GATT Analysis

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Contents

Next steps

To do

1. Create centralized documentation
    - Include history from Unsolved problems in coding.docx (OneDrive)
2. Resolve "complicated" paragraphs, including 4 that still have no tariffs
    - *Matt is looking through last three rounds*
3. **Kennedy, Tokyo, Uruguay**
4. Choose other countries
    - Refine *Members.in.GATT.xlsx*
    - Focus on Benelux, Canada, Chile, France, India, U.K., Dominican Republic, Haiti, Italy, Germany, Peru, Japan
        - Matt is adding # of pages for each schedule
5. **Make list of accuracy checks, run them, fix typos in data**
    - Check for tariffs going up from round to round
6. **Figure out how to integrate "free" list**
    - For which rounds do we have the free list typed up? Just Torquay Free List.xlsx on G: drive
7. Condense data cleaning code
8. Go back to questions in *Plan.docx* when last three rounds are finished
9. Identify lines that switch between specific and ad valorem
10. Look for gradualism in graphs
11. 10 lines in Dillon that have more than 2 years
12. Think about how variation in units affects specific summary stats
    - Look into trade-weighting
13. TOT analysis
14. Find implementation years (maybe get answer from Doug Irwin)
15. Get working draft together ASAP
16. Are current Column 2 tariffs in 1962 Smoot Hawley or the 1946 tariffs?

Done

1. ~~Make Github version for CEA abstract~~
2. ~~Contact Tricia Mueller (USITC) and Roy Santana (WTO) [Bob Staiger's suggestions] [Feb 24]~~
3. ~~Figure out how to source multiple code files~~
4. ~~Program stats into abstract~~
5. ~~Resolve copyright issues, then (hopefully) post the correct schedules on Github~~
6. ~~Determine that TSUS tariffs were always at 5 digit, so we can just use the 5-digit tariff for all of the 7-digit subcategories~~
7. ~~Read and summarize "Two Centuries of Tariffs" (USITC, in G:drive folder)~~
8. ~~Consolidate various notes in Github / One Drive / G drive~~
9. ~~Read and summarize "Tariff negotiations and renegotiations under the GATT and the WTO" (hard copy at SU library)~~

10. ~~Read through Victor's notes for ideas~~
11. ~~Add Schedule A tariff data from 1946 (last available before Geneva 1947)~~

Importing and cleaning the data

Importing and cleaning the data is done in "data_cleaning.rmd". It needs to be reprogrammed before being added here because it is still not as compact and readable as I want it to be. The chunk below calls that program to make the processed data available to the rest of the commands in this document.

Sanity checks

0 rows have either a specific tariff and no unit or a unit with no specific tariff for some round.

Basic summary statistics

Specific tariffs

We see below that the specific tariffs come down by roughly half from Smoot Hawley.

- About half came in Geneva, the rest through Dillon. That is, Geneva did half the work and the following four rounds did the other half

But this could be deceptive since different lines use different units

- Victor has standardized everything to be in cents (per U.S. dollar) in UnitsKey.rmd

```
source('UnitsKey.r')
```

	Summary Statistics of Specific Tariffs by Round						
	Min	1st Quartile	Mean	Median	3rd Quartile	Max	N
Smoot Hawley	0	2.00	47.10	6.0	32.0	3000	1552
1946	0	1.51	38.83	5.0	25.0	1800	1538
Geneva	0	1.23	31.14	5.0	24.5	1800	1543
Annecy	0	1.00	30.39	4.0	22.5	1800	1544
Torquay	0	1.00	26.67	3.5	20.0	1000	1544
GenevaA	0	1.00	26.29	3.5	20.0	1000	1545
GenevaB	0	1.00	25.90	3.5	20.0	1000	1545
GenevaC	0	1.00	25.57	3.5	20.0	1000	1542
DillonA	0	1.00	24.31	3.1	19.0	1000	1542
DillonB	0	1.00	23.62	3.0	18.0	1000	1542

Ad valorem tariffs

Strikingly, the reductions look to be of the same magnitude for Ad valorem, again with Geneva doing about half the work.

- In Dillon, 1071 rows out of 3035 are missing, so there are 1964 ad valorem tariffs. So 64.71% of lines have *ad valorem* tariffs.

How did liberalization vary across Schedules?

First, descriptions of each schedule:

	Summary Statistics of Ad Valorem Tariffs by Round						
	Min	1st Quartile	Mean	Median	3rd Quartile	Max	N
Smoot Hawley	5.00	25.0	39.00	35.0	50.0	105	1990
1946	2.50	20.0	33.95	30.0	45.0	105	1995
Geneva	2.50	15.0	26.38	24.5	35.0	105	1974
Annecy	2.50	12.5	25.46	20.0	32.5	105	1973
Torquay	1.88	12.5	22.08	20.0	27.5	90	1970
GenevaA	1.88	11.5	21.65	17.5	27.5	90	1969
GenevaB	1.88	11.0	21.43	17.5	27.0	118	1969
GenevaC	1.88	10.5	21.15	17.5	25.5	90	1970
DillonA	1.00	10.5	19.46	15.5	25.0	90	1964
DillonB	0.50	10.0	18.90	15.0	25.0	90	1964

Smoot Hawley Schedule Titles		
Schedule	# Lines	Title
1	397	Chemicals, Oil, and Paints
2	243	Earths, Earthenware, and Glassware
3	661	Metals and Manufactures of
4	53	Wood and Manufactures of
5	17	Sugar, Molasses, and Manufactures of
6	12	Tobacco and Manufactures of
7	471	Agricultural Products and Provisions
8	35	Spirits, Wines, and other Beverages
9	118	Cotton Manufactures
10	91	Flax, Hemp, Jute, and Manufactures of
11	160	Wool and Manufactures of
12	38	Silk Manufactures
13	55	Manufactures of Rayon or Other Synthetic Textile
14	145	Papers and Books
15	539	Sundries

Summary stats for specific tariffs

The table below is exactly the same as the one above EXCEPT it drops the 220 lines that are impacted by the "tax interval" issue

Notes:

