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	47.41	6.0	32.0	3000	1554
1946	0	1.65	40.53	5.0	27.0	2000	1541
Geneva	0	1.25	31.76	5.0	25.0	2000	1543
Annecy	0	1.00	30.99	4.0	22.5	2000	1542
Torquay	0	1.00	26.49	3.5	20.0	1000	1542
GenevaA	0	1.00	26.10	3.5	20.0	1000	1542
GenevaB	0	1.00	25.72	3.5	20.0	1000	1542
GenevaC	0	1.00	25.39	3.5	20.0	1000	1539
DillonA	0	1.00	24.78	3.1	19.0	1000	1541
DillonB	0	1.00	24.13	3.0	18.0	1000	1541

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, 1066 rows out of 3031 are missing, so there are 1965 ad valorem tariffs. So 64.83% 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	38.97	35.00	50.00	105	1982
1946	2.50	20.0	33.96	30.00	45.00	105	1987
Geneva	2.50	15.0	26.46	25.00	35.00	105	1971
Annecy	2.50	12.5	25.56	20.00	33.33	105	1971
Torquay	1.88	12.5	22.14	18.75	27.50	90	1970
GenevaA	1.88	11.5	21.63	17.50	27.50	90	1970
GenevaB	1.88	11.0	21.41	17.50	27.00	118	1970
GenevaC	1.88	10.5	21.14	17.50	25.50	90	1971
DillonA	1.00	10.5	19.46	15.50	25.00	90	1965
DillonB	0.50	10.0	18.88	15.00	25.00	90	1965

Smoot Hawley Schedule Titles		
Schedule	# Lines	Title
1	399	Chemicals, Oil, and Paints
2	247	Earths, Earthenware, and Glassware
3	660	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	34	Spirits, Wines, and other Beverages
9	118	Cotton Manufactures
10	91	Flax, Hemp, Jute, and Manufactures of
11	161	Wool and Manufactures of
12	38	Silk Manufactures
13	48	Manufactures of Rayon or Other Synthetic Textile
14	144	Papers and Books
15	538	Sundries

Summary stats for specific tariffs

The table below is exactly the same as the one above EXCEPT it drops the 544 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	22.78	13.31	41.57	5.00	2.50	50.00	265	265	399
2	45.36	25.81	43.09	10.00	5.00	50.00	111	107	247
3	55.01	26.97	50.97	3.50	2.00	42.86	316	306	660
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	34
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	39.83	31.30	21.43	40.00	32.00	20.00	143	143	161
12	NaN	150.00	NaN	NA	150.00	NA	0	1	38
13	40.00	23.18	42.06	45.00	25.00	44.44	34	34	48
14	11.73	12.96	-10.56	5.00	2.00	60.00	84	85	144
15	114.54	56.48	50.68	10.00	7.00	30.00	133	126	538

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	22.90	13.39	41.54	5.00	2.50	50.00	263	263	391
2	58.56	29.39	49.81	11.00	5.50	50.00	81	81	180
3	47.10	21.10	55.20	4.50	2.00	55.56	203	204	487
4	53.55	24.27	54.67	60.00	22.50	62.50	6	6	51
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	20.95	12.06	42.41	3.00	1.50	50.00	337	337	432
8	264.85	78.95	70.19	125.00	42.00	66.40	33	33	34
9	10.71	6.68	37.63	10.00	5.00	50.00	5	5	77
10	11.93	4.82	59.62	2.75	1.62	40.91	42	42	91
11	31.15	19.33	37.96	32.00	17.50	45.31	52	52	60
12	NaN	NaN	NaN	NA	NA	NA	0	0	27
13	38.57	21.43	44.44	45.00	25.00	44.44	21	21	24
14	12.77	7.92	37.94	5.00	2.31	53.75	74	74	131
15	63.08	39.78	36.93	6.00	4.00	33.33	109	105	473

