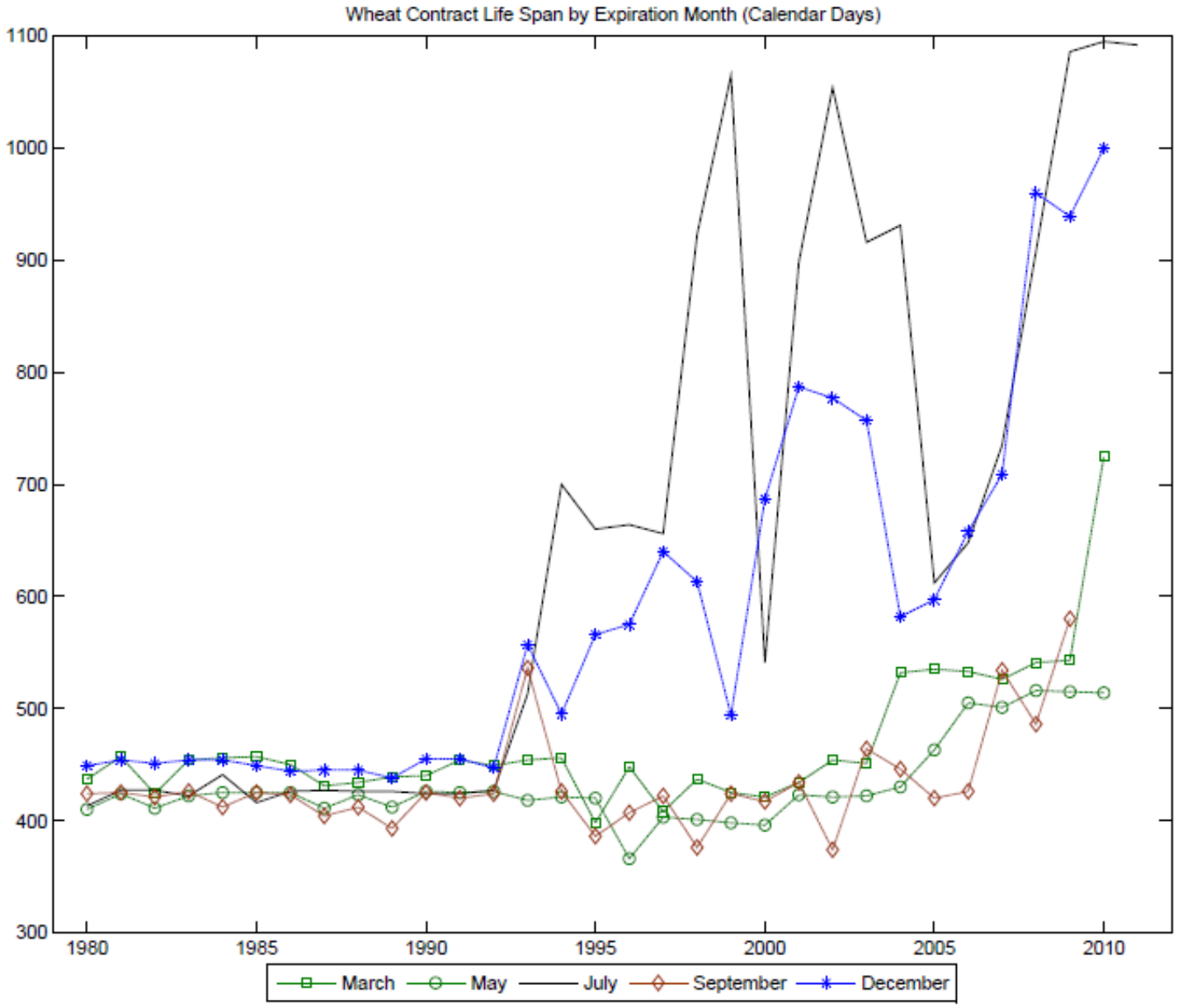
- **Williams** (1986)
  - The number of contracts depends on what additional information is provided.
  - Prices between contracts differ by the price of the spread over the interim.
  - Need to understand the behavior of the distant spread response to new information.
    - Will determine if the price system is an incomplete market.
- **Gardner** (1989)
  - Finds there exist alternative marketing strategies (sequential rollovers) that achieve similar benefits.
  - Simulates the behavior of a hypothetical multiyear futures contract.
  - Results imply the missing market is not a serious problem.

