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Agribusiness and Applied Economics Report No. 801 – Appendix 1

SOYBEAN TRADE REPORT: APPENDIX

Section I

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Acknowledgments
The authors express their gratitude to the North Dakota Soybean Council and North Dakota Soybean Growers' Association for their support, suggestions, comments and several days of discussion during the project. Reviews and suggestions provided by Dr. Bill Wilson and Dr. Frayne Olson are greatly appreciated. Thanks to Ellen Crawford and Edie Nelson for their editorial revisions. All views expressed in this publication are those of the authors and do not reflect the opinions and interest of the supporting organizations or NDSU.

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Section I: Global Temporal Soybean Trade

Figure 1: Global Soybean Grain Exports, Annual Trends

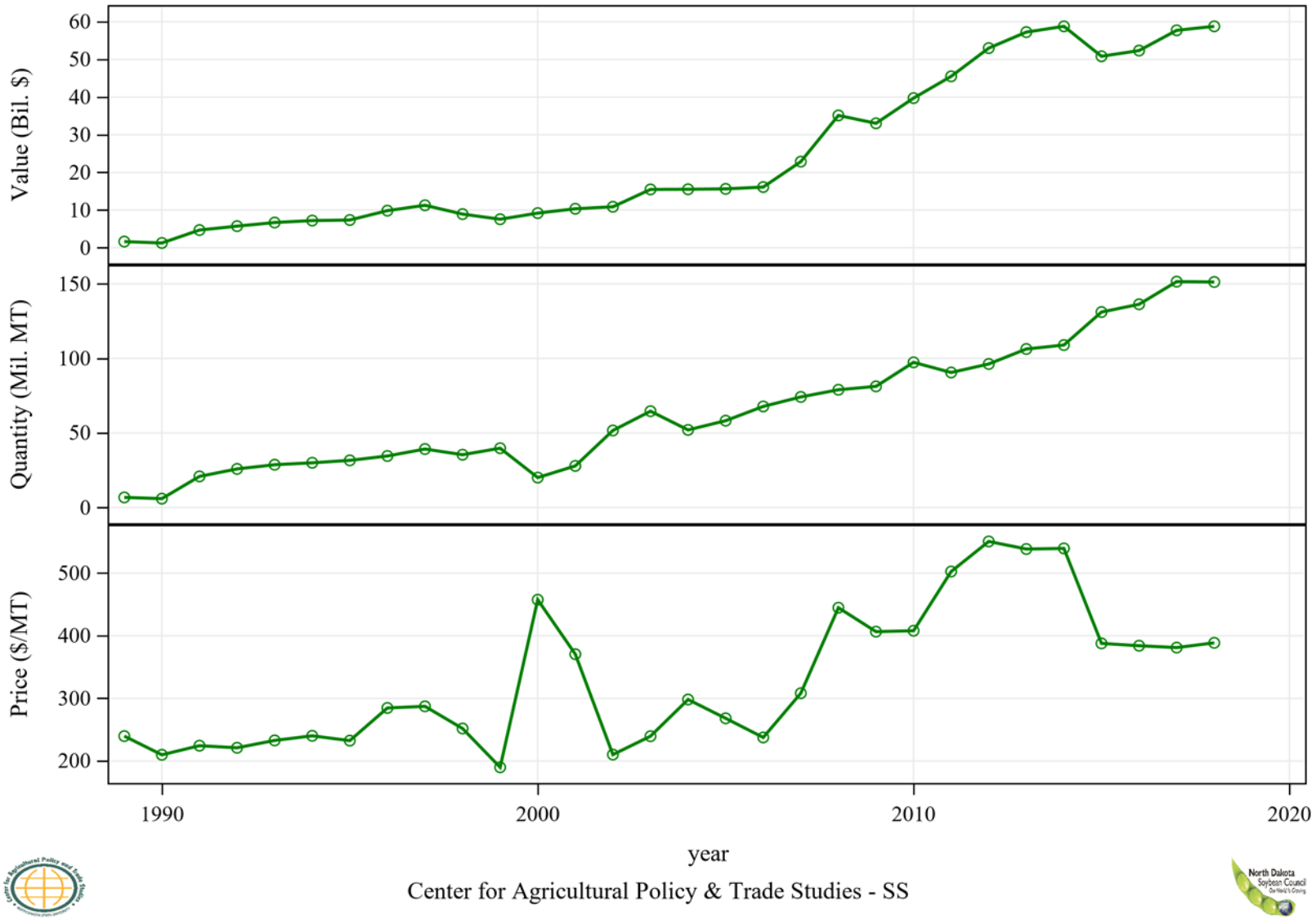

Figure 2: Global Soybean Grain Exports, Periodic Changes

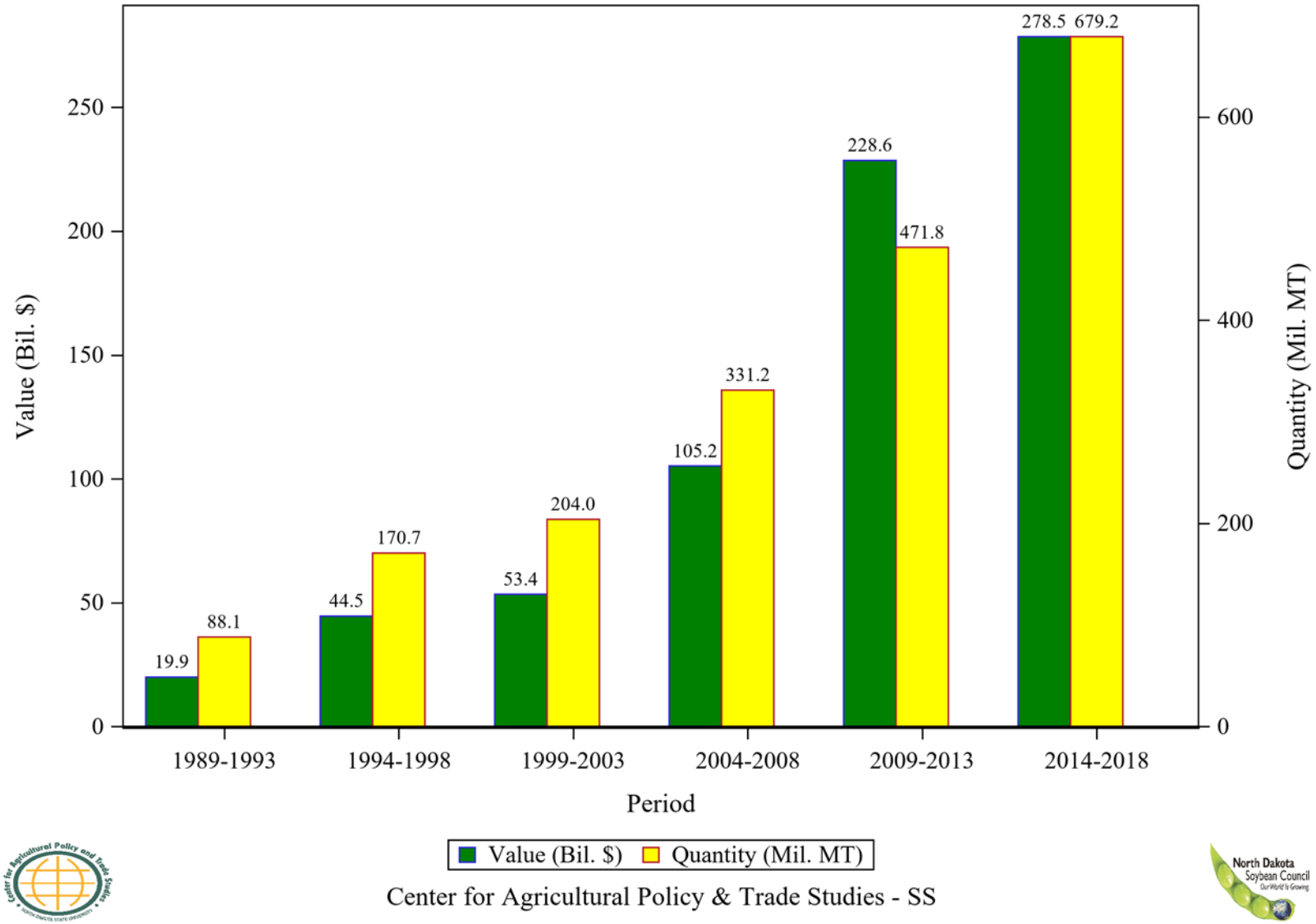

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Table 1: Global Soybean Grain Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
1989-1993	19,926,610,946	3,985,322,189	2,441,855,841	61.27
1994-1998	44,549,081,116	8,909,816,223	1,713,226,671	19.23
1999-2003	53,379,090,381	10,675,818,076	2,964,697,143	27.77
2004-2008	105,204,202,439	21,040,840,488	8,460,357,325	40.21
2009-2013	228,561,938,593	45,712,387,719	9,789,843,442	21.42
2014-2018	278,542,762,593	55,708,552,519	3,812,481,412	6.84

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
1989-1993	88,056,353	17,611,271	10,675,814	60.62	225.51	11.42	5.06
1994-1998	170,731,103	34,146,221	3,574,535	10.47	259.23	25.33	9.77
1999-2003	203,950,776	40,790,155	17,902,907	43.89	293.50	115.62	39.39
2004-2008	331,171,957	66,234,391	11,107,578	16.77	311.34	79.57	25.56
2009-2013	471,784,547	94,356,909	9,247,687	9.80	481.29	69.83	14.51
2014-2018	679,201,266	135,840,253	17,524,405	12.90	416.24	69.01	16.58

Table 2: Global Soybean Grain Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2010	39,730,757,333	97,372,120	408.03
2011	45,516,692,121	90,559,454	502.62
2012	53,014,535,994	96,271,542	550.68
2013	57,265,915,611	106,325,860	538.59
2014	58,799,581,788	108,975,676	539.57
2015	50,843,696,612	131,109,429	387.80
2016	52,358,107,156	136,320,581	384.08
2017	57,739,554,248	151,516,593	381.08
2018	58,801,822,789	151,278,988	388.70