- 8 (spirits) largest, and consistent across rounds (1 ad valorem only)
- 5 (sugar) unambiguously smallest cuts, had some of the highest ad-valorem
- Reduction in median vs. mean: split exactly half and half as to which reduction was smaller
- Schedule 12 must be all ad valorem

Mean of specific tariffs by schedule and round

Removing tax interval lines

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	20.60	13.45	34.69	5.00	2.50	50.00	264	264	397
2	45.68	26.04	43.00	10.00	5.55	44.50	110	106	243
3	55.16	24.51	55.55	3.50	2.00	42.86	315	304	661
4	53.55	24.27	54.67	60.00	22.50	62.50	6	6	53
5	24.42	23.28	4.69	0.38	0.15	59.73	11	11	17
6	147.50	62.19	57.84	52.50	23.50	55.24	12	12	12
7	28.86	13.34	53.78	3.00	1.50	50.00	356	355	471
8	264.85	78.95	70.19	125.00	42.00	66.40	33	33	35
9	8.60	21.60	-151.14	6.50	15.00	-130.77	8	15	118
10	11.93	4.82	59.62	2.75	1.62	40.91	42	42	91
11	39.76	30.81	22.52	40.00	31.00	22.50	142	142	160
12	NaN	NaN	NaN	NA	NA	NA	0	0	38
13	41.00	25.68	37.36	45.00	25.00	44.44	35	41	55
14	11.73	12.96	-10.56	5.00	2.00	60.00	84	85	145
15	113.79	56.48	50.36	10.00	7.00	30.00	134	126	539

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	20.70	13.53	34.63	5.00	2.50	50.00	262	262	389
2	53.99	27.41	49.24	10.00	5.25	47.50	90	90	199
3	58.37	21.80	62.65	4.00	2.00	50.00	297	287	609
4	53.55	24.27	54.67	60.00	22.50	62.50	6	6	53
5	24.42	23.28	4.69	0.38	0.15	59.73	11	11	17
6	147.50	62.19	57.84	52.50	23.50	55.24	12	12	12
7	29.10	13.41	53.91	3.00	1.50	50.00	353	353	468
8	264.85	78.95	70.19	125.00	42.00	66.40	33	33	35
9	11.30	6.75	40.23	10.00	6.06	39.38	6	6	91
10	11.93	4.82	59.62	2.75	1.62	40.91	42	42	91
11	39.12	27.81	28.89	40.00	30.00	25.00	129	129	145
12	NaN	NaN	NaN	NA	NA	NA	0	0	35
13	38.86	21.70	44.15	45.00	25.00	44.44	22	22	25
14	11.73	7.17	38.89	5.00	2.00	60.00	84	84	142
15	85.87	50.60	41.08	6.00	4.00	33.33	124	117	504

Summary stats for ad valorem tariffs

For several paragraphs, the maximum tariff for Dillon B changes when we get rid of the tax interval lines (2,9,11). Still I'm not going to print the tables with the maxes in them for now.

Mean of ad valorem tariffs by schedule and round

Removing tax interval lines

What was the total reduction in negotiated tariffs under the GATT in each round?

Mean and median of specific tariffs in each round

Sched	SH	A	G1	An	To	GC	DB	chgA	chgG1	chgAn	chgTo	chgGC	chgDI
1	20.60	24.86	22.84	22.77	16.44	15.57	13.45	-20.68	8.11	0.33	27.80	5.29	13.5
2	45.68	37.01	33.65	32.63	27.77	26.81	26.04	18.97	9.08	3.02	14.91	3.44	2.8
3	55.16	47.83	34.61	34.03	30.96	29.75	24.51	13.27	27.65	1.68	9.03	3.91	17.5
4	53.55	43.55	22.61	22.61	22.61	22.61	24.27	18.68	48.08	0.00	0.00	0.00	-7.3
5	24.42	23.51	23.36	23.33	23.32	23.31	23.28	3.75	0.63	0.15	0.03	0.02	0.1
6	147.50	83.64	94.54	86.42	67.25	62.65	62.19	43.30	-13.04	8.59	22.18	6.85	0.7
7	28.86	19.48	15.98	15.80	14.25	14.19	13.34	32.50	17.99	1.11	9.78	0.45	5.9
8	264.85	192.65	143.48	125.87	95.87	86.18	78.95	27.26	25.52	12.28	23.83	10.11	8.3
9	8.60	6.72	22.38	22.38	21.90	21.90	21.60	21.80	-232.74	0.00	2.12	0.00	1.3
10	11.93	7.38	6.76	6.71	4.92	4.91	4.82	38.14	8.39	0.79	26.71	0.12	1.9
11	39.76	36.87	29.29	29.18	28.66	28.66	30.81	7.28	20.55	0.36	1.79	0.00	-7.4
12	NaN	NaN	150.00	150.00	150.00	150.00	NaN	NaN	NaN	0.00	0.00	0.00	NaI
13	41.00	39.57	28.38	27.95	25.45	25.45	25.68	3.48	28.29	1.51	8.94	-0.01	-0.9
14	11.73	19.84	18.54	18.43	16.39	15.04	12.96	-69.23	6.57	0.57	11.10	8.23	13.7
15	113.79	83.26	65.52	65.22	61.87	58.10	56.48	26.83	21.31	0.46	5.14	6.09	2.7

Sched	Sp_SH	Sp_A	Sp_Ge	Sp_An	Sp_To	Sp_GC	Sp_DB	chgGe	chgAn	chgTo	chgGC	chgDB
1	20.70	25.02	23.07	22.99	16.54	15.66	13.53	-11.43	0.33	28.06	5.30	13.60
2	53.99	41.74	36.67	35.47	29.61	28.48	27.41	32.08	3.27	16.53	3.80	3.78
3	58.37	48.25	33.47	32.87	29.85	28.56	21.80	42.66	1.81	9.18	4.30	23.67
4	53.55	43.55	22.61	22.61	22.61	22.61	24.27	57.78	0.00	0.00	0.00	-7.37
5	24.42	23.51	23.36	23.33	23.32	23.31	23.28	4.35	0.15	0.03	0.02	0.16
6	147.50	83.64	94.54	86.42	67.25	62.65	62.19	35.90	8.59	22.18	6.85	0.73
7	29.10	19.59	16.06	15.89	14.33	14.27	13.41	44.80	1.11	9.78	0.46	5.99
8	264.85	192.65	143.48	125.87	95.87	86.18	78.95	45.82	12.28	23.83	10.11	8.39
9	11.30	8.80	7.94	7.94	6.75	6.75	6.75	29.72	0.00	14.95	0.00	0.00
10	11.93	7.38	6.76	6.71	4.92	4.91	4.82	43.33	0.79	26.71	0.12	1.90
11	39.12	36.16	29.10	28.98	28.43	28.43	27.81	25.60	0.40	1.91	0.00	2.17
12	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
13	38.86	37.05	24.77	24.77	21.70	21.70	21.70	36.26	0.00	12.39	0.00	0.00
14	11.73	11.45	10.13	10.02	7.95	7.88	7.17	13.61	1.06	20.67	0.85	9.11
15	85.87	69.77	59.71	59.68	56.08	52.27	50.60	30.47	0.05	6.03	6.80	3.19