Movement Toward a More Complete Market

- Investigating historical contract data 1980 – 2008 shows clear change across different commodities.
- Corn, December 2010, first traded price 2/6/2007 → to span approximately four years.


Corn Contract Life Span by Expiration Month (Calendar Days)
1000
900
800
700
600
500
400
300
200
1980
1985
1990
1995
2000
2005
2010
March
May
July
September
December


Soybean Contract Life Span by Expiration Month (Calendar Days)
1300
1200
1100
1000
900
800
700
600
500
400
300
1980
1985
1990
1995
2000
2005
2010
January
March
May
July
August
September
November


Wheat Contract Life Span by Expiration Month (Calendar Days)
1100
1000
900
800
700
600
500
400
300
1980
1985
1990
1995
2000
2005
2010
March
May
July
September
December

Corn New Crop Contract 1979 through 2008
Open Interest Given Number of Trading Days Till Expiration

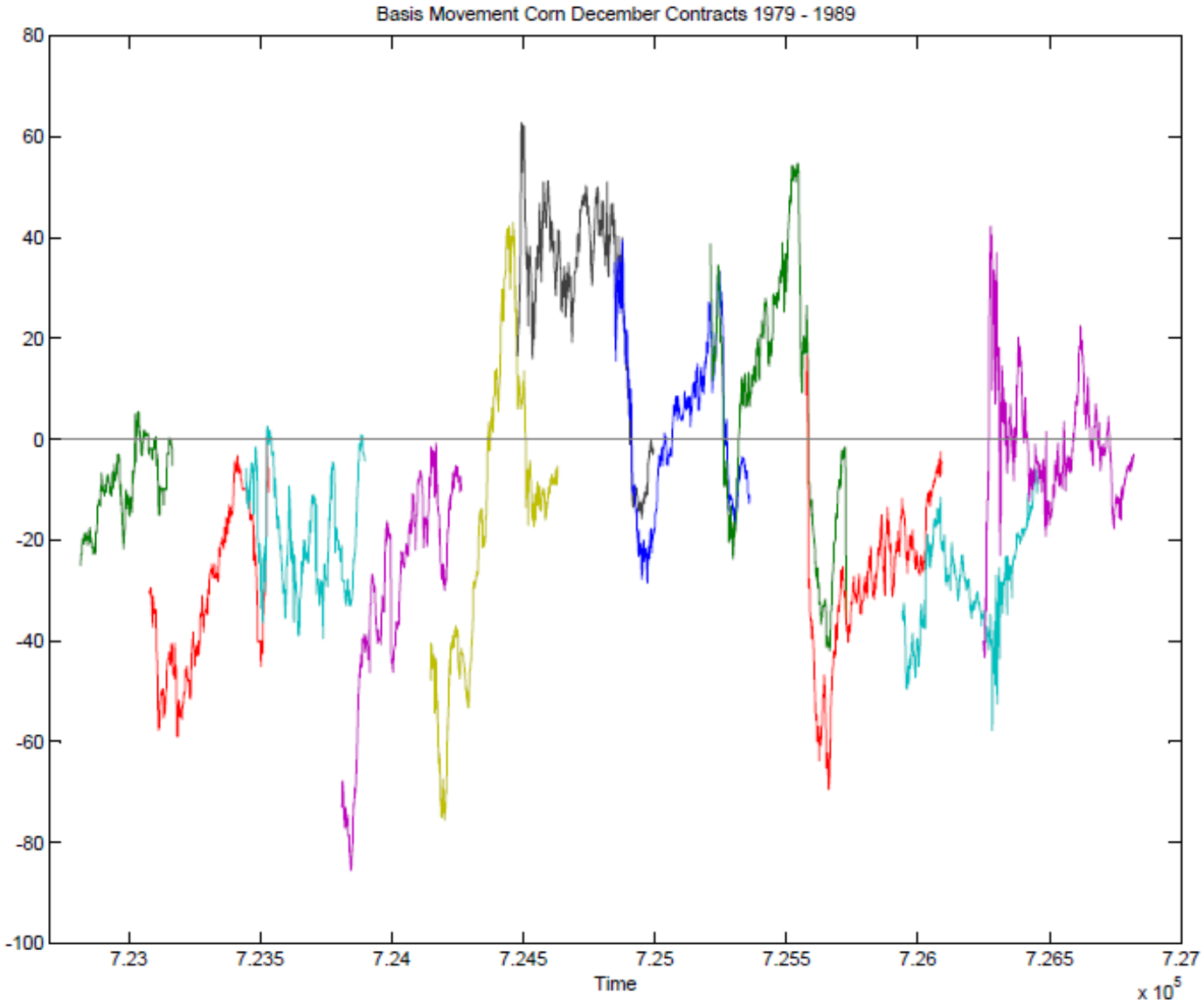
Days Till	*Corn New Crop Year Contract*														
Expiration	**1279**	**1280**	**1281**	**1282**	**1283**	**1284**	**1285**	**1286**	**1287**	**1288**	**1289**	**1290**	**1291**	**1292**	**1293**
100	24,150	25,864	23,170	22,844	24,711	23,521	52,408	73,085	62,381	125,047	83,268	127,493	135,824	129,142	158,457
150	22,997	22,824	22,693	22,007	23,048	22,079	28,634	51,245	43,661	70,624	60,915	103,050	77,747	90,322	73,738
200	21,420	21,905	21,855	21,355	21,780	21,126	16,254	32,247	25,083	28,761	34,478	45,262	47,377	56,245	37,845
250	14,255	15,331	21,010	16,066	16,509	19,114	8,863	17,595	14,395	10,933	22,452	10,614	19,888	17,240	15,879
300	0	11,082	15,008	11,266	12,040	16,323	1,959	9,292	6,552	4,947	11,247	5,179	10,444	8,752	8,099
350	0	0	0	0	0	12,567	157	2,204	1,172	515	6,846	2,911	4,040	2,424	2,970
400	0	0	0	0	0	0	0	0	0	0	7,215	286	597	133	620
450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