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	chgD
1	22.78	21.13	19.15	19.07	15.70	14.83	13.31	7.25	9.40	0.39	17.70	5.52	10.
2	45.36	56.23	52.03	51.02	27.60	26.60	25.81	-23.96	7.47	1.94	45.91	3.63	2.
3	55.01	47.71	34.59	34.00	30.96	29.75	26.97	13.27	27.49	1.72	8.94	3.91	9.
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.
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.
6	147.50	113.75	94.54	86.42	67.25	62.65	62.19	22.88	16.89	8.59	22.18	6.85	0.
7	28.86	19.43	15.91	15.73	14.18	14.12	13.34	32.68	18.13	1.11	9.83	0.46	5.
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.
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.
10	11.93	7.41	6.76	6.71	4.92	4.91	4.82	37.94	8.68	0.79	26.71	0.12	1.
11	39.83	37.17	29.43	29.33	28.81	28.81	31.30	6.69	20.81	0.36	1.76	0.00	-8.
12	NaN	NaN	150.00	150.00	150.00	150.00	150.00	NaN	NaN	0.00	0.00	0.00	0.
13	40.00	38.53	27.43	26.25	23.75	23.32	23.18	3.68	28.82	4.29	9.52	1.80	0.
14	11.73	19.84	18.55	18.44	16.39	15.04	12.96	-69.23	6.54	0.57	11.13	8.23	13.
15	114.54	92.85	65.60	65.30	61.87	58.26	56.48	18.93	29.35	0.46	5.25	5.83	3.

Sched	Sp_SH	Sp_BG	Sp_Ge	Sp_An	Sp_To	Sp_GC	Sp_DB	chgGe	chgAn	chgTo	chgGC	chgDB
1	22.90	21.27	19.33	19.25	15.79	14.92	13.39	15.61	0.39	17.98	5.53	10.25
2	58.56	45.62	39.58	38.25	31.83	30.59	29.39	32.40	3.36	16.80	3.89	3.91
3	47.10	39.63	26.27	25.59	23.93	22.97	21.10	44.23	2.57	6.48	4.01	8.15
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	113.75	94.54	86.42	67.25	62.65	62.19	35.90	8.59	22.18	6.85	0.73
7	20.95	15.49	13.28	13.10	12.30	12.25	12.06	36.61	1.34	6.15	0.37	1.52
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	10.71	7.71	6.68	6.68	6.68	6.68	6.68	37.63	0.00	0.00	0.00	0.00
10	11.93	7.41	6.76	6.71	4.92	4.91	4.82	43.33	0.79	26.71	0.12	1.90
11	31.15	25.50	21.02	20.73	19.88	19.88	19.33	32.53	1.37	4.13	0.00	2.76
12	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
13	38.57	36.67	24.40	24.40	21.43	21.43	21.43	36.73	0.00	12.20	0.00	0.00
14	12.77	12.54	11.21	11.09	8.75	8.71	7.92	12.23	1.09	21.09	0.41	9.04
15	63.08	56.13	46.74	46.71	42.57	41.40	39.78	25.90	0.06	8.86	2.75	3.90

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: 505
- Geneva 1947: 483
- Annecy: 482
- Torquay: 481
- Geneva56A: 481
- Geneva56B: 481
- Geneva56C: 479
- DillonA: 475

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	29.88	14.17	52.56	25.00	12.50	50.00	207	206	399
2	45.84	23.76	48.18	50.00	21.00	58.00	166	161	247
3	37.78	17.19	54.50	35.00	13.00	62.86	467	478	660
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	34
9	37.14	22.26	40.06	40.00	20.00	50.00	112	105	118
10	37.45	14.86	60.31	40.00	12.50	68.75	58	58	91
11	49.49	24.93	49.63	50.00	23.75	52.50	115	110	161
12	57.50	24.38	57.60	60.00	21.00	65.00	38	37	38
13	52.64	26.47	49.71	57.50	23.25	59.57	36	36	48
14	21.75	8.69	60.05	20.00	8.00	60.00	124	123	144
15	43.83	22.38	48.95	40.00	17.00	57.50	484	475	538