Which lines were only ad valorem, only specific, or both?

Mixed

Next we need to know about the lines that have both ad valorem and specific (or take them out from above); at least quantify them to start

How many lines have both ad valorem and specific in each round?

- Smoot Hawley: 513
- Geneva 1947: 487
- Annecy: 487
- Torquay: 484
- Geneva56A: 484
- Geneva56B: 484
- Geneva56C: 482
- DillonA: 476

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	29.90	14.17	52.61	25.00	12.50	50.00	206	205	397
2	45.58	23.93	47.51	50.00	21.00	58.00	163	158	243
3	37.76	17.15	54.58	35.00	13.00	62.86	466	478	661
4	33.91	15.09	55.51	33.33	15.00	55.00	47	47	53
5	50.83	31.92	37.21	50.00	22.50	55.00	6	6	17
6	25.00	7.75	69.00	25.00	7.75	69.00	2	2	12
7	31.74	14.22	55.20	35.00	13.00	62.86	119	120	471
8	60.00	30.00	50.00	60.00	30.00	50.00	1	1	35
9	36.99	22.26	39.81	40.00	20.00	50.00	112	105	118
10	37.45	15.09	59.69	40.00	12.50	68.75	58	58	91
11	49.49	24.93	49.62	50.00	22.50	55.00	114	109	160
12	57.50	23.33	59.43	60.00	21.75	63.75	38	38	38
13	51.90	27.01	47.95	50.00	25.00	50.00	50	40	55
14	21.75	8.70	60.01	20.00	8.00	60.00	124	123	145
15	43.82	22.40	48.87	40.00	17.00	57.50	484	474	539

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	29.90	14.04	53.04	25.00	12.50	50.00	198	198	389
2	42.83	21.52	49.77	45.00	20.00	55.56	127	127	199
3	38.27	17.27	54.88	35.00	13.00	62.86	430	442	609
4	33.91	15.09	55.51	33.33	15.00	55.00	47	47	53
5	50.83	31.92	37.21	50.00	22.50	55.00	6	6	17
6	25.00	7.75	69.00	25.00	7.75	69.00	2	2	12
7	31.74	14.25	55.09	35.00	13.50	61.43	119	119	468
8	60.00	30.00	50.00	60.00	30.00	50.00	1	1	35
9	35.57	21.45	39.69	35.00	20.00	42.86	87	87	91
10	37.45	15.09	59.69	40.00	12.50	68.75	58	58	91
11	48.98	23.44	52.13	50.00	22.50	55.00	101	101	145
12	57.29	23.27	59.38	60.00	21.00	65.00	35	35	35
13	54.40	25.82	52.54	60.00	22.50	62.50	25	25	25
14	21.55	8.72	59.54	20.00	8.00	60.00	121	121	142
15	44.15	21.76	50.72	40.00	17.00	57.50	449	448	504

- DillonB: 476

Victor's intuition on mixed lines

I believe many of the changes from specific tax to ad valorem or otherwise is because of the tax intervals. You could search the keywords "tax boundaries" and "tax interval(s)" in Extra column of every round to locate them.

Proportions of specific, ad valorem, mixed

A few lines in each round have neither specific nor ad valorem. Matt is working on fixing this

```
[1] "Smoot-Hawley"
```

```
 Sched Product Paragraph   id
     3      17       355  980
     3       1  368.c_18 1078
```

Sched	SH	G1	An	To	GC	DB	chgG1	chgAn	chgTo	chgGC	chgDB
1	29.90	21.15	20.75	17.02	16.15	14.17	29.26	1.91	17.98	5.11	12.25
2	45.58	30.78	29.33	25.51	25.32	23.93	32.47	4.73	13.02	0.72	5.52
3	37.76	26.50	25.36	20.88	19.87	17.15	29.84	4.29	17.68	4.82	13.69
4	33.91	22.11	20.39	18.80	17.80	15.09	34.81	7.78	7.78	5.32	15.24
5	50.83	33.58	33.58	33.58	33.58	31.92	33.93	0.00	0.00	0.00	4.96
6	25.00	15.62	15.62	9.38	7.75	7.75	37.50	0.00	40.00	17.33	0.00
7	31.74	20.74	19.45	16.84	15.98	14.22	34.67	6.22	13.39	5.10	11.04
8	60.00	60.00	60.00	30.00	30.00	30.00	0.00	0.00	50.00	0.00	0.00
9	36.99	25.44	25.04	22.92	22.70	22.26	31.21	1.59	8.44	0.96	1.95
10	37.45	19.96	19.74	19.44	18.14	15.09	46.71	1.08	1.53	6.70	16.78
11	49.49	26.15	25.97	24.45	23.88	24.93	47.16	0.67	5.86	2.33	-4.40
12	57.50	36.82	34.05	29.66	27.16	23.33	35.96	7.52	12.90	8.43	14.11
13	51.90	35.40	33.69	28.93	27.18	27.01	31.80	4.82	14.13	6.03	0.63
14	21.75	13.28	12.47	10.91	10.19	8.70	38.96	6.09	12.47	6.61	14.66
15	43.82	31.56	30.79	27.12	25.96	22.40	27.98	2.42	11.93	4.28	13.69