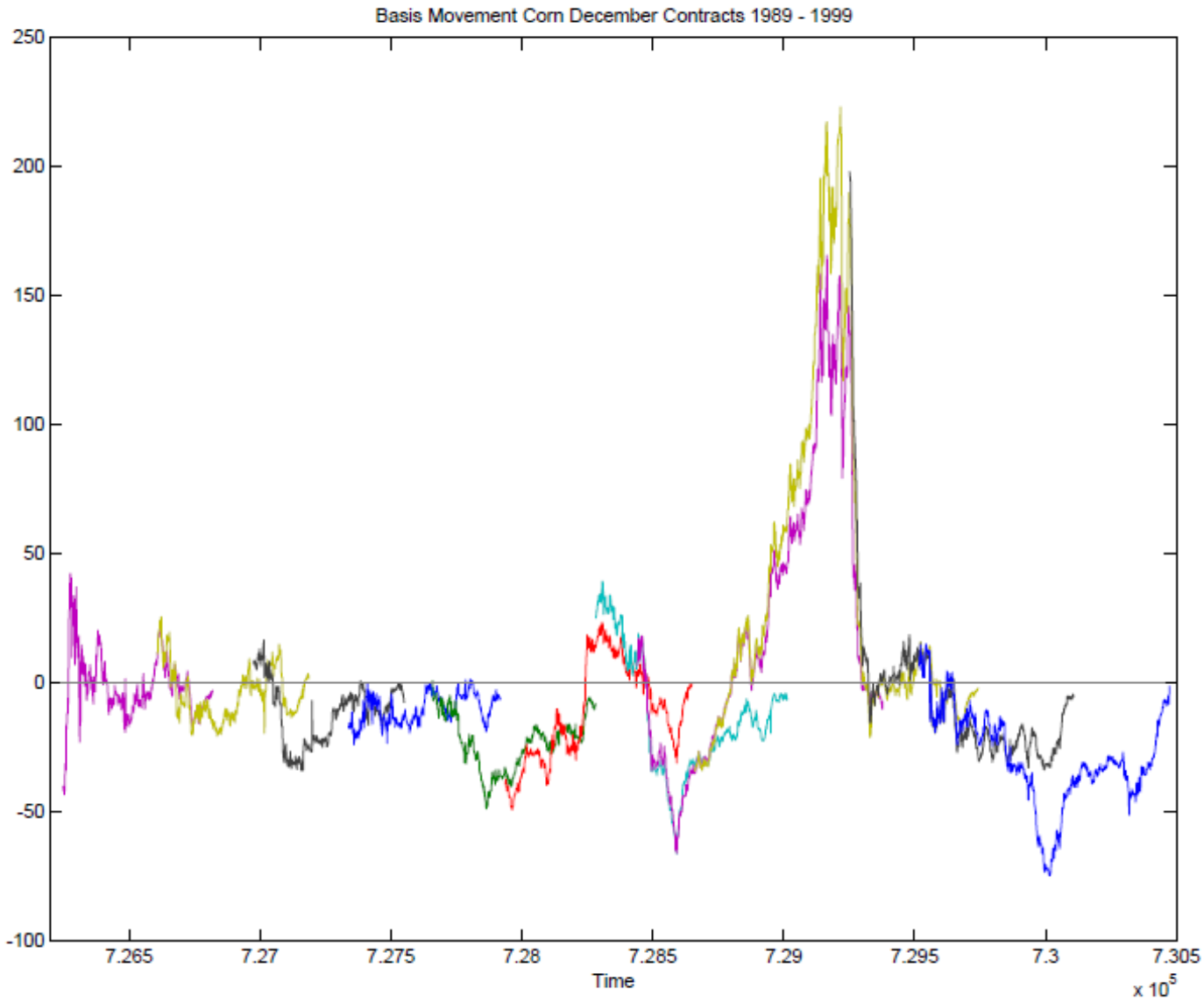
Days Till	*Corn New Crop Year Contract*														
Expiration	**1294**	**1295**	**1296**	**1297**	**1298**	**1299**	**1200**	**1201**	**1202**	**1203**	**1204**	**1205**	**1206**	**1207**	**1208**
100	122,718	246,994	164,419	154,215	159,606	159,885	181,977	193,858	244,277	205,592	310,364	354,202	543,379	520,673	532,316
150	87,093	185,345	156,829	112,655	126,498	114,692	139,295	124,377	114,451	107,999	301,115	165,037	391,904	438,594	486,346
200	59,417	86,109	90,134	77,363	87,965	69,839	79,907	85,175	67,331	79,661	163,909	106,440	244,303	400,310	406,736
250	36,311	34,968	43,708	37,713	33,875	29,186	33,486	42,416	38,048	43,105	41,650	56,077	95,314	309,842	281,042
300	13,114	13,233	21,495	26,225	24,899	18,681	15,466	21,030	19,759	27,110	20,961	26,180	41,287	181,050	173,186
350	9,085	5,281	13,206	7,754	8,979	8,141	10,141	11,862	12,781	16,098	6,370	13,473	24,779	150,602	134,047
400	1,911	2,775	6,526	4,725	3,410	2,956	3,612	5,690	7,527	13,271	3,763	10,235	12,769	100,869	113,707
450	359	984	3,596	2,490	2,754	1,184	2,531	3,635	4,176	4,461	1,920	3,657	6,333	40,084	101,116
500	0	45	880	787	1,139	765	1,073	1,774	1,532	1,917	1,209	1,038	2,642	15,343	79,970
550	0	0	354	338	478	536	906	662	784	1,184	1,126	728	1,031	5,358	63,409
600	0	0	129	168	10	45	254	68	342	1,091	1,276	137	898	2,639	60,774
650	0	0	46	56	0	36	10	0	275	548	1,134	50	517	921	35,662
700	0	0	0	58	0	0	0	0	39	246	230	10	209	353	13,671
750	0	0	0	13	0	0	0	0	15	0	52	0	0	0	2,589