Figure 3: Global Soybean Seed Exports, Annual Trends

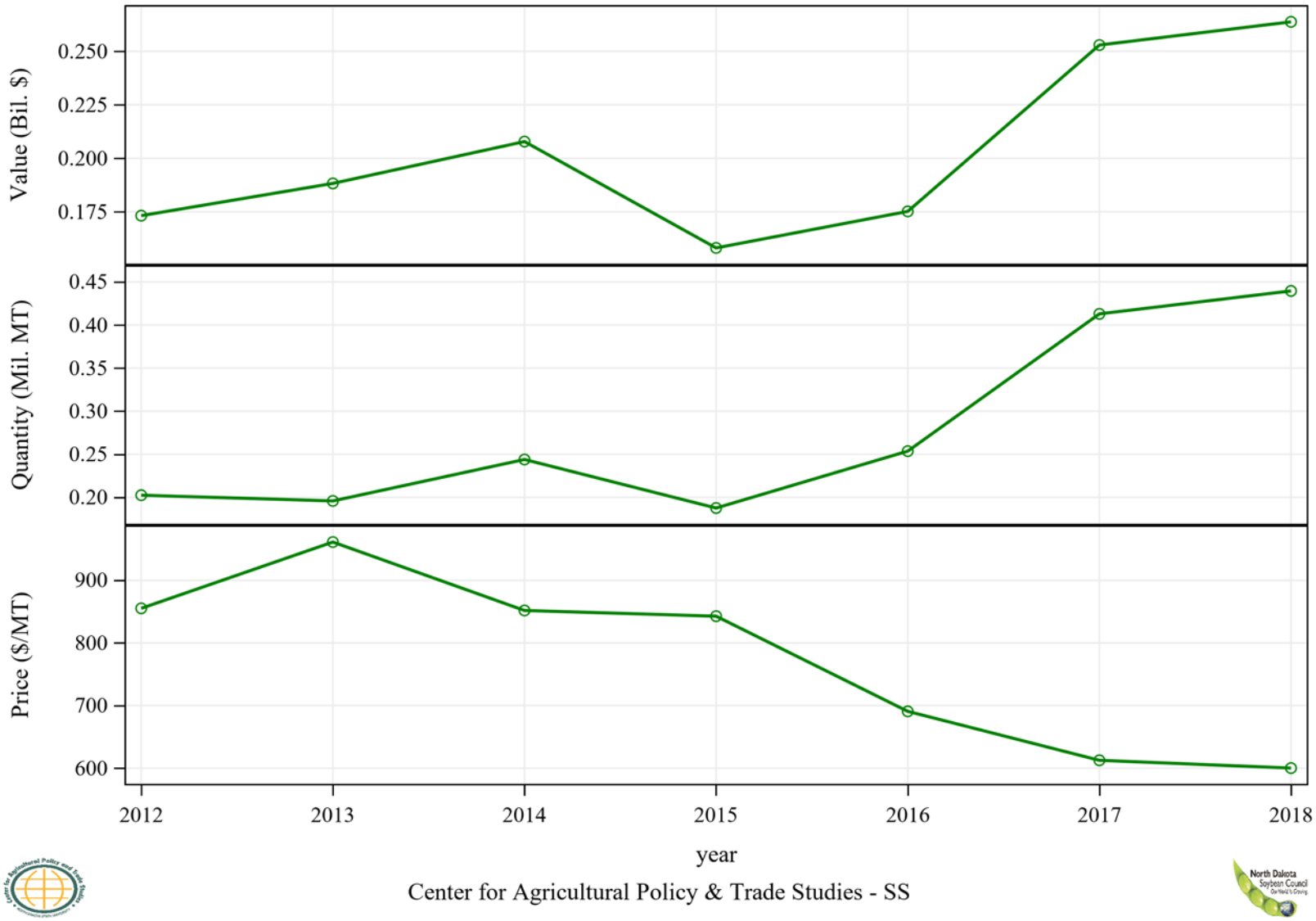

Figure 4: Global Soybean Seed Exports, Periodic Changes

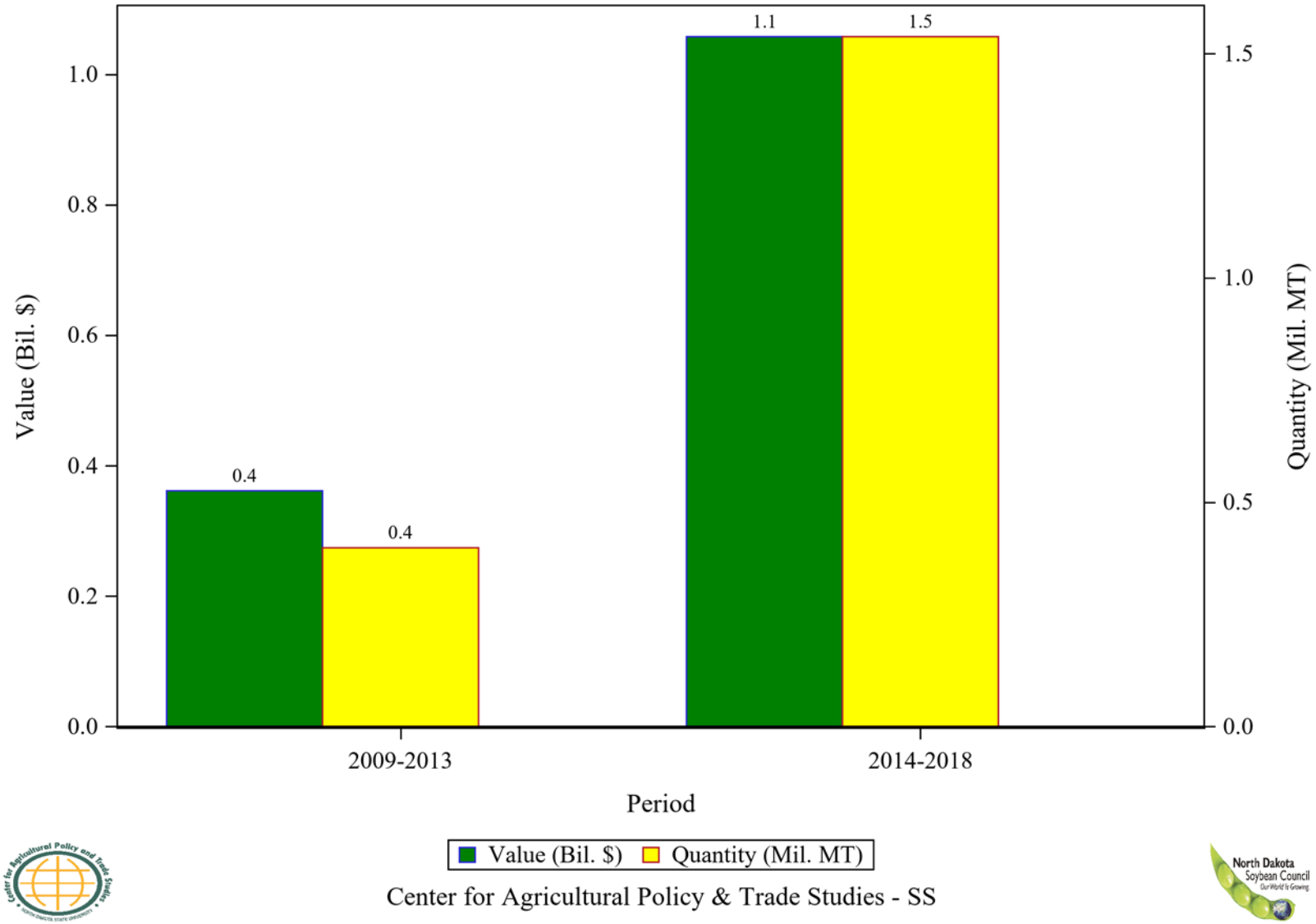

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Table 3: Global Soybean Seed Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
2009-2013	361,464,120	180,732,060	10,652,063	5.89
2014-2018	1,057,825,890	211,565,178	46,445,958	21.95

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
2009-2013	398,374	199,187	4,696	2.36	908.23	74.89	8.25
2014-2018	1,537,743	307,549	111,653	36.30	719.57	121.70	16.91

Table 4: Global Soybean Seed Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2012	173,199,914	202,508	855.28
2013	188,264,206	195,866	961.19
2014	207,820,150	243,962	851.86
2015	158,121,285	187,630	842.73
2016	175,192,243	253,646	690.70
2017	252,927,048	412,941	612.50
2018	263,765,164	439,565	600.06