Sched	SH	G1	An	To	GC	DB	chgG1	chgAn	chgTo	chgGC	chgDB
1	29.90	21.10	20.68	16.92	16.02	14.04	29.43	1.97	18.17	5.32	12.39
2	42.83	28.53	26.88	23.01	22.67	21.52	33.39	5.80	14.38	1.51	5.07
3	38.27	27.27	26.15	21.29	20.27	17.27	28.76	4.09	18.60	4.76	14.82
4	33.91	22.11	20.39	18.80	17.80	15.09	34.81	7.78	7.78	5.32	15.24
5	50.83	33.58	33.58	33.58	33.58	31.92	33.93	0.00	0.00	0.00	4.96
6	25.00	15.62	15.62	9.38	7.75	7.75	37.50	0.00	40.00	17.33	0.00
7	31.74	20.83	19.53	16.90	16.03	14.25	34.39	6.24	13.45	5.12	11.10
8	60.00	60.00	60.00	30.00	30.00	30.00	0.00	0.00	50.00	0.00	0.00
9	35.57	24.77	24.28	22.10	21.84	21.45	30.37	1.97	8.97	1.20	1.76
10	37.45	19.96	19.74	19.44	18.14	15.09	46.71	1.08	1.53	6.70	16.78
11	48.98	26.35	26.15	24.54	23.90	23.44	46.20	0.75	6.14	2.62	1.91
12	57.29	36.36	33.43	28.79	26.14	23.27	36.53	8.06	13.89	9.18	10.98
13	54.40	35.00	35.00	27.60	26.06	25.82	35.66	0.00	21.14	5.58	0.92
14	21.55	13.31	12.49	10.91	10.21	8.72	38.22	6.18	12.66	6.42	14.60
15	44.15	31.23	30.46	26.57	25.38	21.76	29.26	2.48	12.77	4.49	14.26

	Decrease in specific tariffs by round			
	Mean	% decrease	Median	% decrease
Smoot Hawley	47.10	0.00	6.0	0.00
1946	38.83	17.55	5.0	16.67
Geneva	31.14	19.80	5.0	0.00
Annecy	30.39	2.43	4.0	20.00
Torquay	26.67	12.22	3.5	12.50
GenevaA	26.29	1.43	3.5	0.00
GenevaB	25.90	1.47	3.5	0.00
GenevaC	25.57	1.31	3.5	0.00
DillonA	24.31	4.90	3.1	11.43
DillonB	23.62	2.85	3.0	3.23

	Decrease in ad valorem tariffs by round			
	Mean	% decrease	Median	% decrease
Smoot Hawley	39.00	0.00	35.0	0.00
1946	33.95	12.95	30.0	14.29
Geneva	26.38	22.30	24.5	18.33
Annecy	25.46	3.49	20.0	18.37
Torquay	22.08	13.29	20.0	0.00
GenevaA	21.65	1.93	17.5	12.50
GenevaB	21.43	1.00	17.5	0.00
GenevaC	21.15	1.30	17.5	0.00
DillonA	19.46	8.00	15.5	11.43
DillonB	18.90	2.88	15.0	3.23

```
     8       1       810 1889
    14       1      1408 2443
    15      17    1532.a 2866
    15      12      1558 3035
```

```
[1] "Dillon B"
```

```
 Sched Product Paragraph   id
     3       1  368.c_18 1078
     8       1       810 1889
    14       1      1408 2443
    15      17    1532.a 2866
    15      12      1558 3035
```