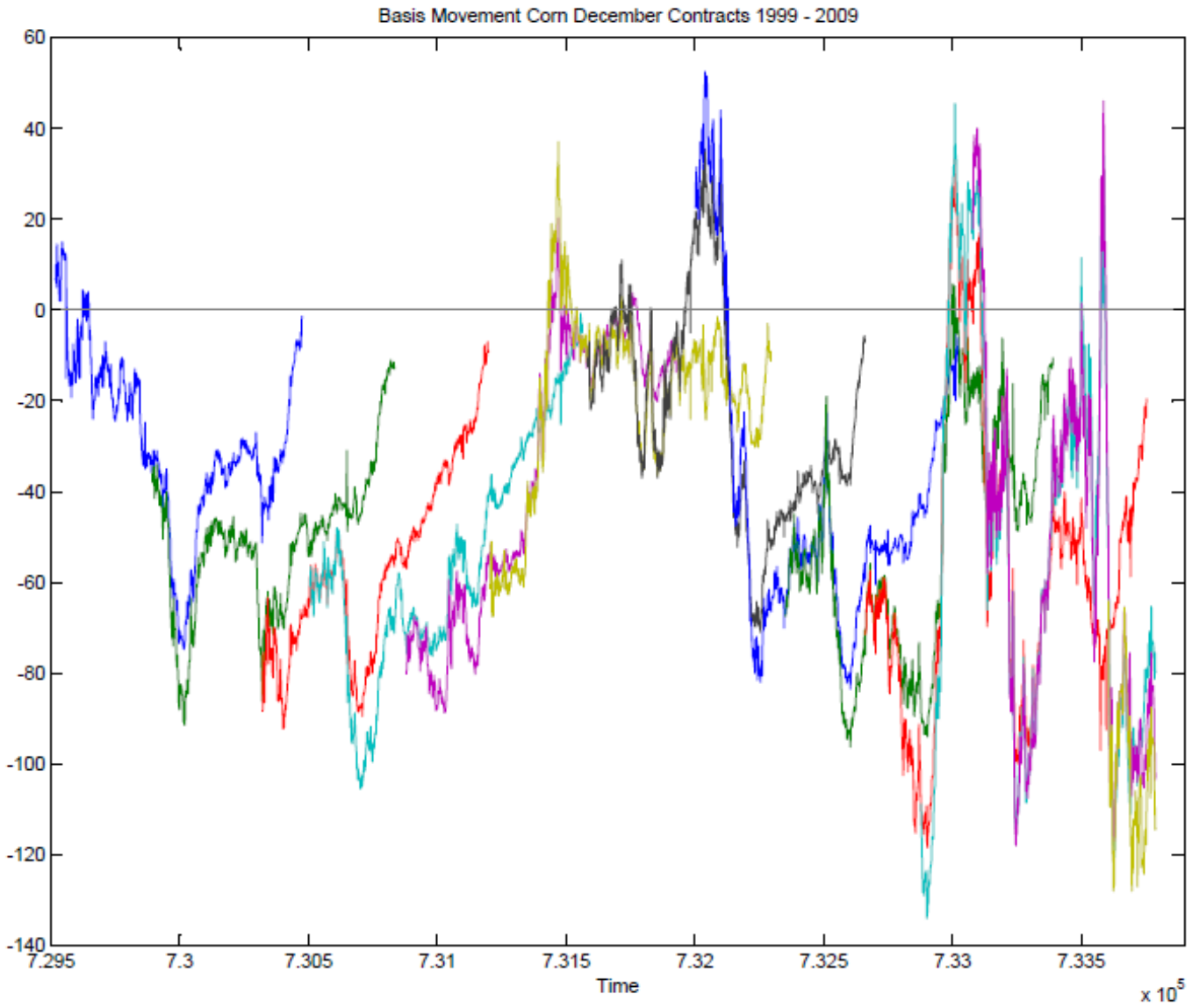
Soybean New Crop Contract 1979 through 2008
Open Interest Given Number of Trading Days Till Expiration