Sched	SH_mean	DB_mean	mean_chg	SH_med	DB_med	med_chg	SH_obs	DB_obs	n
1	29.87	14.04	52.99	25.00	12.50	50.00	199	199	391
2	42.59	21.15	50.35	45.00	19.50	56.67	110	110	180
3	37.63	17.13	54.47	35.00	12.50	64.29	356	357	487
4	33.94	15.22	55.14	33.33	15.00	55.00	45	45	51
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	32.70	14.07	56.97	35.00	12.50	64.29	99	99	432
8	60.00	30.00	50.00	60.00	30.00	50.00	1	1	34
9	37.61	21.53	42.74	37.50	20.00	46.67	74	74	77
10	37.45	14.86	60.31	40.00	12.50	68.75	58	58	91
11	45.31	22.42	50.52	50.00	20.50	59.00	16	16	60
12	57.04	21.37	62.53	60.00	20.00	66.67	27	27	27
13	53.48	23.83	55.45	60.00	22.50	62.50	23	23	24
14	21.77	8.86	59.29	20.00	8.00	60.00	111	111	131
15	43.33	21.49	50.41	40.00	17.00	57.50	421	421	473

- DillonB: 475

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 had neither specific nor ad valorem. These were all fixed as of 5/15/21, but we keep this here to check in case things pop up.

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

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[1] Sched     Product   Paragraph id
<0 rows> (or 0-length row.names)
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Sched	SH	G1	An	To	GC	DB	chgG1	chgAn	chgTo	chgGC	chgDB
1	29.88	21.12	20.72	17.01	16.14	14.17	29.31	1.91	17.92	5.09	12.19
2	45.84	31.45	30.02	26.36	25.30	23.76	31.39	4.54	12.19	4.03	6.10
3	37.78	26.56	25.43	20.88	19.87	17.19	29.69	4.28	17.90	4.82	13.48
4	33.91	23.17	21.45	19.86	18.33	15.09	31.67	7.42	7.40	7.71	17.70
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	37.14	25.44	25.04	22.92	22.70	22.26	31.50	1.59	8.44	0.96	1.95
10	37.45	19.96	19.74	19.31	18.08	14.86	46.71	1.08	2.18	6.38	17.79
11	49.49	26.27	26.10	24.59	23.91	24.93	46.92	0.66	5.78	2.74	-4.24
12	57.50	36.82	34.05	29.66	27.16	24.38	35.96	7.52	12.90	8.43	10.25
13	52.64	35.00	33.68	28.33	26.79	26.47	33.51	3.77	15.88	5.44	1.19
14	21.75	13.28	12.47	10.91	10.19	8.69	38.96	6.09	12.47	6.61	14.74
15	43.83	31.64	30.89	27.08	25.93	22.38	27.82	2.36	12.33	4.28	13.68

Sched	SH	G1	An	To	GC	DB	chgG1	chgAn	chgTo	chgGC	chgDB
1	29.87	21.07	20.65	16.91	16.02	14.04	29.48	1.97	18.10	5.30	12.33
2	42.59	28.12	26.22	23.08	22.44	21.15	33.96	6.79	11.96	2.77	5.76
3	37.63	27.20	26.39	21.77	20.57	17.13	27.70	2.99	17.51	5.51	16.71
4	33.94	23.61	21.81	20.15	18.61	15.22	30.44	7.61	7.60	7.64	18.21
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	32.70	20.90	19.39	16.65	15.86	14.07	36.08	7.24	14.13	4.76	11.28
8	60.00	60.00	60.00	30.00	30.00	30.00	0.00	0.00	50.00	0.00	0.00
9	37.61	25.23	24.66	22.30	21.99	21.53	32.91	2.28	9.56	1.39	2.06
10	37.45	19.96	19.74	19.31	18.08	14.86	46.71	1.08	2.18	6.38	17.79
11	45.31	29.14	27.89	26.95	25.02	22.42	35.69	4.29	3.36	7.19	10.37
12	57.04	34.44	31.94	26.76	24.59	21.37	39.61	7.26	16.23	8.10	13.10
13	53.48	33.80	33.80	25.76	24.09	23.83	36.79	0.00	23.79	6.50	1.08
14	21.77	13.57	12.68	11.07	10.39	8.86	37.66	6.60	12.70	6.13	14.68
15	43.33	31.06	30.28	26.17	25.02	21.49	28.32	2.50	13.56	4.39	14.14