Figure 5: Global Soybean Oil (Crude) Exports, Annual Trends

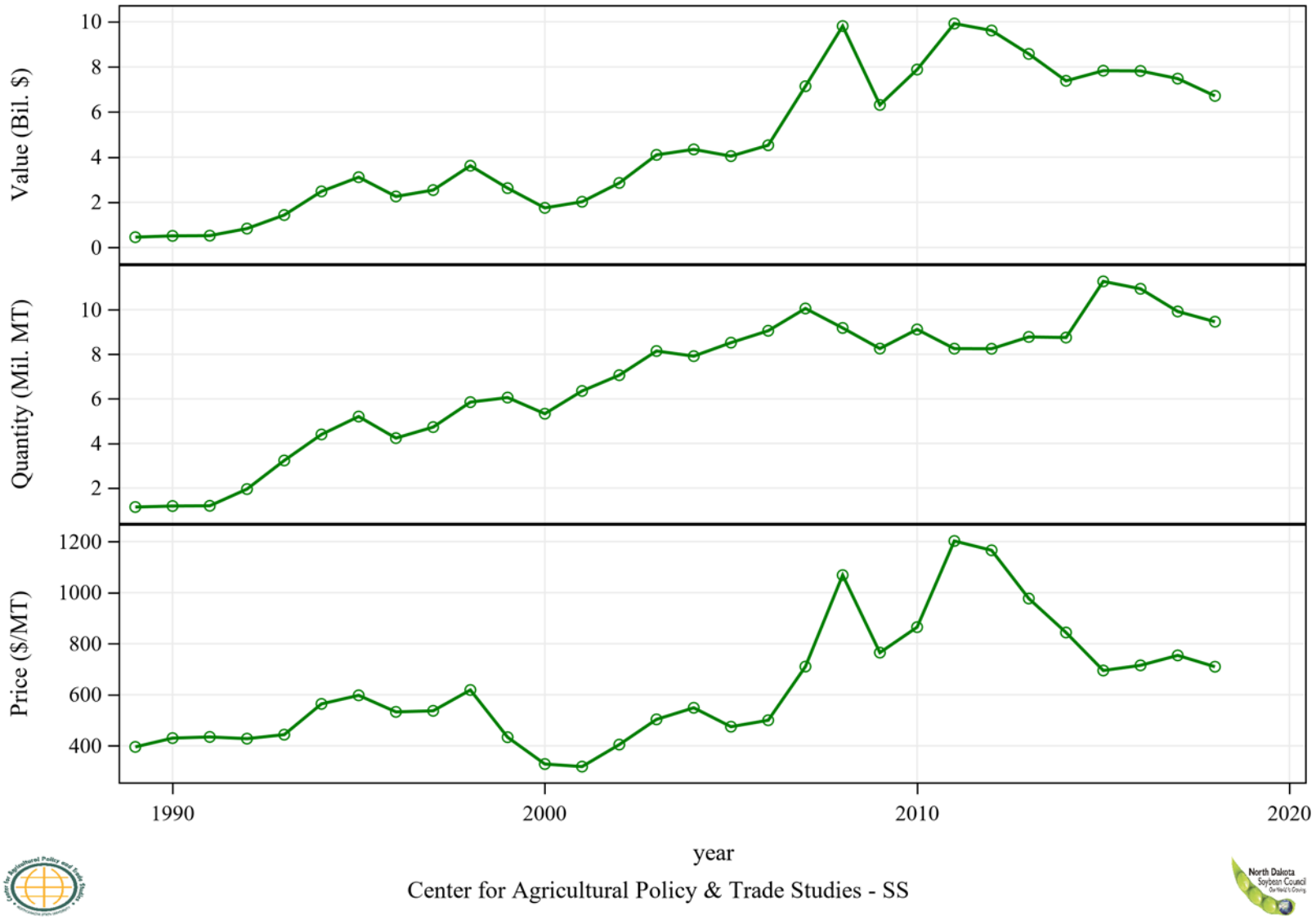

Figure 6: Global Soybean Oil (Crude) Exports, Periodic Changes

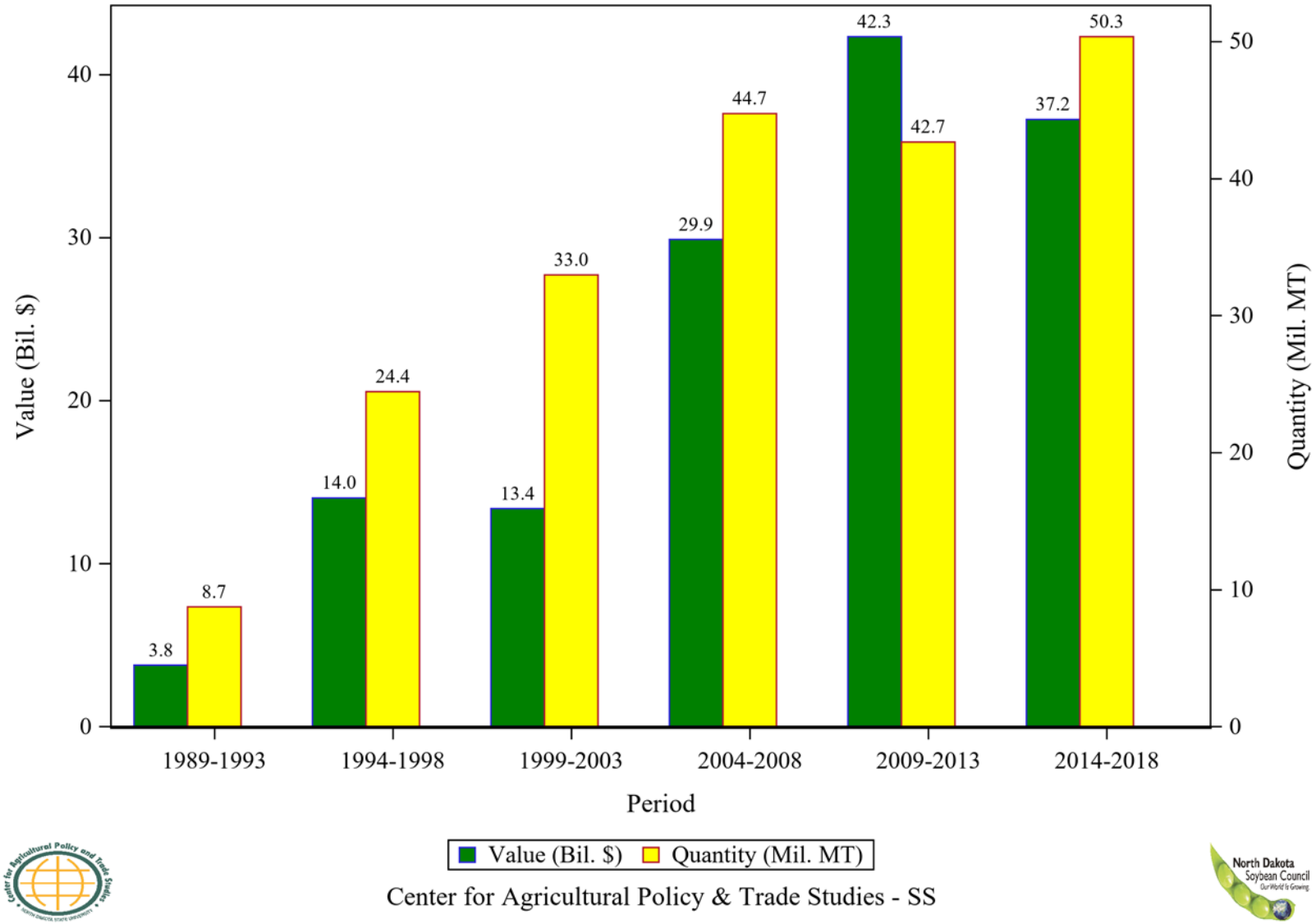

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Table 5: Global Soybean Oil (Crude) Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
1989-1993	3,759,732,190	751,946,438	410,168,426	54.55
1994-1998	14,017,300,051	2,803,460,010	554,726,255	19.79
1999-2003	13,365,150,703	2,673,030,141	914,615,416	34.22
2004-2008	29,875,286,019	5,975,057,204	2,477,118,912	41.46
2009-2013	42,312,613,416	8,462,522,683	1,450,394,808	17.14
2014-2018	37,236,160,294	7,447,232,059	455,547,476	6.12

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
1989-1993	8,727,449	1,745,490	897,598	51.42	426.46	18.22	4.27
1994-1998	24,435,043	4,887,009	654,618	13.40	570.06	37.52	6.58
1999-2003	32,955,246	6,591,049	1,067,809	16.20	397.84	76.78	19.30
2004-2008	44,731,462	8,946,292	796,848	8.91	660.56	245.77	37.21
2009-2013	42,652,386	8,530,477	399,019	4.68	994.93	188.61	18.96
2014-2018	50,343,812	10,068,762	1,040,222	10.33	743.53	60.12	8.09

Table 6: Global Soybean Oil (Crude) Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2010	7,883,261,239	9,116,182	864.75
2011	9,922,668,844	8,253,255	1202.3
2012	9,614,589,449	8,247,672	1165.7
2013	8,575,937,659	8,779,034	976.87
2014	7,383,576,767	8,751,245	843.72
2015	7,832,510,738	11,270,987	694.93
2016	7,822,807,978	10,938,760	715.15
2017	7,481,713,106	9,920,933	754.13
2018	6,715,551,705	9,461,887	709.75

Figure 7: Global Soybean Oil (Refine) Exports, Annual Trends

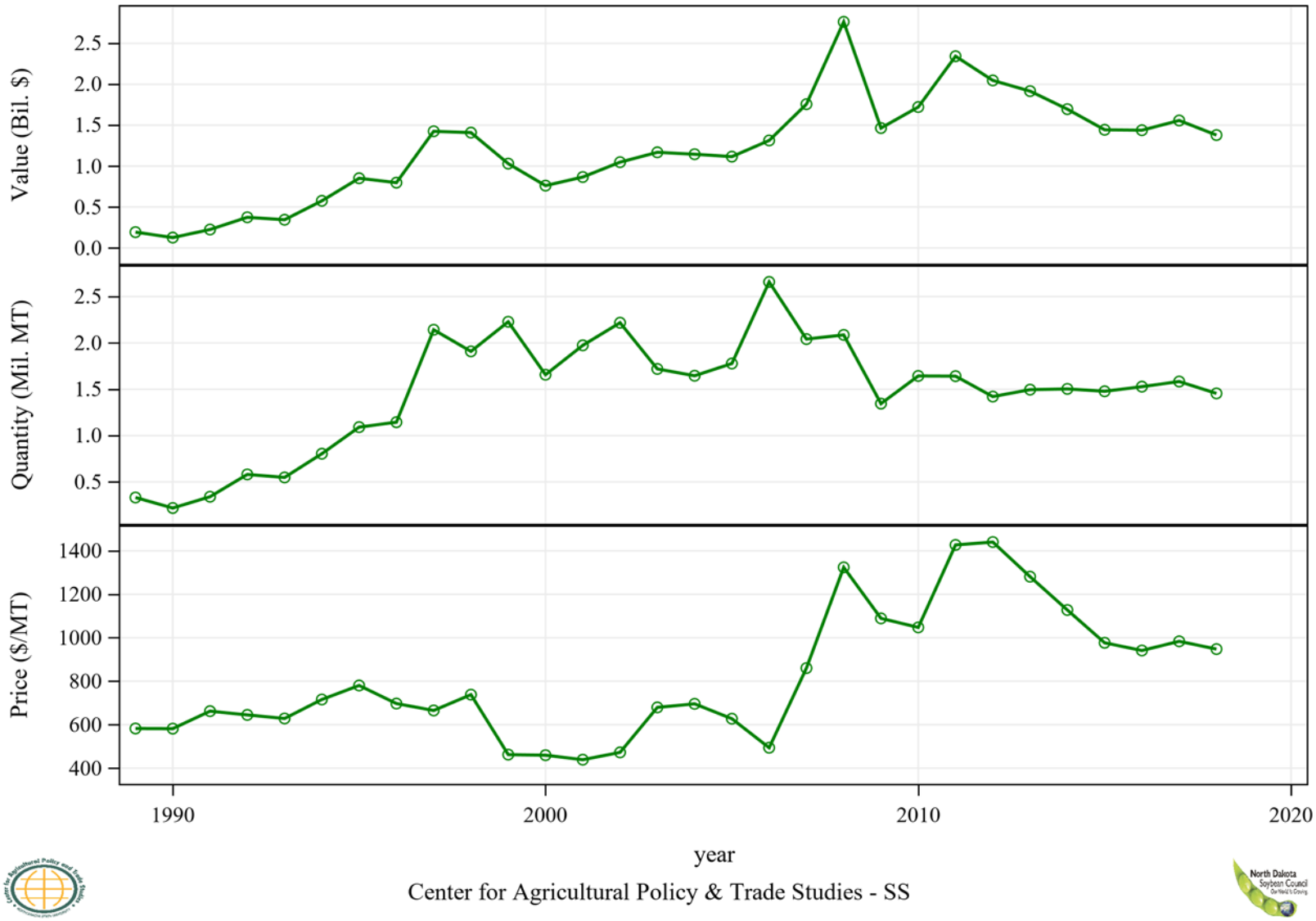

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Figure 8: Global Soybean Oil (Refine) Exports, Periodic Changes

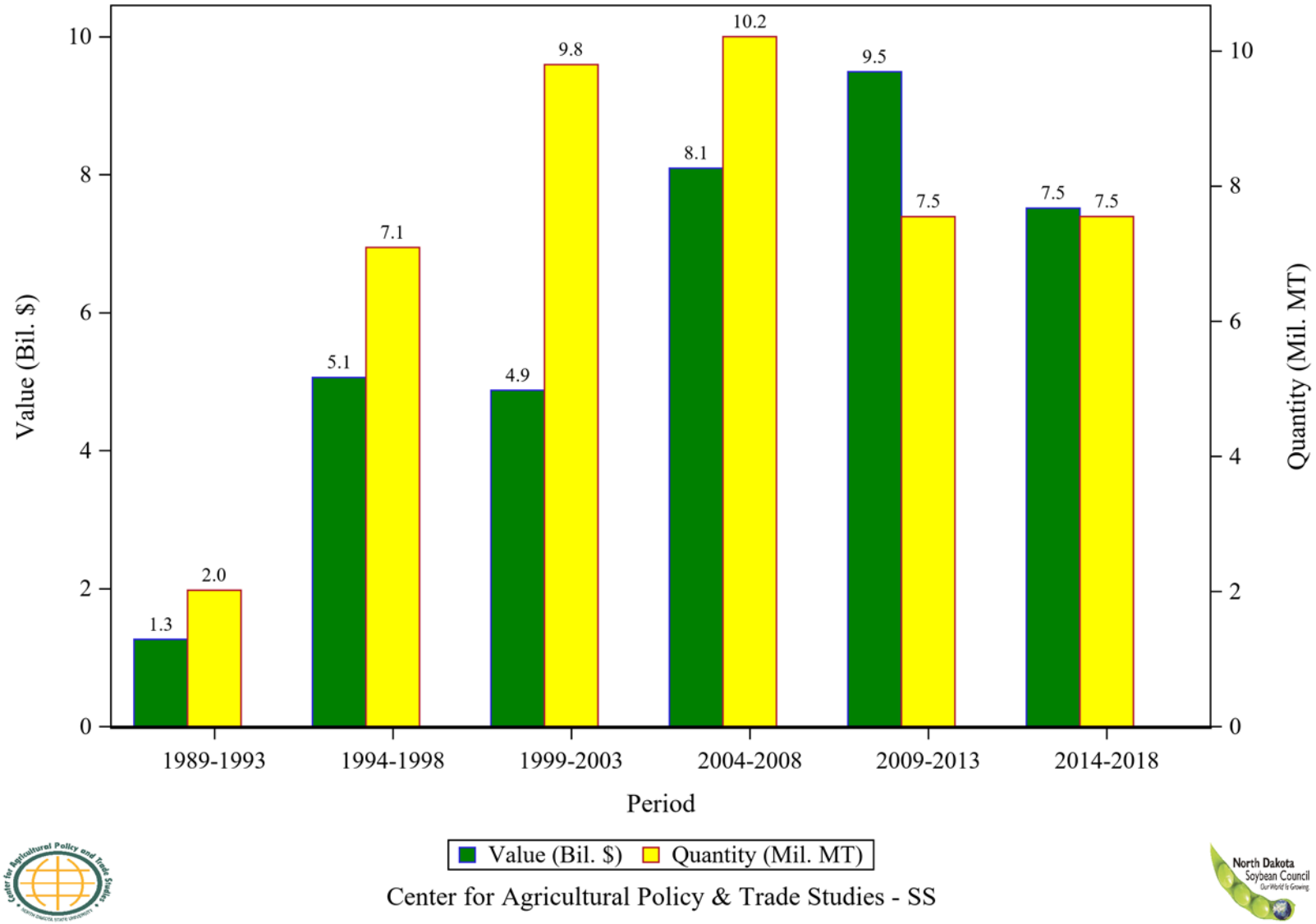

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Table 7: Global Soybean Oil (Refine) Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
1989-1993	1,262,745,234	252,549,047	104,219,958	41.27
1994-1998	5,059,067,442	1,011,813,488	384,358,996	37.99
1999-2003	4,873,908,593	974,781,719	160,667,531	16.48
2004-2008	8,093,151,769	1,618,630,354	689,006,993	42.57
2009-2013	9,491,952,715	1,898,390,543	331,260,927	17.45
2014-2018	7,514,329,545	1,502,865,909	125,619,339	8.36