Days Till	*Soybean New Crop Year Contract*														
Expiration	**1179**	**1180**	**1181**	**1182**	**1183**	**1184**	**1185**	**1186**	**1187**	**1188**	**1189**	**1190**	**1191**	**1192**	**1193**
100	21,833	21,846	21,571	21,533	22,035	27,980	26,228	31,109	47,098	73,190	42,044	53,438	41,272	59,932	92,076
150	21,511	21,129	21,178	18,723	21,183	19,293	10,632	19,631	27,218	53,723	27,650	28,164	21,569	27,515	29,696
200	21,232	19,700	16,890	14,391	15,087	15,853	7,690	11,395	8,970	22,858	17,682	13,629	13,006	15,141	13,527
250	0	13,730	16,540	12,545	11,956	11,747	2,718	7,031	3,347	9,069	10,905	5,290	9,020	8,127	5,233
300	0	4,940	11,380	6,290	2,170	7,416	961	973	720	2,188	5,344	1,686	3,776	4,388	2,982
350	0	0	0	0	0	0	0	0	0	0	2,575	323	381	501	1,784
400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78
450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Days Till	*Soybean New Crop Year Contract*														
Expiration	**1194**	**1195**	**1196**	**1197**	**1198**	**1199**	**1100**	**1101**	**1102**	**1103**	**1104**	**1105**	**1106**	**1107**	**1108**
100	77,858	64,288	102,240	65,135	65,719	76,938	71,550	62,998	84,311	105,976	86,379	196,530	197,201	297,713	258,001
150	38,197	37,896	70,449	40,834	39,880	41,951	45,403	30,627	27,450	49,939	51,997	53,139	72,406	103,648	147,900
200	21,729	18,471	43,200	18,692	14,355	22,369	19,337	19,747	15,485	34,909	24,462	20,704	48,589	84,856	135,382
250	10,516	11,891	17,401	9,739	8,797	9,945	8,997	6,645	8,260	15,165	13,979	10,044	15,219	51,997	90,048
300	6,810	4,378	9,682	5,417	3,379	4,602	3,807	3,165	2,780	6,089	3,427	4,090	7,389	20,078	64,567
350	4,983	2,214	4,677	2,319	915	2,091	2,788	1,774	915	1,952	836	1,246	2,045	14,517	47,150
400	946	1,569	2,248	1,770	486	910	1,222	989	235	504	534	725	305	4,699	23,684
450	238	913	672	995	241	342	613	121	87	52	210	150	23	2,463	11,581
500	2	231	165	431	134	48	54	30	2	25	148	0	0	1,006	5,830
550	0	0	64	95	55	2	0	0	0	6	38	0	0	792	2,790
600	0	0	0	9	0	2	0	0	0	2	0	0	0	21	1,834
650	0	0	0	2	0	2	0	0	0	0	0	0	0	8	1,048
700	0	0	0	2	0	0	0	0	0	0	0	0	0	0	230
750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0