	Decrease in specific tariffs by round			
	Mean	% decrease	Median	% decrease
Smoot Hawley	47.41	0.00	6.0	0.00
1946	40.53	14.51	5.0	16.67
Geneva	31.76	21.64	5.0	0.00
Annecy	30.99	2.43	4.0	20.00
Torquay	26.49	14.51	3.5	12.50
GenevaA	26.10	1.49	3.5	0.00
GenevaB	25.72	1.43	3.5	0.00
GenevaC	25.39	1.32	3.5	0.00
DillonA	24.78	2.40	3.1	11.43
DillonB	24.13	2.59	3.0	3.23

	Decrease in ad valorem tariffs by round			
	Mean	% decrease	Median	% decrease
Smoot Hawley	38.97	0.00	35.00	0.00
1946	33.96	12.87	30.00	14.29
Geneva	26.46	22.08	25.00	16.67
Annecy	25.56	3.40	20.00	20.00
Torquay	22.14	13.38	18.75	6.25
GenevaA	21.63	2.29	17.50	6.67
GenevaB	21.41	1.01	17.50	0.00
GenevaC	21.14	1.28	17.50	0.00
DillonA	19.46	7.95	15.50	11.43
DillonB	18.88	2.95	15.00	3.23

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[1] "Dillon B"
```

```
[1] Sched     Product   Paragraph id
<0 rows> (or 0-length row.names)
```

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 1946 (Before Geneva)"
```

```
##      Para   id Prod av_pc sp_pc AV_SH AV_BG Sp_SH Sp_BG Un_SH Un_BG Int
##        41  198    9    20   -25    25    20   2.0   2.5     1     1  NA
##       318  802    1   -50    NA    50    75    NA    NA    NA    NA  NA
##       318  803    2   -50    NA    50    75    NA    NA    NA    NA  NA
##       318  811   10   -50    NA    50    75    NA    NA    NA    NA  NA
##       331  863   10    NA   -50    NA    NA   3.0   4.5     1     1  NA
##       364 1029    2   -40    NA    50    70    NA    NA    NA    NA  NA
##       396 1271    1   -44    NA    45    65    NA    NA    NA    NA  NA
##       397 1301   29   -47    NA    45    66    NA    NA    NA    NA  NA
##       397 1302   30   -47    NA    45    66    NA    NA    NA    NA  NA
##       397 1304   32   -11    NA    45    50    NA    NA    NA    NA  NA
##       397 1305   33   -33    NA    45    60    NA    NA    NA    NA  NA
##       412 1338    2   -50    NA    40    60    NA    NA    NA    NA  NA
##       713 1465    4    NA   -50    NA    NA  18.0  27.0     1     1  NA
##     717.a 1475    5    NA   -50    NA    NA   2.0   3.0     1     1  NA
##     718.a 1491    3   -47    NA    30    44    NA    NA    NA    NA  NA
##  1005.a.3 2048    1    NA   -50    NA    NA   3.2   4.9     1     1  NA
##      1022 2098    2    NA   -50    NA    NA   8.0  12.0    44    44  NA
##    1114.d 2211    4   -50     0    50    75  50.0  50.0     1     1   1
```

```
## [1] "Increased tariff from 1946 to Geneva"
```

```
##    Para   id Prod  av_pc sp_pc AV_BG AV_Ge Sp_BG Sp_Ge Un_BG Un_Ge Int
##   202.a  414    9  -20.0    NA  25.0    30    NA    NA    NA    NA   1
##     412 1337    1  -33.3    NA  22.5    30    NA    NA    NA    NA  NA
##   718.a 1492    4  -46.7    NA  30.0    44    NA    NA    NA    NA   1
##   904.a 1908    2 -266.7    NA   7.5    28    NA    NA    NA    NA   1
##   904.a 1909    3 -266.7    NA   7.5    28    NA    NA    NA    NA   1
```

```
##   904.b 1914    3  -50.0    NA  20.0    30    NA    NA    NA    NA   1
##   904.c 1918    3  -39.1    NA  23.0    32    NA    NA    NA    NA   1
##   911.a 1956    7  -37.5    NA  40.0    55    NA    NA    NA    NA   1
##     917 1985    1  -16.7    NA  30.0    35    NA    NA    NA    NA  NA
##     923 2006    8  -16.7    NA  30.0    35    NA    NA    NA    NA   1
##  1519.c 2668    1   -7.1    NA  35.0    38    NA    NA    NA    NA  NA
##  1529.a 2740    9  -33.3    NA  45.0    60    NA    NA    NA    NA   1
##  1537.c 2899    2   42.9   -50  35.0    20     2     3    19    19   1
```