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
1989-1993	2,016,274	403,255	154,951	38.43	619.95	36.57	5.90
1994-1998	7,090,147	1,418,029	575,466	40.58	719.40	43.31	6.02
1999-2003	9,796,660	1,959,332	268,660	13.71	502.51	99.71	19.84
2004-2008	10,209,902	2,041,980	390,218	19.11	800.37	321.19	40.13
2009-2013	7,546,028	1,509,206	132,778	8.80	1257.2	183.85	14.62
2014-2018	7,547,861	1,509,572	49,453	3.28	995.49	76.10	7.64

Table 8: Global Soybean Oil (Refine) Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2010	1,721,760,470	1,643,413	1047.7
2011	2,342,627,728	1,641,388	1427.2
2012	2,046,806,358	1,420,862	1440.5
2013	1,916,017,679	1,495,618	1281.1
2014	1,695,716,640	1,503,685	1127.7
2015	1,443,683,449	1,477,915	976.84
2016	1,438,408,468	1,528,017	941.36
2017	1,557,358,961	1,583,243	983.65
2018	1,379,162,027	1,455,002	947.88

Figure 9: Global Soybean Residue Exports, Annual Trends

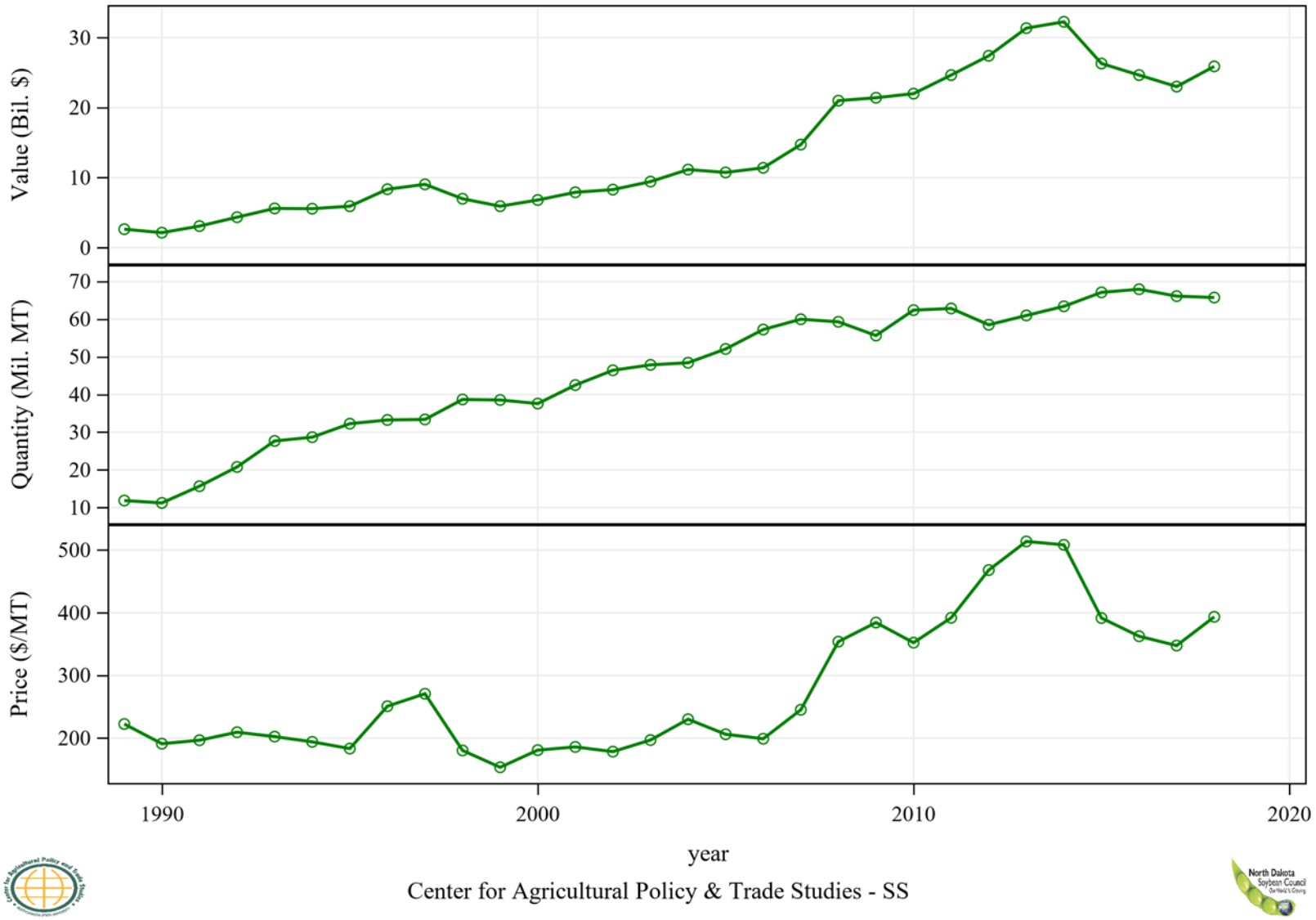

Figure 10: Global Soybean Residue Exports, Periodic Changes

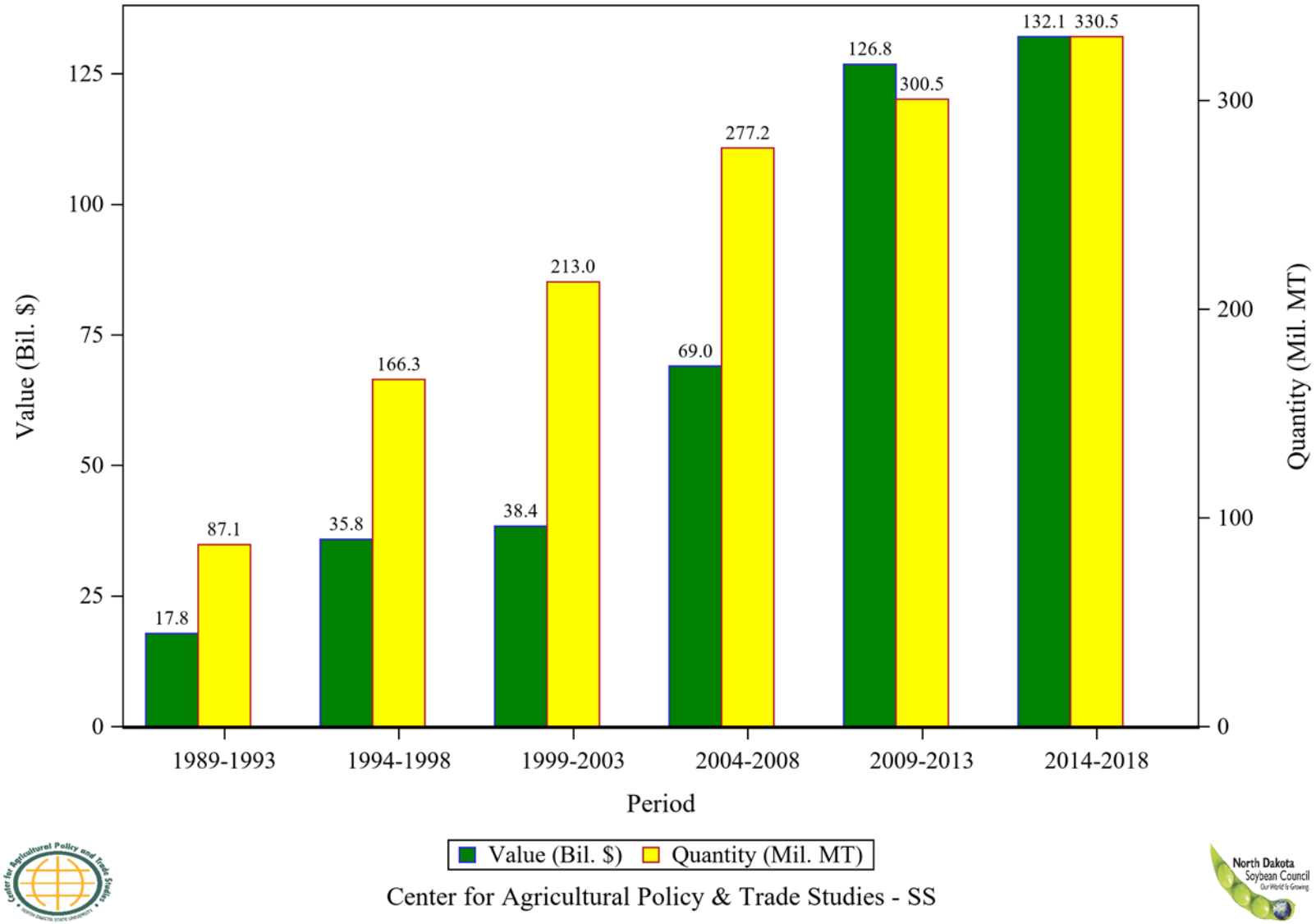

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Table 9: Global Soybean Residue Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
1989-1993	17,808,593,001	3,561,718,600	1,405,127,514	39.45
1994-1998	35,847,961,852	7,169,592,370	1,505,411,562	21.00
1999-2003	38,353,706,599	7,670,741,320	1,356,753,412	17.69
2004-2008	69,013,072,392	13,802,614,478	4,322,898,327	31.32
2009-2013	126,800,183,526	25,360,036,705	4,107,166,863	16.20
2014-2018	132,087,021,916	26,417,404,383	3,506,210,278	13.27

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
1989-1993	87,135,353	17,427,071	6,877,420	39.46	204.47	12.20	5.97
1994-1998	166,260,447	33,252,089	3,592,837	10.80	215.94	41.95	19.43
1999-2003	213,004,137	42,600,827	4,582,703	10.76	179.19	16.01	8.93
2004-2008	277,165,520	55,433,104	4,983,055	8.99	246.93	62.62	25.36
2009-2013	300,531,514	60,106,303	2,997,040	4.99	422.15	66.56	15.77
2014-2018	330,489,968	66,097,994	1,717,077	2.60	400.78	63.24	15.78

Table 10: Global Soybean Residue Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2010	21,997,813,911	62,433,148	352.34
2011	24,646,641,540	62,871,748	392.01
2012	27,401,594,520	58,531,726	468.15
2013	31,348,240,941	61,012,088	513.80
2014	32,254,361,637	63,441,276	508.41
2015	26,298,611,196	67,148,176	391.65
2016	24,645,745,231	67,975,954	362.57
2017	23,001,301,696	66,147,777	347.73
2018	25,887,002,156	65,776,784	393.56