Basis Movement Corn December Contracts 1979 - 1989
80
60
40
20
0
-20
-40
-60
-80
-100
7.23
7.235
7.24
7.245
7.25
7.255
7.26
7.265
7.27
Time
x 10^5


Basis Movement Corn December Contracts 1989 - 1999
250
200
150
100
50
0
-50
-100
7.265
7.27
7.275
7.28
7.285
7.29
7.295
7.3
7.305
Time
x 10^5

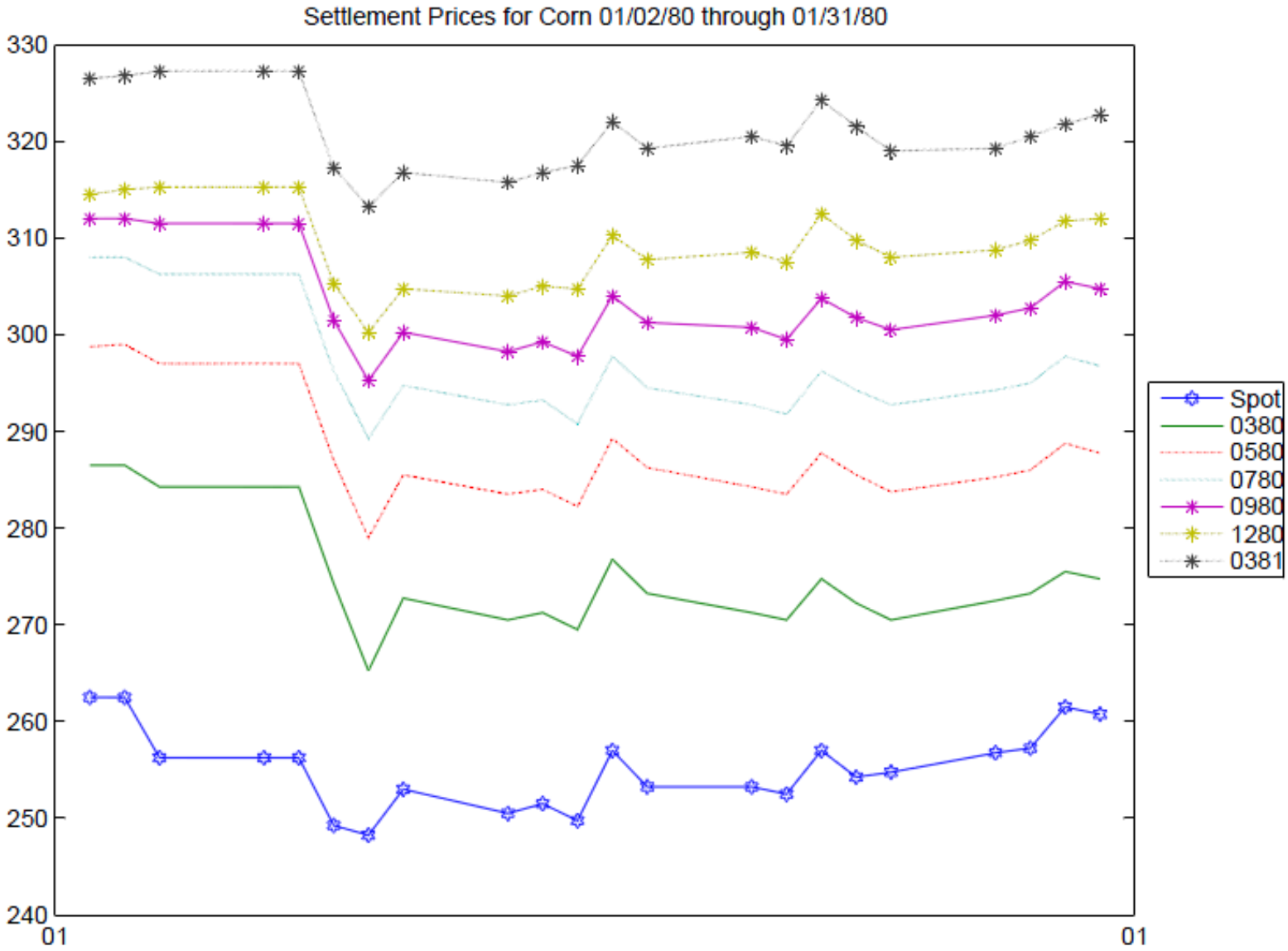

Basis Movement Corn December Contracts 1999 - 2009
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
7.295
7.3
7.305
7.31
7.315
7.32
7.325
7.33
7.335
Time
x 10^5