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

```
##  [1] Para  id    Prod  av_pc sp_pc AV_Ge AV_An Sp_Ge Sp_An Un_Ge Un_An Int
## <0 rows> (or 0-length row.names)
```

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

```
##    Para   id Prod  av_pc sp_pc AV_An AV_To Sp_An Sp_To Un_An Un_To Int
##     389 1256    4 -75.00    NA     5   8.8    NA    NA    NA    NA  NA
##  1114.d 2211    4  -0.67     0    37  37.5    38    38     1     1   1
```

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

```
##   Para   id Prod av_pc sp_pc AV_To AV_GC Sp_To Sp_GC Un_To Un_GC Int
##    209  480    6   -71    NA    18    30    NA    NA    NA    NA  NA
##    214  520    7   -70    NA    20    34    NA    NA    NA    NA  NA
##  302.b  656    1    NA   -71    NA    NA    18    30     1     1  NA
##    360 1013    1   -13    NA    22    26    NA    NA    NA    NA  NA
##    701 1396    8    NA   -67    NA    NA     6    10     1     1  NA
##    778 1828    1  -112    NA     8    17    NA    NA    NA    NA  NA
```

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

```
##    Para   id Prod  av_pc sp_pc AV_GC AV_DB  Sp_GC Sp_DB Un_GC Un_DB Int
##      24  102    6 -300.0    67   9.0    36  30.00  10.0     1     1  NA
##      24  103    7 -373.3    67   7.5    36  51.00  17.0     1     1  NA
##     209  481    7  -55.6    NA  22.5    35     NA    NA    NA    NA  NA
##     331  862    9     NA   -20    NA    NA   3.00   3.6     1     1  NA
##     354  957    1  -70.0    68  25.0    42   0.62   0.2    19    19   1
##     354  958    2  -70.0    68  25.0    42   2.50   0.8    19    19   1
##     354  959    3  -54.5    67  27.5    42   5.50   1.8    19    19   1
##     354  966   10  -54.5    67  27.5    42   7.50   2.5    19    19   1
##     354  967   11  -54.5    72  27.5    42   9.00   2.5    19    19   1
##     354  968   12  -70.0    80  25.0    42  12.50   2.5    19    19   1
##     354  969   13  -54.5    86  27.5    42  17.50   2.5    19    19   1
##     365 1038    9  -18.4   -18  19.0    22 425.00 500.0    19    19   1
##     365 1049   20 -140.0    NA   5.0    12     NA    NA    NA    NA  NA
##     371 1102    2     NA   -50    NA    NA 125.00 187.5    19    19   1
##     371 1103    3  -50.0    NA  15.0    22     NA    NA    NA    NA   1
##     371 1105    5     NA   -50    NA    NA 200.00 300.0    19    19   1
##     371 1106    6  -50.0    NA  15.0    22     NA    NA    NA    NA   1
##     371 1107    7  -50.0    NA  15.0    22     NA    NA    NA    NA   1
##     371 1108    8     NA   -50    NA    NA 125.00 187.5    19    19   1
##     371 1109    9  -50.0    NA   7.5    11     NA    NA    NA    NA   1
##     371 1111   11     NA   -50    NA    NA 250.00 375.0    19    19   1
##     371 1112   12  -50.0    NA  15.0    22     NA    NA    NA    NA   1
##     372 1119    3  -33.3    NA  10.5    14     NA    NA    NA    NA  NA
##     412 1343    7     NA  -100    NA    NA  10.00  20.0    18    18  NA
##   721.e 1536    1     NA   -12    NA    NA   4.00   4.5     1     1  NA
```

```
##    1108 2165    7 -140.0     0  25.0    60  30.00  30.0     1     1   1
##    1108 2166    8 -140.0     0  25.0    60  30.00  30.0     1     1   1
##    1108 2169   11  -52.0     0  25.0    38  30.00  30.0     1     1   1
##    1108 2170   12 -140.0     0  25.0    60  37.50  37.5     1     1   1
##    1108 2173   15  -52.0     0  25.0    38  37.50  37.5     1     1   1
##  1109.a 2174    1 -140.0     0  25.0    60  37.50  37.5     1     1   1
##  1109.a 2176    3  -52.0     0  25.0    38  37.50  37.5     1     1   1
##  1109.a 2177    4  -50.0     0  20.0    30  37.50  37.5     1     1   1
##  1109.a 2178    5  -50.0     0  20.0    30  37.50  37.5     1     1   1
##  1109.a 2179    6  -50.0     0  20.0    30  37.50  37.5     1     1   1
##  1114.d 2210    3  -28.0     0  25.0    32  37.50  37.5     1     1   1
##    1404 2366    9   -6.7    20   7.5     8   2.50   2.0     1     1  NA
##    1551 2983    7     NA   -60    NA    NA   0.50   0.8    55    55  NA
##    1551 2984    8     NA   -60    NA    NA   1.50   2.4    55    55  NA
```