Figure 11: Global Soybean Flour Exports, Annual Trends

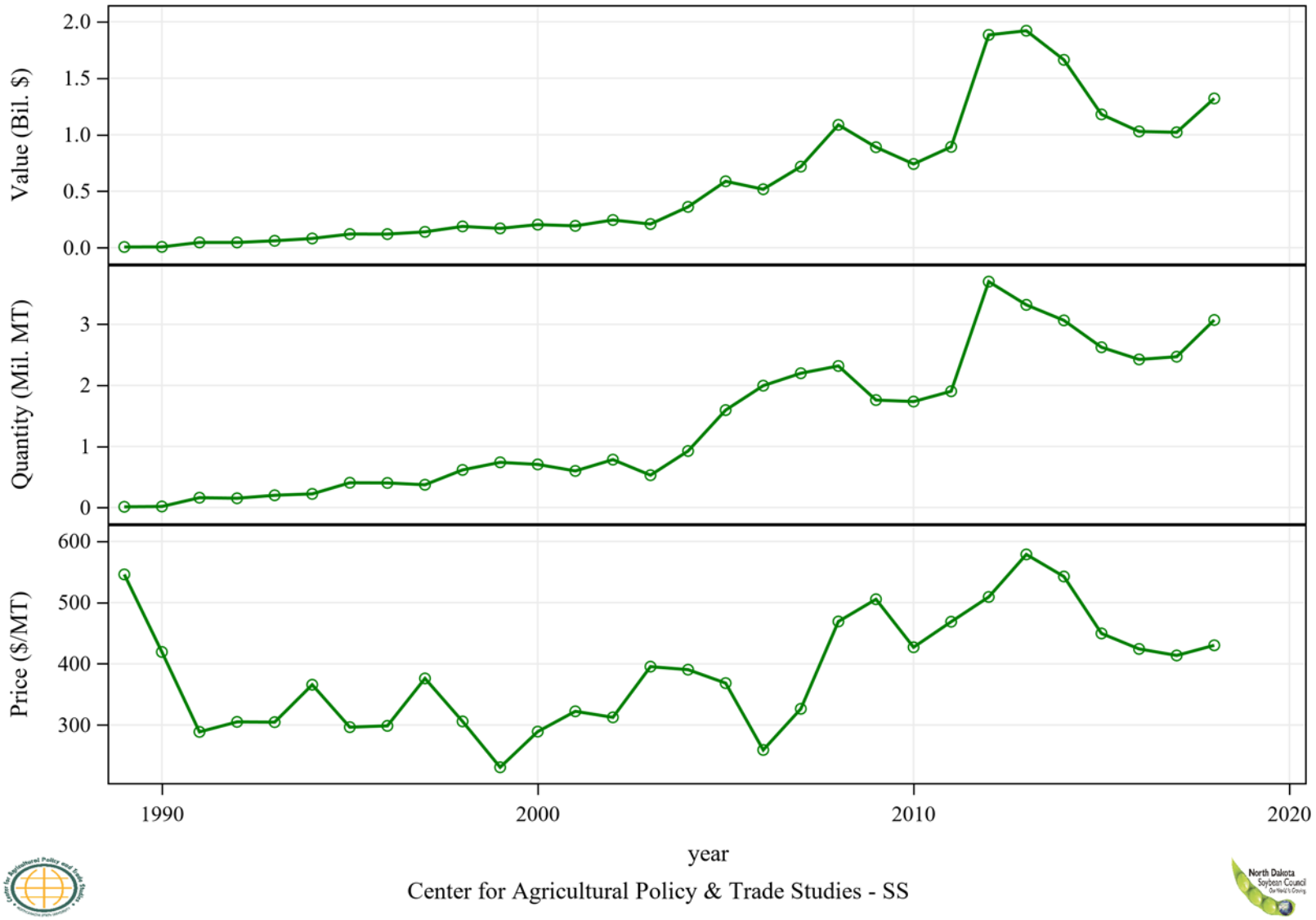

Figure 12: Global Soybean Flour Exports, Periodic Changes

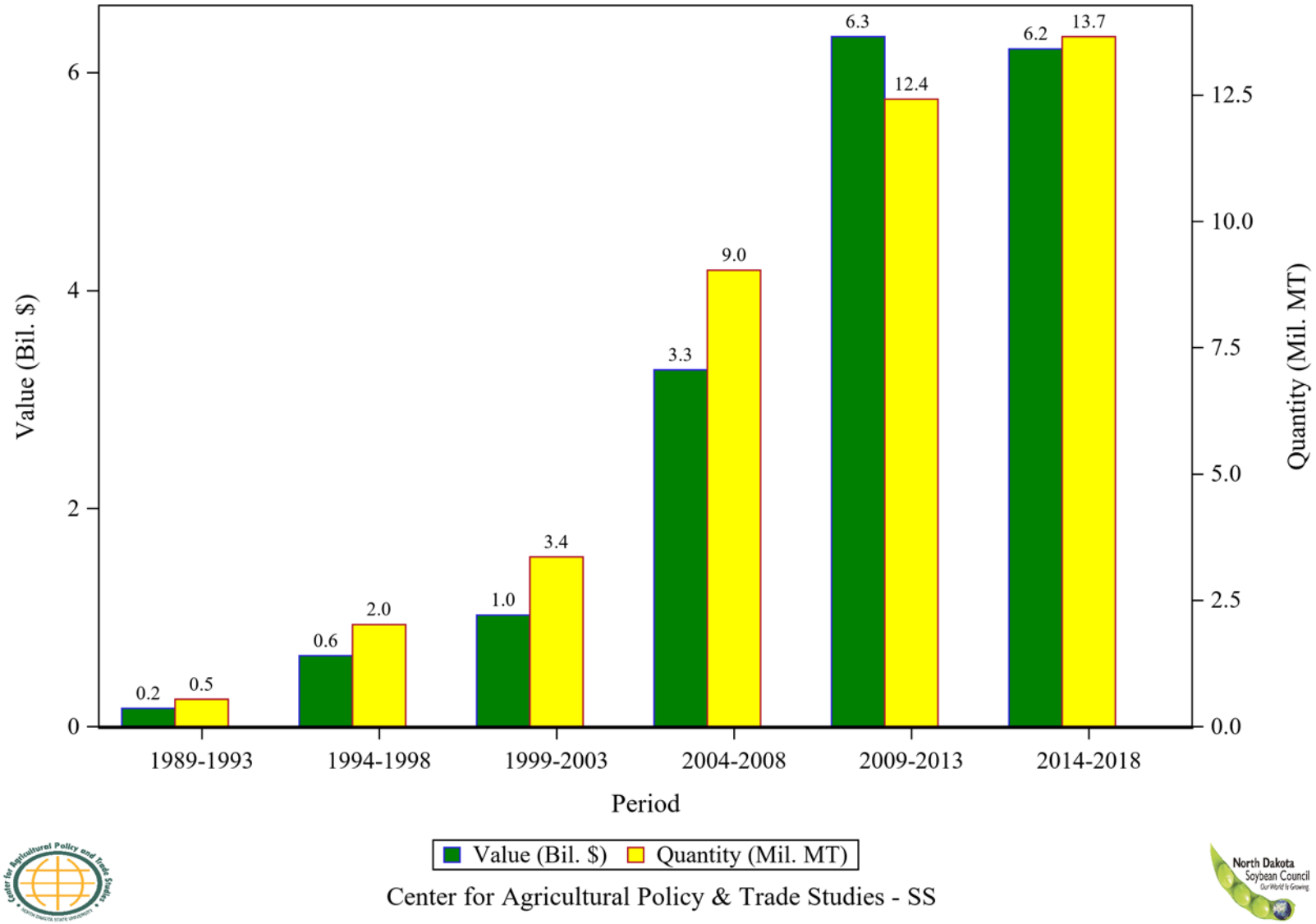

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Table 11: Global Soybean Flour Exports, Descriptive Statistics

Period	Value ($)			
	Sum	Mean	Risk	Coefficient of Variation
1989-1993	165,932,634	33,186,527	25,163,181	75.82
1994-1998	649,443,234	129,888,647	38,841,197	29.90
1999-2003	1,021,442,901	204,288,580	27,070,597	13.25
2004-2008	3,271,136,907	654,227,381	274,316,183	41.93
2009-2013	6,327,888,552	1,265,577,710	584,828,158	46.21
2014-2018	6,215,184,976	1,243,036,995	265,305,666	21.34

Period	Quantity (MT)				Price ($/MT)		
	Sum	Mean	Risk	Coefficient of Variation	Mean	Risk	Coefficient of Variation
1989-1993	538,027	107,605	87,740	81.54	372.76	110.13	29.55
1994-1998	2,016,465	403,293	140,062	34.73	328.53	39.01	11.87
1999-2003	3,355,588	671,118	104,875	15.63	310.03	59.48	19.18
2004-2008	9,032,117	1,806,423	564,188	31.23	362.71	77.74	21.43
2009-2013	12,416,860	2,483,372	948,365	38.19	497.88	56.11	11.27
2014-2018	13,655,396	2,731,079	316,410	11.59	452.10	52.29	11.57

Table 12: Global Soybean Flour Exports, Annual Trends

Year	Value ($)	Quantity (MT)	Price ($/MT)
2010	740,958,720	1,735,009	427.06
2011	892,378,386	1,903,683	468.76
2012	1,884,097,534	3,699,547	509.28
2013	1,920,989,731	3,319,105	578.77
2014	1,663,238,526	3,064,954	542.66
2015	1,180,025,968	2,624,386	449.64
2016	1,028,921,192	2,425,005	424.30
2017	1,021,619,846	2,469,850	413.64
2018	1,321,379,444	3,071,201	430.25