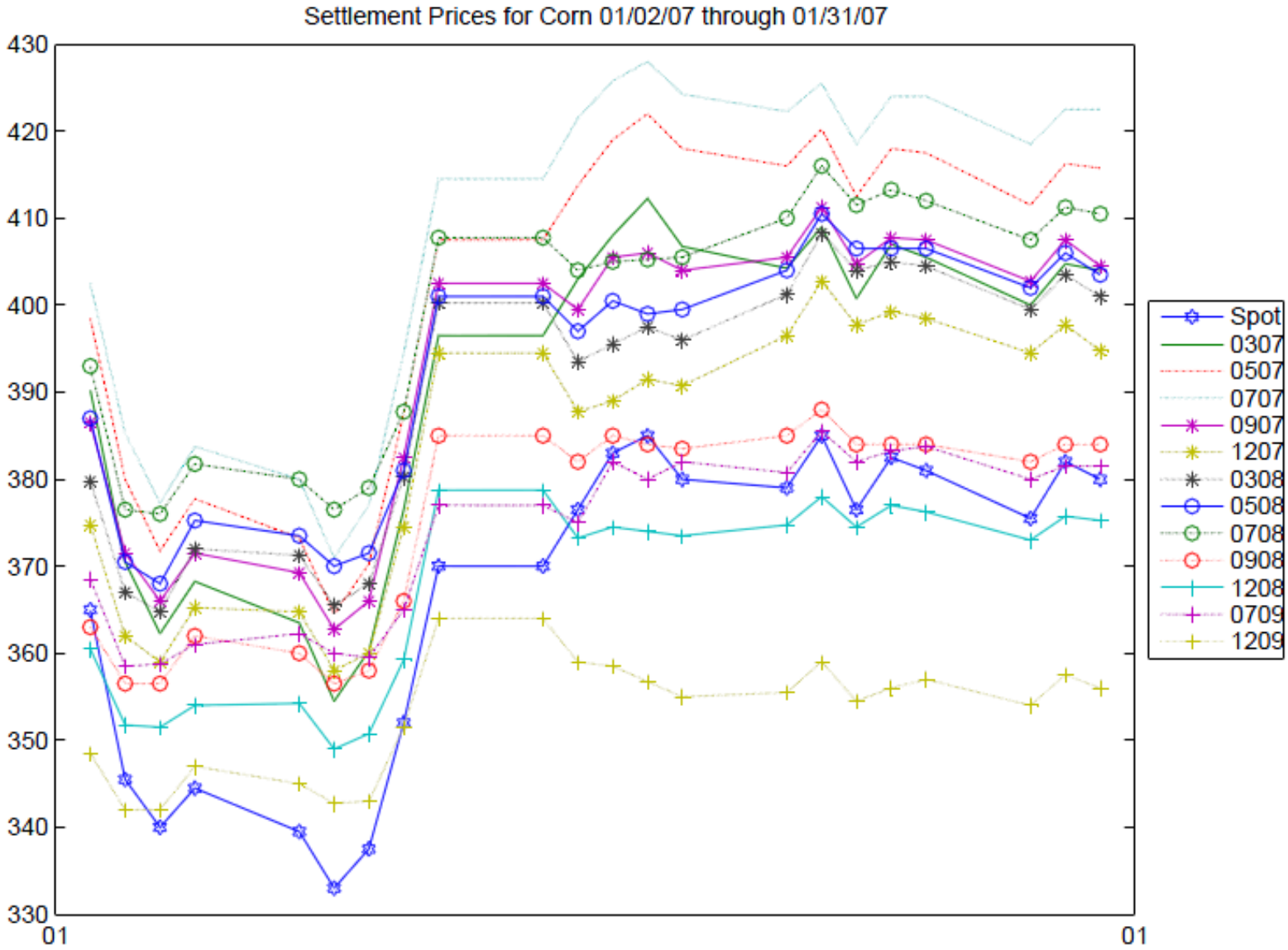
Current Research

- Investigate the efficiency of these expanded markets

- Most event study research on futures markets use nearby or new crop contracts
  - Generally finds markets are efficient and respond to information.

- Past literature indicates a clear focus to study spread behavior.
  - New development → liquid distant contracts
  - Test the efficiency of spreads between contract, or the price of storage as defined by Holbrook Working.
  - Expansion of the constellation of futures prices → more trading possibilities
  - Goal is to understand the market impact from the increased activity and new trading opportunities.


Settlement Prices for Corn 01/02/80 through 01/31/80
330
320
310
300
290
280
270
260
250
240
01
01
Spot
0380
0580
0780
0980
1280
0381


Settlement Prices for Corn 01/02/07 through 01/31/07
430
420
410
400
390
380
370
360
350
340
330
01
01
Spot
0307
0507
0707
0907
1207
0308
0508
0708
0908
1208
0709
1209

Consequences of Multiyear Futures?

- Questions to be determined,
  - How does the price profile behavior change with distant price discovery?
  - How can this behavior be explained with past theory?
  - How can this information be incorporated into past models (storage models)?
  - How can we use this expanded profile to study expectations?
  - How can this information be used to look at dynamic supply/demand adjustment?

- What can be applied from different commodities like Oil that have seen similar expansion?

Conclusion

- Further research needs to understand the relationship between activity in distant contracts and,
  - Growth of underlying commodity use/importance
  - Expected spot price volatility

- What information can distant contracts provide?
- How does this affect the informational content of nearby futures?

Please send questions/comments to jroberts@arec.umd.edu