Tariff Increases

Here we are looking round by round for lines that had an increase in either the ad valorem or specific tariff (or both). Later we will look at lines that switch from one type of tariff to the other.

```
## [1] "Increased tariff from Smoot Hawley to Geneva"
```

```
##  Paragraph   id Product av_pc sp_pc Ad_Valorem_SH Ad_Valorem_Geneva Specific_SH
##         41  198       9    60   -25            25                10         2.0
##         59  280       2    NA  -500            NA                NA       300.0
##        212  498      11    NA  -300            60                NA        10.0
##        318  796       1   -50    NA            50                75          NA
##        318  797       2   -50    NA            50                75          NA
##        318  805      10   -50    NA            50                75          NA
##        331  857      10    NA   -50            NA                NA         3.0
##        355  971       8    22  -300            45                35         2.0
##        364 1023       2   -40    NA            50                70          NA
##        389 1251       4   -75    NA            10                18          NA
##        396 1266       1   -44    NA            45                65          NA
##        397 1296      29   -47    NA            45                66          NA
##        397 1300      33   -33    NA            45                60          NA
##      718.a 1486       3   -47    NA            30                44          NA
##      718.a 1487       4   -47    NA            30                44          NA
##      904.a 1904       2  -175    NA            10                28          NA
##      904.b 1910       3  -131    NA            13                30          NA
##      904.c 1914       3  -100    NA            16                32          NA
```

```
##      911.a 1952       7   -38    NA            40                55          NA
##   1005.a.3 2044       1    NA   -50            NA                NA         3.2
##       1022 2094       2    NA   -25            NA                NA         8.0
##       1301 2315      19    NA   -22            50                NA        45.0
##       1301 2319      23    NA   -33            55                NA        45.0
##       1301 2321      25    NA   -11            50                NA        45.0
##     1526.a 2696       2  -120    NA            25                55       125.0
##     1526.a 2697       3  -120    NA            25                55       250.0
##     1526.a 2698       4  -120    NA            25                55       500.0
##     1526.a 2699       5   -90    NA            25                48       600.0
##     1526.a 2700       6   -90    NA            25                48       700.0
##     1526.a 2701       7   -60    NA            25                40       900.0
##     1526.a 2702       8   -60    NA            25                40      1200.0
##   1527.a.2 2708       2   -10    NA            50                55       100.0
##     1527.b 2711       2   -10    NA            50                55         6.0
##   1527.c.2 2713       1   -10    NA            50                55         1.0
##   1527.c.2 2714       2   -30    NA            50                65         1.0
##   1527.c.2 2715       3   -10    NA            50                55         1.0
##     1537.c 2903       2    43   -50            35                20         2.0
##  Specific_Geneva Units_SH Units_Geneva Interval
##              2.5        1            1       NA
##           1800.0        1            1       NA
##             40.0       20           20        1
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##              4.5        1            1       NA
##              8.0       19           19       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA       NA
##               NA       NA           NA        1
##              4.9        1            1       NA
##             10.0       44           44       NA
##             55.0        1            1        1
##             60.0        1            1        1
##             50.0        1            1        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       20           NA        1
##               NA       19           NA        1
##               NA       55           NA       NA
##               NA        1           NA       NA
```

```
##               NA        1           NA       NA
##               NA        1           NA       NA
##              3.0       19           19       NA
```

```
## [1] "Increased tariff from Geneva to Annecy"
```

```
##  Paragraph   id Product av_pc sp_pc Ad_Valorem_Geneva Ad_Valorem_Annecy
##        385 1240       2     0   -67                10                 10
##  Specific_Geneva Specific_Annecy Units_Geneva Units_Annecy Interval
##                6              10            1            1       NA
```

```
## [1] "Increased tariff from Annecy to Torquay"
```

```
##  Paragraph   id Product   av_pc sp_pc Ad_Valorem_Annecy Ad_Valorem_Torquay
##        212  500      13 -100.00    NA              35.0                 70
##        360 1012       6  -50.00    NA              20.0                 30
##        394 1260       2      NA   -12                NA                 NA
##       1013 2061       3  -50.00    NA              15.0                 22
##     1114.d 2206       4   -0.67     0              37.2                 38
##       1405 2380       3  -33.33     0               7.5                 10
##       1405 2390      13    0.00   -50              10.0                 10
##     1519.b 2666       1  -12.50    NA              20.0                 22
##     1530.c 2808       5  -50.00    NA              10.0                 15
##     1537.b 2896       8  -25.00    NA              10.0                 12
##  Specific_Annecy Specific_Torquay Units_Annecy Units_Torquay Interval
##              5.0               NA         20.0            NA        1
##               NA               NA           NA            NA       NA
##              1.0              1.1          1.0             1       NA
##               NA               NA           NA            NA       NA
##             37.5             37.5          1.0             1       NA
##              2.5              2.5          1.0             1       NA
##              1.0              1.5          0.5             1       NA
##               NA               NA           NA            NA       NA
##               NA               NA           NA            NA       NA
##               NA               NA           NA            NA       NA
```

```
## [1] "Increased tariff from Torquay to Geneva56_C"
```

```
##  Paragraph   id Product  av_pc sp_pc Ad_Valorem_Torquay Ad_Valorem_Geneva56_C
##      202.a  410       7  -20.0    NA                 35                   42
##      202.a  411       8     NA -20.0                 NA                   NA
##      202.a  412       9  -20.0    NA                 25                   30
##      202.a  413      10   -7.1    NA                 28                   30
##      202.a  414      11     NA  -6.2                 NA                   NA
##      202.a  415      12   -5.0    NA                 20                   21
##      202.a  417      14  -18.3    NA                 30                   36
##      202.a  418      15   -6.2    NA                 24                   26
##        209  474       6  -71.4    NA                 18                   30
##        212  493       6  -71.4    NA                 35                   60
##        214  514       7  -70.0    NA                 20                   34
##      302.b  650       1     NA -71.4                 NA                   NA
##        357  983       1 -122.2    NA                 22                   50
##        357  984       2 -122.2    NA                 22                   50
##        360 1007       1  -13.3    NA                 22                   26
##        411 1331       4  -70.0    NA                 25                   42
##        701 1391       8     NA -66.7                 NA                   NA
##        778 1823       1 -112.5    NA                  8                   17
```

```
##     1114.d 2205       3  -28.0   0.0                25                   32
##  Specific_Torquay Specific_Geneva56_C Units_Torquay Units_Geneva56_C Interval
##                NA                  NA            NA                NA        1
##               5.0                 6.0             6                 6        1
##                NA                  NA            NA                NA        1
##                NA                  NA            NA                NA        1
##               4.0                 4.2             6                 6        1
##                NA                  NA            NA                NA        1
##                NA                  NA            NA                NA       NA
##                NA                  NA            NA                NA       NA
##                NA                  NA            NA                NA       NA
##                NA                  NA            NA                NA       NA
##                NA                  NA            NA                NA       NA
##              17.5                30.0             1                 1       NA
##               1.8                  NA            19                NA       NA
##               7.5                  NA            19                NA       NA
##                NA                  NA            NA                NA       NA
##                NA                  NA            NA                NA       NA
##               6.0                10.0             1                 1       NA
##                NA                  NA            NA                NA       NA
##              37.5                37.5             1                 1       NA
```