Figure 13: Global Export Share of Soybean Products, 1989-1993

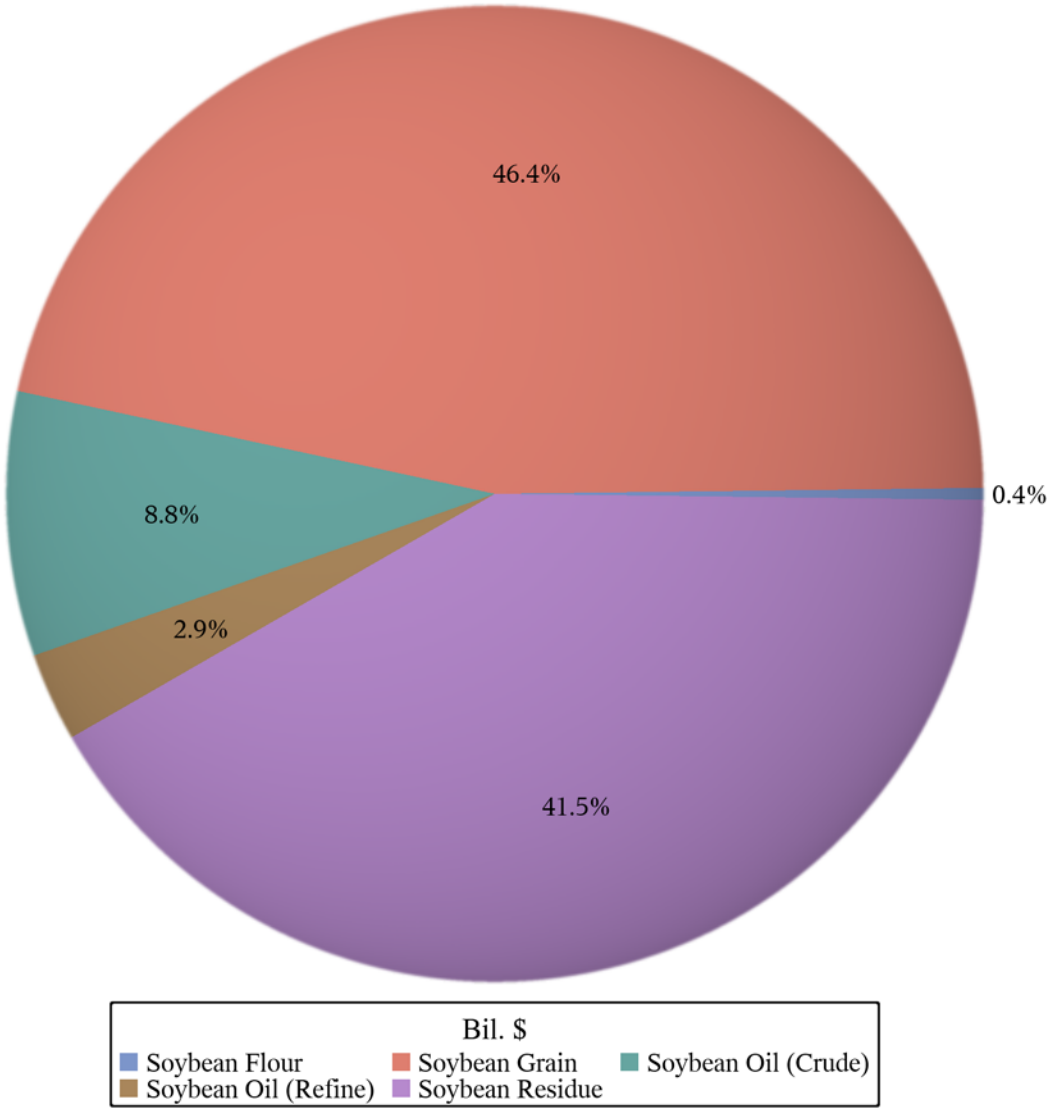

Figure 14: Global Export Share of Soybean Products, 1994-1998

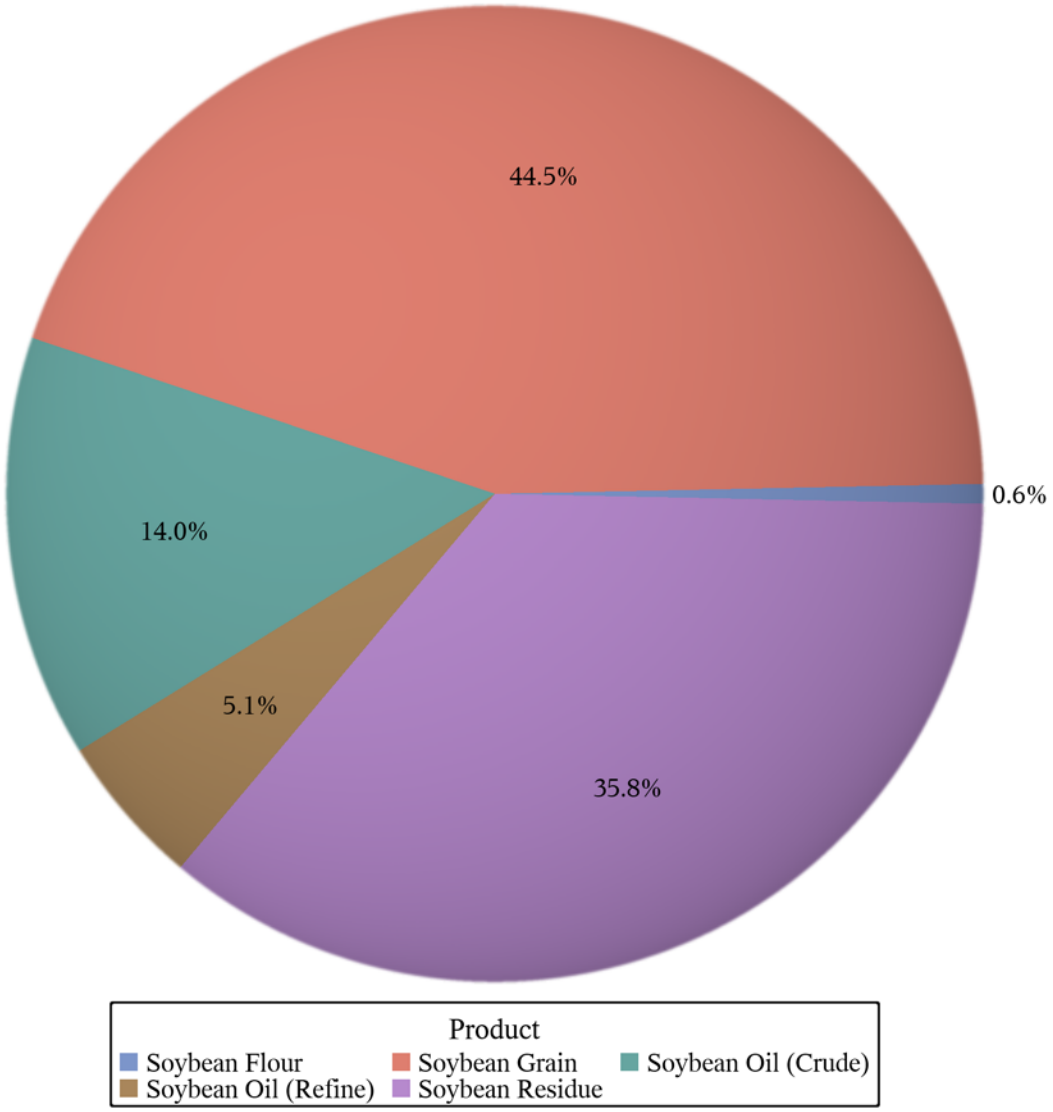

Figure 15: Global Export Share of Soybean Products, 1999-2003

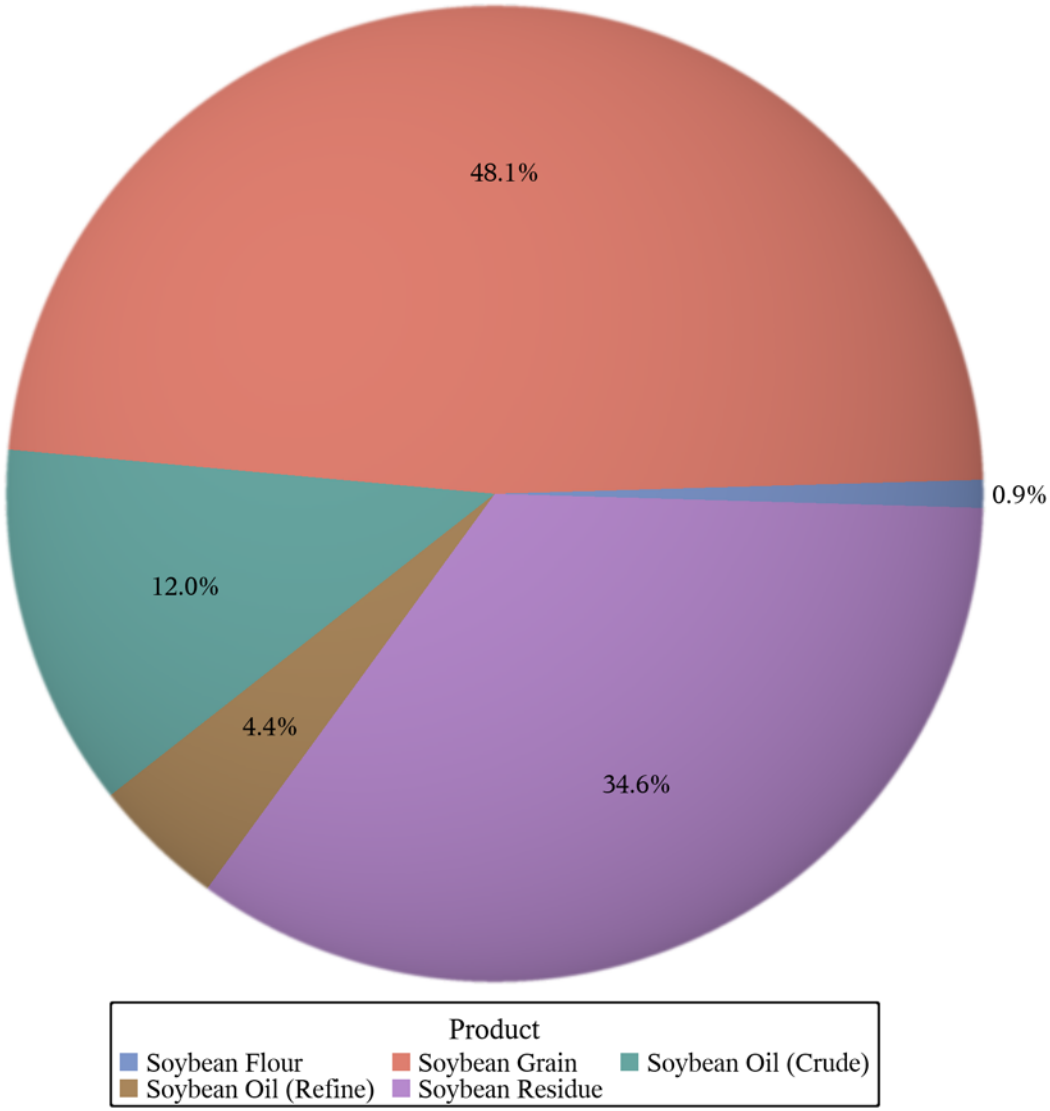

Figure 16: Global Export Share of Soybean Products, 2004-2008

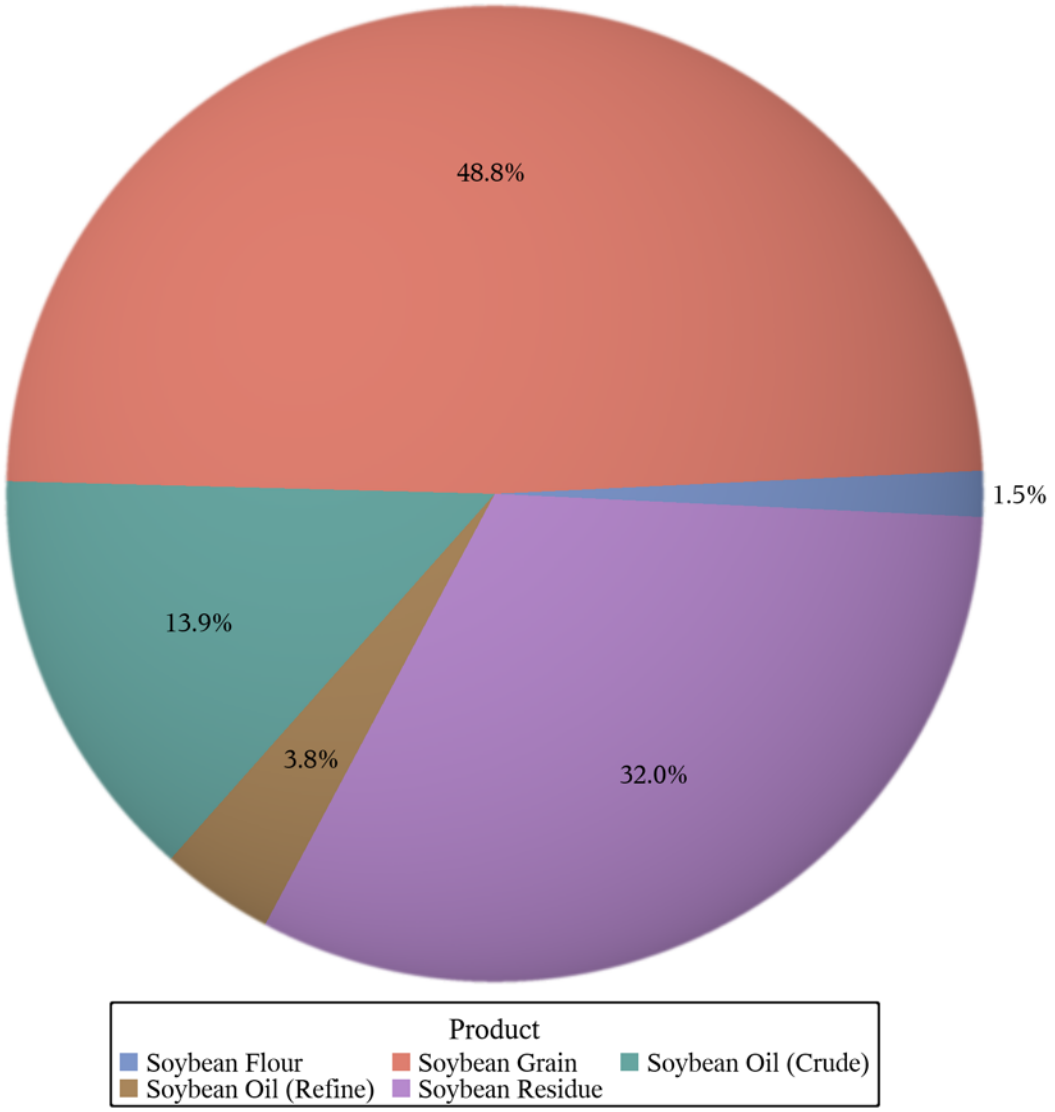

Figure 17: Global Export Share of Soybean Products, 2009-2013

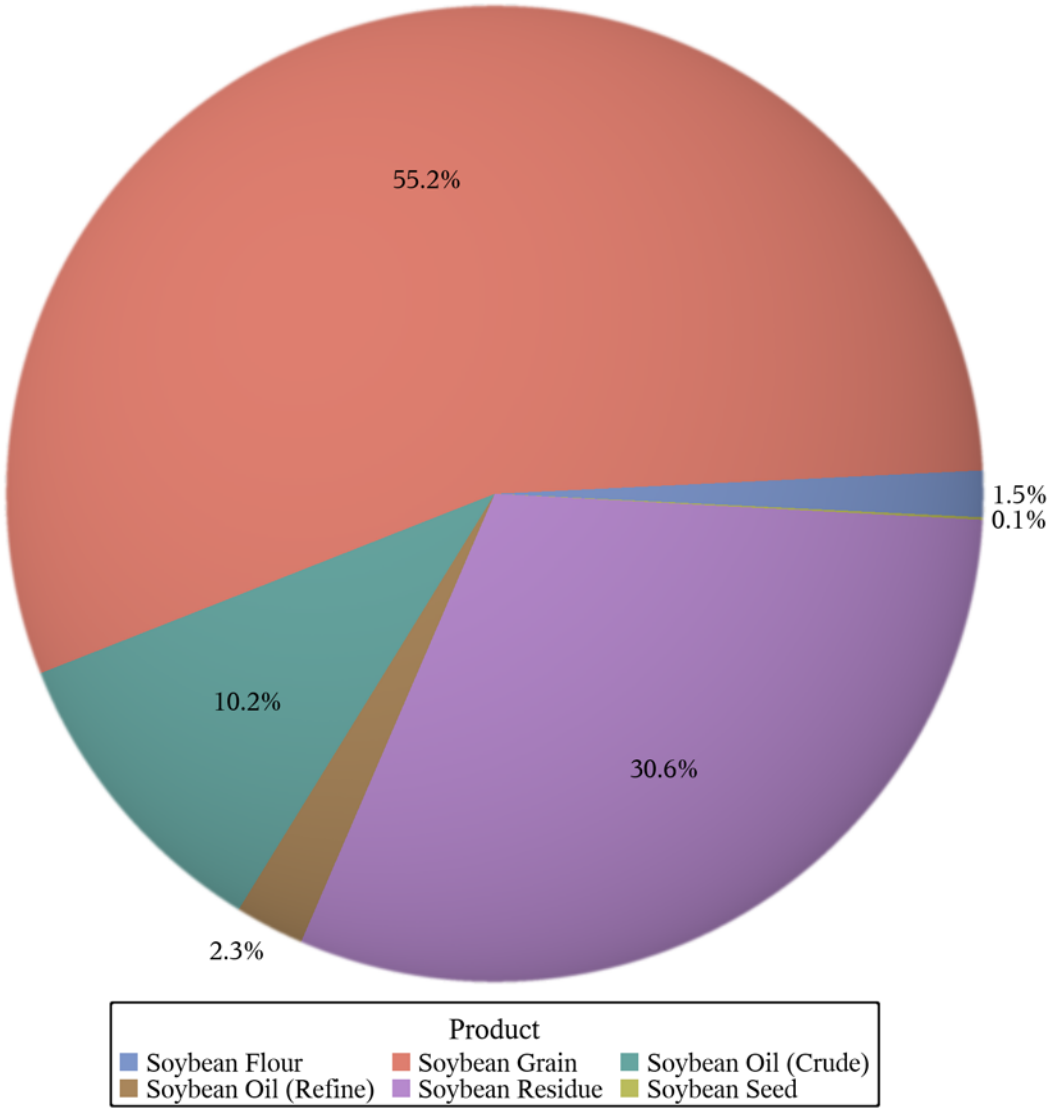

Figure 18: Global Export Share of Soybean Products, 2014-2018

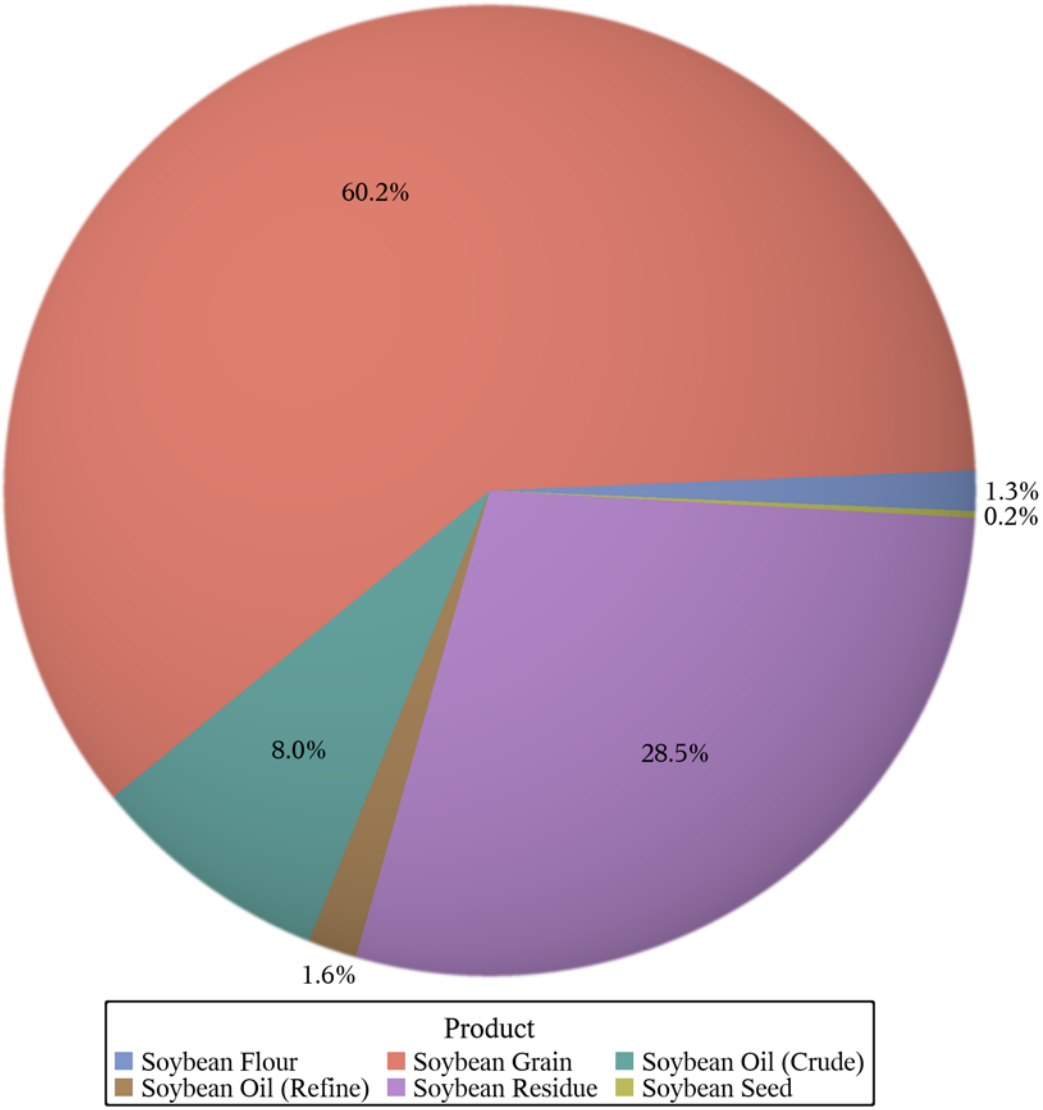

Table 13: Global Export Value of Soybean Products, Periodic Changes

Period	Soybean Flour	Soybean Grain	Soybean Oil (Crude)	Soybean Oil (Refine)	Soybean Residue	Soybean Seed
1989-1993	165,932,634	19,926,610,946	3,759,732,190	1,262,745,234	17,808,593,001	.
1994-1998	649,443,234	44,549,081,116	14,017,300,051	5,059,067,442	35,847,961,852	.
1999-2003	1,021,442,901	53,379,090,381	13,365,150,703	4,873,908,593	38,353,706,599	.
2004-2008	3,271,136,907	105,204,202,439	29,875,286,019	8,093,151,769	69,013,072,392	.
2009-2013	6,327,888,552	228,561,938,593	42,312,613,416	9,491,952,715	126,800,183,526	361,464,120
2014-2018	6,215,184,976	278,542,762,593	37,236,160,294	7,514,329,545	132,087,021,916	1,057,825,890

Table 14: Global Export Value Share of Soybean Products, Periodic Changes

Period	Soybean Flour	Soybean Grain	Soybean Oil (Crude)	Soybean Oil (Refine)	Soybean Residue	Soybean Seed	**Sum**
1989-1993	0.39	46.42	8.76	2.94	41.49	.	42,923,614,005