No changes

No change from Smoot Hawley to Dillon B

```
same <- function(b,e){
  beg <- shortnames %>% select(ends_with(b))
  end <- shortnames %>% select(ends_with(e))
  name <- substitute(e)
  z <- as.name(paste0("same",name))
  assign(deparse(substitute(z)), shortnames %>%
           filter(((is.na(end[,3]) == T & is.na(beg[,3]) == T) | beg[,3] == end[,3])
                & ((is.na(end[,2]) == T & is.na(beg[,2]) == T) | beg[,2] == end[,2])
                & ((is.na(end[,1]) == T & is.na(beg[,1]) == T) | beg[,1] == end[,1]) )
         , envir=.GlobalEnv)
}

same("SH","DB")

# below we get the sets of lines for each round compared to SH
same("SH","BG")
same("SH","Ge")
same("SH","An")
same("SH","To")
same("SH","GA")
same("SH","GB")
same("SH","GC")
same("SH","DA")

nr = nrow(shortnames)
num_sameSH <- c(nr,nrow(sameBG),nrow(sameGe),nrow(sameAn),
                nrow(sameTo),nrow(sameGA),nrow(sameGB),
                nrow(sameGC),nrow(sameDA),nrow(sameDB))
```

The code above produces 272 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

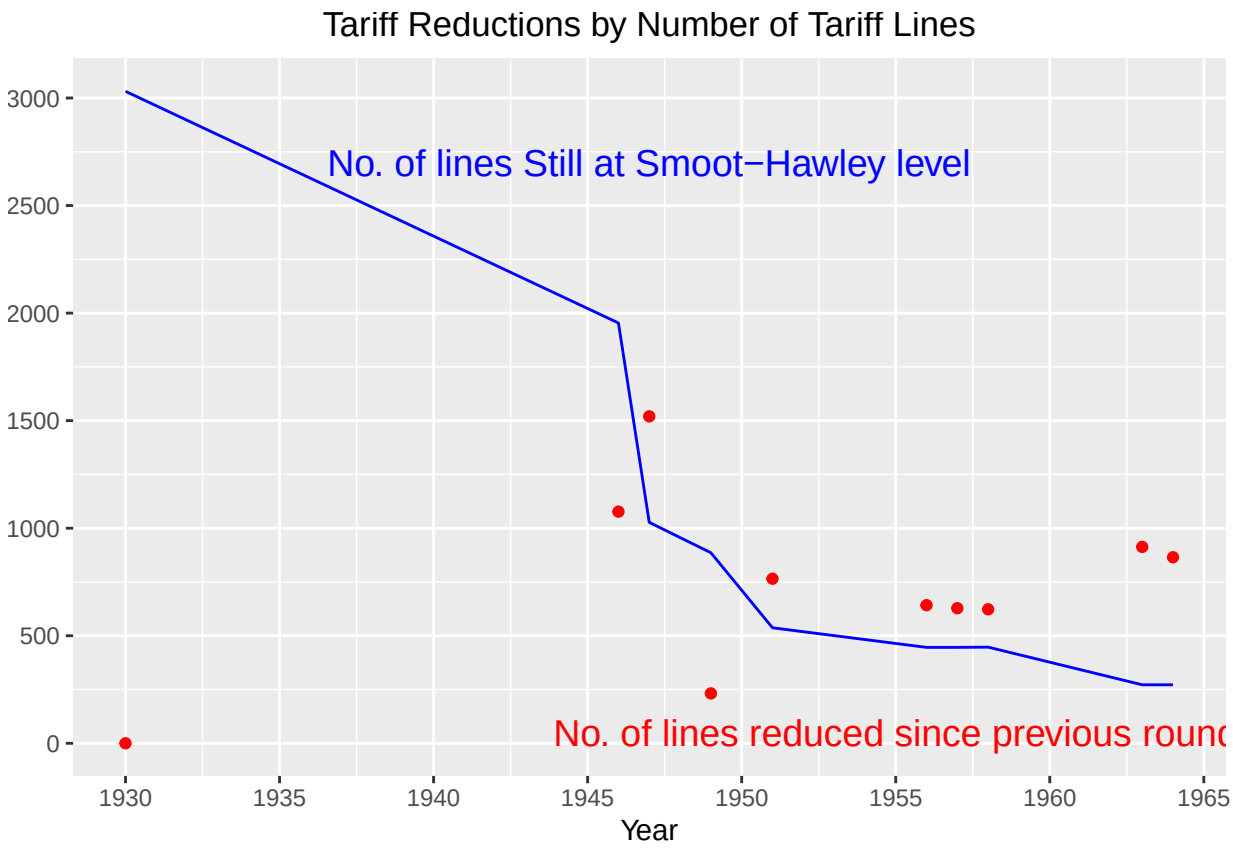
```
# we removed the "1946_before" variables once we verified that they were exactly the same as Smoot Hawl
# all the lines that are exactly the same in Smoot Hawley and 1946_before
#same <- shortnames %>%