```
## [1] "Increased tariff from Geneva56_C to Dillon_B"
```

```
##  Paragraph   id Product  av_pc sp_pc Ad_Valorem_Geneva56_C Ad_Valorem_Dillon_B
##         24  102       6 -300.0    67                   9.0                  36
##         24  103       7 -373.3    67                   7.5                  36
##      202.a  413      10  -30.0    NA                  30.0                  39
##      202.a  414      11     NA   -32                    NA                  NA
##      202.a  415      12  -33.3    NA                  21.0                  28
##        209  470       2  -37.1    NA                   8.8                  12
##        209  475       7  -55.6    NA                  22.5                  35
##        331  856       9     NA   -20                    NA                  NA
##        354  951       1  -70.0    68                  25.0                  42
##        354  952       2  -70.0    68                  25.0                  42
##        354  953       3  -54.5    67                  27.5                  42
##        354  960      10  -54.5    67                  27.5                  42
##        354  961      11  -54.5    72                  27.5                  42
##        354  962      12  -70.0    80                  25.0                  42
##        354  963      13  -54.5    86                  27.5                  42
##        365 1032       9  -18.4   -18                  19.0                  22
##        371 1097       2     NA   -50                    NA                  NA
##        371 1098       3  -50.0    NA                  15.0                  22
##        371 1100       5     NA   -50                    NA                  NA
##        371 1101       6  -50.0    NA                  15.0                  22
##        371 1102       7  -50.0    NA                  15.0                  22
##        371 1103       8     NA   -50                    NA                  NA
##        371 1104       9  -50.0    NA                   7.5                  11
##        371 1106      11     NA   -50                    NA                  NA
##        371 1107      12  -50.0    NA                  15.0                  22
##        372 1114       3  -33.3    NA                  10.5                  14
##        411 1330       3  -36.0    NA                  25.0                  34
##        412 1338       7     NA  -100                    NA                  NA
##      721.e 1531       1     NA   -12                    NA                  NA
##       1014 2068       6 -300.0    NA                   2.5                  10
```

```
##       1108 2161       7 -140.0     0                 25.0                 60
##       1108 2162       8 -140.0     0                 25.0                 60
##       1108 2163       9     NA  -260                 25.0                 NA
##       1108 2164      10     NA  -260                 25.0                 NA
##       1108 2165      11  -52.0     0                 25.0                 38
##       1108 2166      12 -140.0     0                 25.0                 60
##       1108 2167      13     NA  -203                 25.0                 NA
##       1108 2168      14     NA  -203                 25.0                 NA
##       1108 2169      15  -52.0     0                 25.0                 38
##     1109.a 2170       1 -140.0     0                 25.0                 60
##     1109.a 2171       2     NA  -203                 25.0                 NA
##     1109.a 2172       3  -52.0     0                 25.0                 38
##     1109.a 2173       4  -50.0     0                 20.0                 30
##     1109.a 2174       5  -50.0     0                 20.0                 30
##     1109.a 2175       6  -50.0     0                 20.0                 30
##       1301 2304       8 -122.2    NA                 22.5                 50
##       1404 2368       9   -6.7    20                  7.5                  8
##     1549.a 2968       1   20.0 -7995                 12.5                 10
##       1551 2987       7     NA   -60                   NA                 NA
##       1551 2988       8     NA   -60                   NA                 NA
##  Specific_Geneva56_C Specific_Dillon_B Units_Geneva56_C Units_Dillon_B Interval
##                30.00              10.0                1              1       NA
##                51.00              17.0                1              1       NA
##                   NA                NA               NA             NA        1
##                 4.25               5.6                6              6        1
##                   NA                NA               NA             NA        1
##                   NA                NA               NA             NA       NA
##                   NA                NA               NA             NA       NA
##                 3.00               3.6                1              1       NA
##                 0.62               0.2               19             19       NA
##                 2.50               0.8               19             19       NA
##                 5.50               1.8               19             19       NA
##                 7.50               2.5               19             19       NA
##                 9.00               2.5               19             19       NA
##                12.50               2.5               19             19       NA
##                17.50               2.5               19             19       NA
##               425.00             500.0               19             19       NA
##               125.00             187.5               19             19        1
##                   NA                NA               NA             NA        1
##               200.00             300.0               19             19        1
##                   NA                NA               NA             NA        1
##                   NA                NA               NA             NA        1
##               125.00             187.5               19             19        1
##                   NA                NA               NA             NA        1
##               250.00             375.0               19             19        1
##                   NA                NA               NA             NA        1
##                   NA                NA               NA             NA       NA
##                   NA                NA               NA             NA       NA
##                10.00              20.0               18             18       NA
##                 4.00               4.5                1              1       NA
##                   NA                NA               NA             NA       NA
##                30.00              30.0                1              1        1
##                30.00              30.0                1              1        1
##                30.00             108.0                1              1        1
```

```
##                30.00            108.0                1             1        1
##                30.00             30.0                1             1        1
##                37.50             37.5                1             1        1
##                37.50            113.5                1             1        1
##                37.50            113.5                1             1        1
##                37.50             37.5                1             1        1
##                37.50             37.5                1             1        1
##                37.50            113.5                1             1        1
##                37.50             37.5                1             1       NA
##                37.50             37.5                1             1       NA
##                37.50             37.5                1             1       NA
##                37.50             37.5                1             1       NA
##                   NA               NA               NA            NA        1
##                 2.50              2.0                1             1       NA
##                 0.21             17.0                1            18       NA
##                 0.50              0.8               55            55       NA
##                 1.50              2.4               55            55       NA
```