1994-1998	0.65	44.49	14.00	5.05	35.80	.	100,122,853,695
1999-2003	0.92	48.09	12.04	4.39	34.55	.	110,993,299,177
2004-2008	1.52	48.83	13.87	3.76	32.03	.	215,456,849,526
2009-2013	1.53	55.23	10.22	2.29	30.64	0.09	413,856,040,922
2014-2018	1.34	60.21	8.05	1.62	28.55	0.23	462,653,285,214

Table 15: Global Export Quantity of Soybean Products, Periodic Changes

Period	Soybean Flour	Soybean Grain	Soybean Oil (Crude)	Soybean Oil (Refine)	Soybean Residue	Soybean Seed
1989-1993	538,027	88,056,353	8,727,449	2,016,274	87,135,353	.
1994-1998	2,016,465	170,731,103	24,435,043	7,090,147	166,260,447	.
1999-2003	3,355,588	203,950,776	32,955,246	9,796,660	213,004,137	.
2004-2008	9,032,117	331,171,957	44,731,462	10,209,902	277,165,520	.
2009-2013	12,416,860	471,784,547	42,652,386	7,546,028	300,531,514	398,374
2014-2018	13,655,396	679,201,266	50,343,812	7,547,861	330,489,968	1,537,743

Table 16: Global Export Quantity Share of Soybean Products, Periodic Changes

Period	Soybean Flour	Soybean Grain	Soybean Oil (Crude)	Soybean Oil (Refine)	Soybean Residue	Soybean Seed	**Sum**
1989-1993	0.29	47.22	4.68	1.08	46.73	.	186,473,456
1994-1998	0.54	46.08	6.59	1.91	44.87	.	370,533,205
1999-2003	0.72	44.04	7.12	2.12	46.00	.	463,062,407
2004-2008	1.34	49.26	6.65	1.52	41.23	.	672,310,957
2009-2013	1.49	56.48	5.11	0.90	35.98	0.05	835,329,708
2014-2018	1.26	62.73	4.65	0.70	30.52	0.14	1,082,776,046

Figure 19: Global Export Value of Soybean Products, Annual Trends

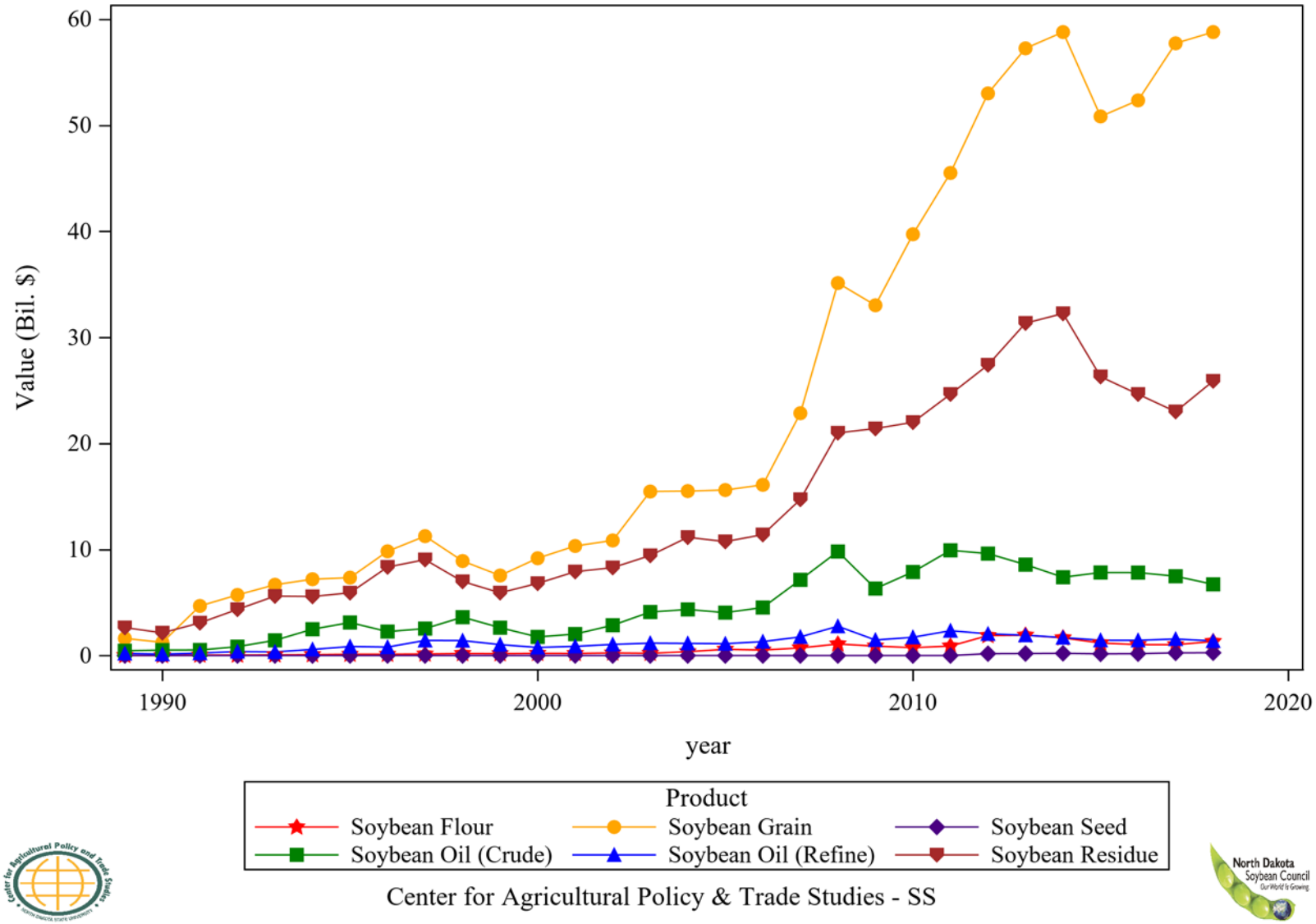

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Table 17: Global Export Value of Soybean Products, Annual Trends