#         filter( ((is.na(Sp_SH) == is.na(Sp_B) & is.na(Sp_SH)) | Sp_SH == Sp_B)
#                 & ((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 Before Geneva
same("SH","BG")

# below we get the sets of lines for each round compared to the previou round
same("BG","Ge")
same("Ge","An")
same("An","To")
same("To","GA")
same("GA","GB")
same("GB","GC")
same("GC","DA")
same("DA","DB")

year <- c(1930,1946,1947,1949,1951,1956,1957,1958,1963,1964)
num_nego <- c(0,nr-nrow(sameBG),nr-nrow(sameGe),nr-nrow(sameAn),nr-nrow(sameTo),
            nr-nrow(sameGA),nr-nrow(sameGB),nr-nrow(sameGC),nr-nrow(sameDA),nr-nrow(sameDB))
plot1_data <- data.frame(year,num_nego,num_sameSH)

# Plot
ggplot() +
  geom_line(data = plot1_data, aes(x=year, y= num_sameSH), color = "blue") +
  annotate("text", label = "No. of lines Still at Smoot-Hawley level", x = 1947, y = 2700, size = 5, co
  geom_point(data = plot1_data, aes(x=year, y= num_nego), color = "red") +
  annotate("text", label = "No. of lines reduced since previous round", x = 1955, y = 50, size = 5, colo
  labs(x="Year", y= NULL) +
  ggtitle("Tariff Reductions by Number of Tariff Lines") +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_x_continuous(breaks = seq(1930, 1965, by = 5)) +
  scale_y_continuous(breaks = seq(0, 3000, by = 500))
```



The code above produces 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.