No change from Smoot Hawley to Dillon B

```
sm_db <- data_set %>%
       mutate(av_pc =((Ad_Valorem_SH - Ad_Valorem_Dillon_B)/Ad_Valorem_SH)*100,sp_pc
       =((Specific_SH - Specific_Dillon_B)/Specific_SH)*100)

sm_db2 <- subset(sm_db,is.na(sp_pc) | sp_pc==0) %>% subset(is.na(av_pc) | av_pc==0)
```

The code above produces 339 lines that are the same in Smoot Hawley and Dillon B (i.e. that don't change at all through these five rounds of negotiations–we assume. We still need a check for rates going up.)

No change from Smoot Hawley to Geneva

```
# we removed the "before" variables once we verified that they were exactly the same as Smoot Hawley
# all the lines that are exactly the same in Smoot Hawley and 1946_before
#same <- shortnames %>%
#         filter( ((is.na(Sp_SH) == is.na(Sp_B) & is.na(Sp_SH)) | Sp_SH == Sp_B)
#                 & ((is.na(AV_SH) == is.na(AV_B) & is.na(AV_SH)) | AV_SH == AV_B)
#                 & ((is.na(Un_SH) == is.na(Un_B) & is.na(Un_SH)) | Un_SH == Un_B))


# all the lines that are exactly the same in Smoot Hawley and Geneva
same <- data_set %>%
        filter( ((is.na(Specific_SH) == is.na(Specific_Geneva) & is.na(Specific_SH)) | Specific_SH == S
                & ((is.na(Ad_Valorem_SH) == is.na(Ad_Valorem_Geneva) & is.na(Ad_Valorem_SH)) | Ad_Valo
                & ((is.na(Units_SH) == is.na(Units_Geneva) & is.na(Units_SH)) | Units_SH == Units_Gene

# supposed to be all the lines that have any difference, but misses lines that switch
# between ad valorem and specific. Almost certainly is because of treatment of NAs
diff <- data_set %>%
        filter( Specific_SH != Specific_Geneva | Ad_Valorem_SH != Ad_Valorem_Geneva |
                Units_SH != Units_Geneva )

# lines that are NOT in "same"
t <- setdiff(data_set$id,same$id)
```

```
same_removed <- data_set[t,]

# lines that are NOT in either "same" or "diff"
t3 <- setdiff(same_removed$id,diff$id)
samediff_removed <- data_set[t3,]

# both these methods miss out on the ones that are not equal because one is an NA
units_diff <- data_set %>%
         filter( (Units_SH != Units_Geneva) )

units_diff2 <- data_set[which(data_set$Units_SH != data_set$Units_Geneva), ]

# tbl %>% rowwise(id) %>% mutate(s = sum(c_across(x:w)) %>% ungroup()
# all(is.na(x))
# all(is.na(c_across(stuff)))
```

The code above produces 1020 lines that are the same in Smoot Hawley and Geneva.