Product	2010	2011	2012	2013	2014	2015	2016	2017	2018
Soybean Flour	740,958,720	892,378,386	1,884,097,534	1,920,989,731	1,663,238,526	1,180,025,968	1,028,921,192	1,021,619,846	1,321,379,444
Soybean Grain	39,730,757,333	45,516,692,121	53,014,535,994	57,265,915,611	58,799,581,788	50,843,696,612	52,358,107,156	57,739,554,248	58,801,822,789
Soybean Seed	.	.	173,199,914	188,264,206	207,820,150	158,121,285	175,192,243	252,927,048	263,765,164
Soybean Oil (Crude)	7,883,261,239	9,922,668,844	9,614,589,449	8,575,937,659	7,383,576,767	7,832,510,738	7,822,807,978	7,481,713,106	6,715,551,705
Soybean Oil (Refine)	1,721,760,470	2,342,627,728	2,046,806,358	1,916,017,679	1,695,716,640	1,443,683,449	1,438,408,468	1,557,358,961	1,379,162,027
Soybean Residue	21,997,813,911	24,646,641,540	27,401,594,520	31,348,240,941	32,254,361,637	26,298,611,196	24,645,745,231	23,001,301,696	25,887,002,156

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Figure 20: Global Export Quantity of Soybean Products, Annual Trends

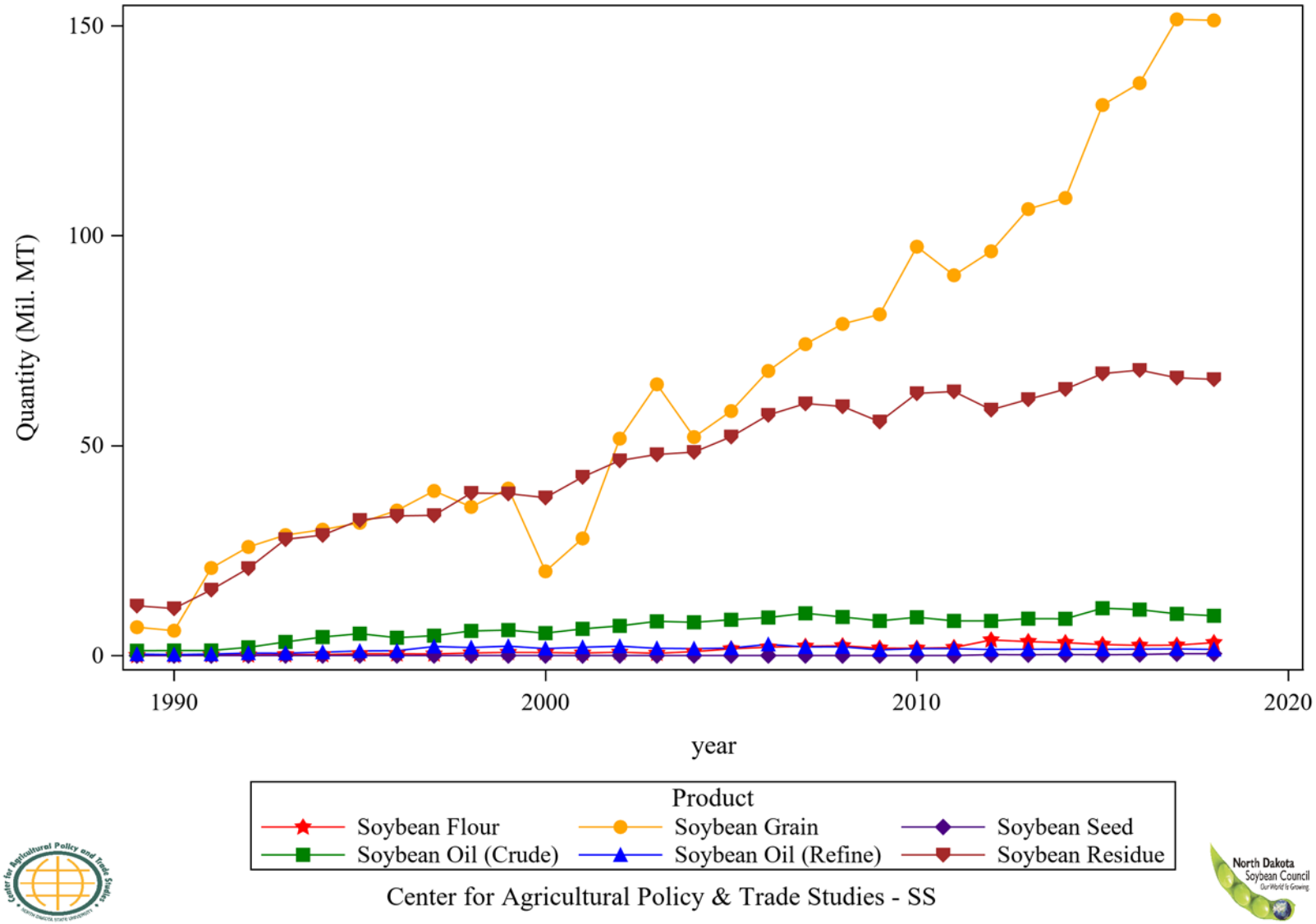

Table 18: Global Export Quantity of Soybean Products, Annual Trends

Product	2010	2011	2012	2013	2014	2015	2016	2017	2018
Soybean Flour	1,735,009	1,903,683	3,699,547	3,319,105	3,064,954	2,624,386	2,425,005	2,469,850	3,071,201
Soybean Grain	97,372,120	90,559,454	96,271,542	106,325,860	108,975,676	131,109,429	136,320,581	151,516,593	151,278,988
Soybean Seed	.	.	202,508	195,866	243,962	187,630	253,646	412,941	439,565
Soybean Oil (Crude)	9,116,182	8,253,255	8,247,672	8,779,034	8,751,245	11,270,987	10,938,760	9,920,933	9,461,887
Soybean Oil (Refine)	1,643,413	1,641,388	1,420,862	1,495,618	1,503,685	1,477,915	1,528,017	1,583,243	1,455,002
Soybean Residue	62,433,148	62,871,748	58,531,726	61,012,088	63,441,276	67,148,176	67,975,954	66,147,777	65,776,784

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Figure 21: Global Export Price of Soybean Products, Annual Trends

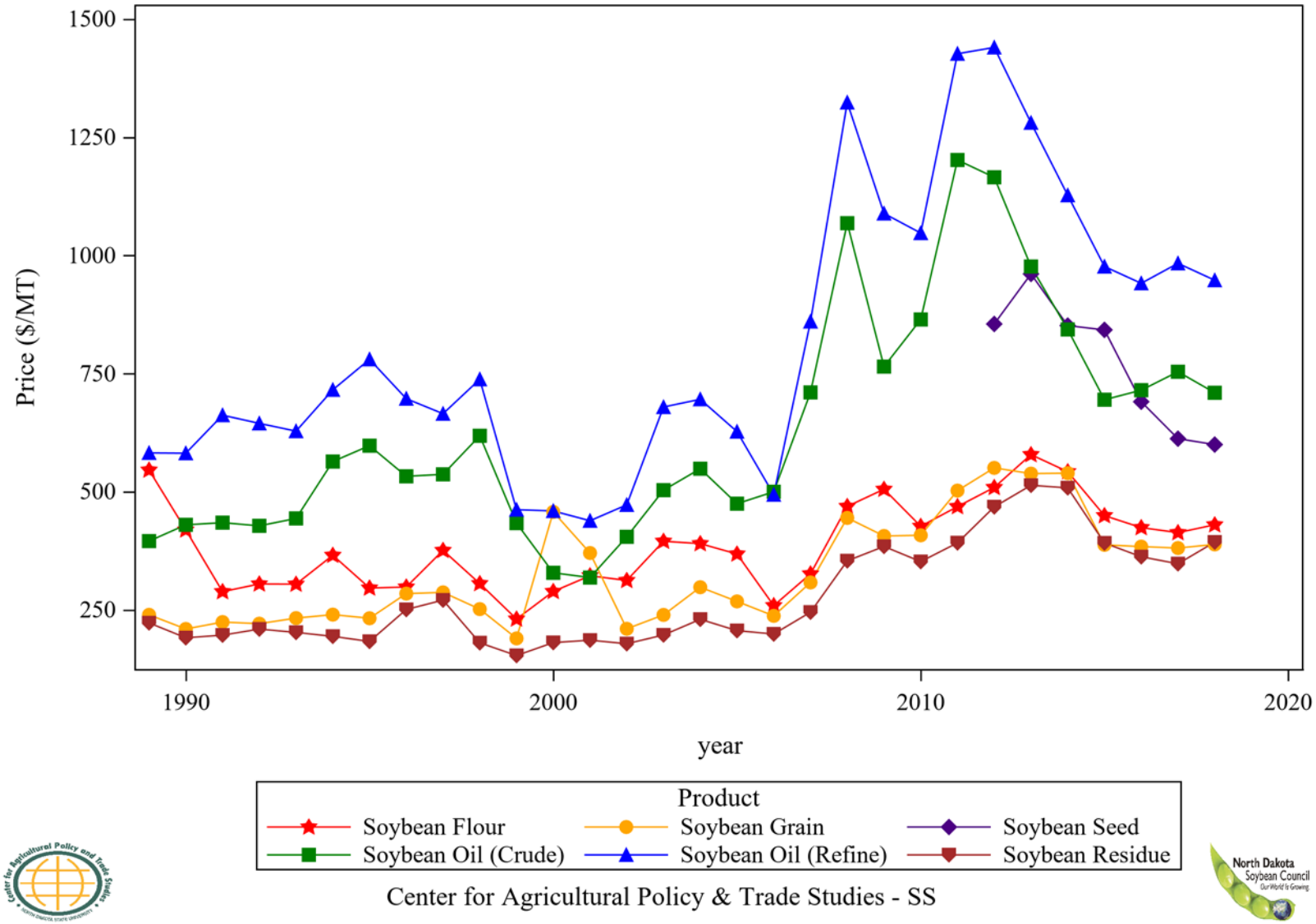

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Table 19: Global Export Price of Soybean Products, Annual Trends

Product	2010	2011	2012	2013	2014	2015	2016	2017	2018
Soybean Flour	427	469	509	579	543	450	424	414	430
Soybean Grain	408	503	551	539	540	388	384	381	389
Soybean Seed	.	.	855	961	852	843	691	613	600
Soybean Oil (Crude)	865	1,202	1,166	977	844	695	715	754	710
Soybean Oil (Refine)	1,048	1,427	1,441	1,281	1,128	977	941	984	948
Soybean Residue	352	392	468	514	508	392	363	348	394

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