Lines that switch between specific, ad valorem, and compound

Below are the lines that either change units or change between specific only, ad valorem only or both specific and ad valorem. Indicator variables for each round (G for Geneva, A for Annecy, etc.) show in which round the change(s) occurred. Variable "unit_ch" equals 1 if the unit changed.

```
##  Sched Product  Paragraph   id  G  A  T GA GB GC DA DB unit_ch Interval
##      1      16       28.a  148  1 NA NA NA NA NA NA NA      NA        1
##      1      10         53  253  1 NA  1 NA NA NA NA NA      NA        1
##      1       6         72  324  1 NA NA NA NA NA NA NA      NA        1
##      2       4        210  479  1 NA NA NA NA NA NA NA      NA        1
##      2       2        212  489  1 NA NA NA NA NA NA NA      NA        1
##      2       3        212  490  1 NA  1 NA NA NA NA NA       0        1
##      2       4        212  491  1 NA NA NA NA NA NA NA      NA        1
##      2      10        212  497  1 NA NA NA NA NA NA NA      NA        1
##      2      11        212  498  1 NA NA NA NA NA NA NA       0        1
##      2      12        212  499  1 NA NA NA NA NA NA NA      NA        1
##      2      13        212  500 NA NA  1 NA NA NA NA NA       0        1
##      2      14        212  501  1 NA  1 NA NA NA NA NA      NA        1
##      2      15        212  502  1 NA NA NA NA NA NA NA      NA        1
##      2       4        213  506  1 NA NA NA NA NA NA NA      NA        1
##      2       2      218.d  535  1 NA  1 NA NA NA NA NA      NA        1
##      2       5      218.d  538  1 NA NA NA NA NA NA NA      NA        1
##      2       7      218.f  554  1 NA NA NA NA NA NA NA      NA        1
##      2      11      218.f  558 NA NA NA NA NA NA  1 NA      NA        1
##      2       4        226  592  1 NA NA NA NA NA NA NA      NA        1
##      3       3      302.d  654 NA NA  1 NA NA NA NA NA       0       NA
##      3       3        304  693  1 NA NA NA NA NA NA NA      NA        1
##      3       4        304  694  1 NA NA NA NA NA NA NA      NA        1
##      3       5        304  695  1 NA NA NA NA NA NA NA      NA        1
##      3      11        304  701  1 NA NA NA NA NA NA NA      NA        1
##      3      12        304  702  1 NA NA NA NA NA NA NA      NA        1
##      3      13        304  703  1 NA NA NA NA NA NA NA      NA        1
##      3      21        304  711  1 NA NA NA NA NA NA NA      NA       NA
##      3      22        304  712  1 NA NA NA NA NA NA NA      NA       NA
##      3      23        304  713  1 NA NA NA NA NA NA NA      NA       NA
```

```
##      3      24        304  714  1 NA NA NA NA NA NA NA       0       NA
##      3      25        304  715  1 NA NA NA NA NA NA NA      NA       NA
##      3      26        304  716  1 NA NA NA NA NA NA NA       0       NA
##      3      30        304  720  1 NA NA NA NA NA NA NA      NA       NA
##      3      38        304  728  1 NA NA NA NA NA NA NA      NA        1
##      3      39        304  729  1 NA NA NA NA NA NA NA      NA        1
##      3      40        304  730  1 NA NA NA NA NA NA NA      NA        1
##      3      41        304  731  1 NA NA NA NA NA NA NA      NA        1
##      3      46        304  736  1 NA NA NA NA NA NA NA      NA       NA
##      3      47        304  737  1 NA NA NA NA NA NA NA      NA       NA
##      3      48        304  738  1 NA NA NA NA NA NA NA      NA       NA
##      3       1        308  749  1 NA  1 NA NA NA NA NA      NA        1
##      3       3        308  751  1 NA  1 NA NA NA NA NA      NA        1
##      3      12      316.a  790  1 NA NA NA NA NA NA NA      NA        1
##      3       4        318  799  1 NA NA NA NA NA NA NA      NA        1
##      3       7        318  802  1 NA NA NA NA NA NA NA      NA        1
##      3      17        355  980  1 NA NA NA NA NA NA NA      NA       NA
##      3       1        357  983 NA NA NA NA NA  1 NA NA       0       NA
##      3       2        357  984 NA NA NA NA NA  1 NA NA       0       NA
##      3       7        358  996  1 NA NA NA NA NA NA NA      NA        1
##      3      16        365 1039 NA NA NA NA NA NA  1 NA       0       NA
##      3      18        365 1041 NA NA NA NA NA NA  1 NA       0       NA
##      3       1    368.c_2 1061 NA NA NA NA NA NA  1 NA      NA       NA
##      3       2    368.c_2 1062 NA NA NA NA NA NA  1 NA      NA       NA
##      3       1   368.c_17 1077 NA NA  1 NA NA NA NA NA       0       NA
##      3       2        371 1097  1 NA NA NA NA NA NA NA      NA        1
##      3       5        371 1100  1 NA NA NA NA NA NA NA      NA        1
##      3       8        371 1103  1 NA NA NA NA NA NA NA      NA        1
##      3      11        371 1106  1 NA NA NA NA NA NA NA      NA        1
##      3      14        371 1109  1 NA NA NA NA NA NA NA      NA        1
##      3       2        375 1189 NA NA NA NA NA  1 NA NA       0       NA
##      3       4      382.a 1215  1 NA NA NA NA NA NA NA      NA        1
##      3      11        397 1278  1 NA NA NA NA NA NA NA      NA        1
##      7       4        726 1545  1 NA NA NA NA NA NA NA      NA        1
##      7       2        754 1663  1 NA NA NA NA NA NA NA       1       NA
##      7       1        779 1824 NA NA NA NA  1  1 NA NA       0       NA
##      9       4        909 1929  1 NA NA NA NA NA NA NA      NA        1
##      9       7        909 1932  1 NA NA NA NA NA NA NA      NA        1
##      9      14        909 1939  1 NA NA NA NA NA NA NA      NA        1
##      9       2        910 1944  1 NA NA NA NA NA NA NA      NA        1
##      9       8      911.a 1953  1 NA NA NA NA NA NA NA      NA        1
##      9       2        915 1975  1 NA NA NA NA NA NA NA      NA        1
##      9       9        923 2003  1 NA NA NA NA NA NA NA      NA        1
##     11       9       1108 2163 NA NA NA NA NA NA  1 NA       0        1
##     11      10       1108 2164 NA NA NA NA NA NA  1 NA       0        1
##     11      13       1108 2167 NA NA NA NA NA NA  1 NA       0        1
##     11      14       1108 2168 NA NA NA NA NA NA  1 NA       0        1
##     11       2     1109.a 2171 NA NA NA NA NA NA  1 NA       0        1
##     12       3       1208 2283  1 NA NA NA NA NA  1 NA      NA        1
##     13       1       1301 2297 NA  1 NA NA NA NA NA NA      NA        1
##     13       3       1301 2299 NA  1 NA NA NA NA NA NA      NA        1
##     13       5       1301 2301 NA NA NA  1 NA NA NA NA      NA        1
##     13       9       1301 2305 NA NA NA NA NA NA  1 NA      NA        1
##     13      15       1301 2311  1 NA NA NA NA NA NA NA      NA        1
```

```
##     13      17       1301 2313  1 NA NA NA NA NA NA NA      NA        1
##     13      19       1301 2315  1 NA NA NA NA NA NA NA       0        1
##     13      21       1301 2317  1 NA NA NA NA NA NA NA       0        1
##     13      23       1301 2319  1 NA NA NA NA NA NA NA       0        1
##     13      25       1301 2321  1 NA NA NA NA NA NA NA       0        1
##     14      13       1405 2390  1 NA  1 NA NA NA NA NA       1       NA
##     14       6       1413 2487  1 NA NA NA NA NA NA NA      NA        1
##     15       5     1504.a 2530  1 NA NA NA NA NA NA NA      NA        1
##     15       5 1504.b.1.2 2541  1 NA NA NA NA NA NA NA      NA       NA
##     15      10       1506 2559  1 NA NA NA NA NA NA NA      NA        1
##     15       1       1509 2564 NA  1 NA NA NA NA NA NA       0       NA
##     15       1     1526.a 2695  1 NA NA NA NA NA NA NA       0        1
##     15       2     1526.a 2696  1 NA NA NA NA NA NA NA      NA        1
##     15       3     1526.a 2697  1 NA NA NA NA NA NA NA      NA        1
##     15       4     1526.a 2698  1 NA NA NA NA NA NA NA      NA        1
##     15       5     1526.a 2699  1 NA NA NA NA NA NA NA      NA        1
##     15       6     1526.a 2700  1 NA NA NA NA NA NA NA      NA        1
##     15       7     1526.a 2701  1 NA NA NA NA NA NA NA      NA        1
##     15       8     1526.a 2702  1 NA NA NA NA NA NA NA      NA        1
##     15       1   1527.a.2 2707 NA  1 NA NA NA NA NA NA       0        1
##     15       2   1527.a.2 2708  1 NA NA NA NA NA NA NA      NA        1
##     15       2     1527.b 2711  1 NA NA NA NA NA NA NA      NA       NA
##     15       1   1527.c.2 2713  1 NA NA NA NA NA NA NA      NA       NA
##     15       2   1527.c.2 2714  1 NA NA NA NA NA NA NA      NA       NA
##     15       3   1527.c.2 2715  1 NA NA NA NA NA NA NA      NA       NA
##     15       4   1527.c.2 2716 NA NA NA NA NA NA  1 NA       0       NA
##     15       5   1527.c.2 2717  1 NA NA NA NA NA NA NA      NA       NA
##     15       3     1530.e 2819  1 NA NA NA NA NA NA NA      NA        1
##     15       4       1535 2873  1 NA NA NA NA NA NA NA      NA        1
##     15       8       1535 2877  1 NA NA NA NA NA NA NA      NA        1
##     15      11       1535 2880  1 NA  1 NA NA NA NA NA      NA        1
##     15       5     1537.b 2893  1 NA NA NA NA NA NA NA      NA        1
##     15       8     1541.a 2923  1 NA NA NA NA NA NA NA      NA        1
##     15      25     1541.a 2940 NA NA NA  1 NA NA NA NA       0       NA
##     15       1       1548 2967  1 NA  1 NA NA NA NA NA       0       NA
##     15       1     1549.a 2968 NA NA NA NA  1 NA  1 NA       0       NA
##     15       4     1549.b 2976 NA NA  1 NA NA NA NA NA       0       NA
##     15       5     1549.b 2977 NA NA  1 NA NA NA NA NA       0       NA
##     15       1     1550.a 2978 NA NA NA  1 NA NA NA NA       0       NA
```

Summarizing the impact of tax intervals

PUT THIS BACK IN WHEN I'M AT HOME AND CAN FIGURE OUT THE BETTER WAY TO WORK WITH THE INTERVALS

Implementation dates

Geneva 1: January 1, 1948 (Irwin 2017, p. 486)

TOT analysis

We'll need measure of importer market power

1. inverse foreign supply elasticities are at HS6 level, are much more recent
    - Ross will look into the feasibility (data and code) of creating these measures for the 1930s/40s
    - Would we want Broda, Limao, Weinstein version (requires trade flows only) or Anson Soderbery's heterogeneous version?
    - Ross recalls he's seen a joint project between Anson Soderbery and Doug Irwin about the 1930s
2. product differentiaton index (Rauch), also newer, but maybe less sensitive to changes over time
3. market share might be credible enough, and easier to get

We'll need to think about whether it's credible to try the identification strategy Ross has used in his work