In all, 99 lines are affected by some change in the form of the tariff.

```
##  Sched Product Paragraph   id  G  A  T GA GB GC DA DB Interval
##      1      16      28.a  148 NA NA NA NA NA NA NA NA        1
##      1      10        53  254  1 NA  1 NA NA NA NA NA        1
##      1       6        72  326 NA NA NA NA NA NA NA NA        1
##      2       4       210  485  1 NA NA NA NA NA NA NA        1
##      2       7       211  493 NA NA  1 NA NA NA NA NA        1
##      2       2       212  495 NA NA NA NA NA NA NA NA        1
##      2       4       212  497 NA NA NA NA NA NA NA NA        1
##      2      10       212  503  1 NA NA NA NA NA NA NA        1
##      2      11       212  504  1 NA NA NA NA NA NA NA        1
##      2      12       212  505  1 NA NA NA NA NA NA NA        1
##      2      13       212  506 NA NA  1 NA NA NA NA NA        1
##      2      14       212  507 NA NA  1 NA NA NA NA NA        1
##      2      15       212  508 NA NA NA NA NA NA NA NA        1
##      2       4       213  512 NA NA NA NA NA NA NA NA        1
##      2       2     218.d  541  1 NA  1 NA NA NA NA NA        1
##      2       5     218.d  544  1 NA NA NA NA NA NA NA        1
##      2       7     218.f  560  1 NA NA NA NA NA NA NA        1
```

```
##      2      11     218.f  564 NA NA NA NA NA NA  1 NA        1
##      2       4       226  598 NA NA NA NA NA NA NA NA        1
##      3       3     302.d  660 NA NA  1 NA NA NA NA NA       NA
##      3       3       304  699 NA NA NA NA NA NA NA NA        1
##      3       4       304  700 NA NA NA NA NA NA NA NA        1
##      3       5       304  701 NA NA NA NA NA NA NA NA        1
##      3      11       304  707 NA NA NA NA NA NA NA NA        1
##      3      12       304  708 NA NA NA NA NA NA NA NA        1
##      3      13       304  709 NA NA NA NA NA NA NA NA        1
##      3      21       304  717 NA NA NA NA NA NA NA NA        1
##      3      22       304  718 NA NA NA NA NA NA NA NA        1
##      3      23       304  719 NA NA NA NA NA NA NA NA        1
##      3      24       304  720  1 NA NA NA NA NA NA NA        1
##      3      25       304  721 NA NA NA NA NA NA NA NA        1
##      3      26       304  722  1 NA NA NA NA NA NA NA        1
##      3      30       304  726 NA NA NA NA NA NA NA NA        1
##      3      38       304  734 NA NA NA NA NA NA NA NA        1
##      3      39       304  735 NA NA NA NA NA NA NA NA        1
##      3      40       304  736 NA NA NA NA NA NA NA NA        1
##      3      41       304  737 NA NA NA NA NA NA NA NA        1
##      3      46       304  742 NA NA NA NA NA NA NA NA        1
##      3      47       304  743 NA NA NA NA NA NA NA NA        1
##      3      48       304  744 NA NA NA NA NA NA NA NA        1
##      3       1       308  755  1 NA  1 NA NA NA NA NA        1
##      3       3       308  757  1 NA  1 NA NA NA NA NA        1
##      3      12     316.a  796 NA NA NA NA NA NA NA NA        1
##      3       4       318  805 NA NA NA NA NA NA NA NA        1
##      3       7       318  808 NA NA NA NA NA NA NA NA        1
##      3       1       357  989 NA NA NA NA NA  1 NA NA        1
##      3       2       357  990 NA NA NA NA NA  1 NA NA        1
##      3       7       358 1002  1 NA NA NA NA NA NA NA        1
##      3       1   368.c_2 1067 NA NA NA NA NA NA  1 NA       NA
##      3       2   368.c_2 1068 NA NA NA NA NA NA  1 NA       NA
##      3       1  368.c_17 1083 NA NA  1 NA NA NA NA NA       NA
##      3       2       371 1102 NA NA NA NA NA NA NA NA        1
##      3       5       371 1105 NA NA NA NA NA NA NA NA        1
##      3       8       371 1108 NA NA NA NA NA NA NA NA        1
##      3      11       371 1111  1 NA NA NA NA NA NA NA        1
##      3      14       371 1114 NA NA NA NA NA NA NA NA        1
##      3       2       375 1194 NA NA NA NA NA  1 NA NA       NA
##      3       4     382.a 1220 NA NA NA NA NA NA NA NA        1
##      3      11       397 1283 NA NA NA NA NA NA NA NA        1
##      7       4       726 1550 NA NA NA NA NA NA NA NA        1
##      9       4       909 1933  1 NA NA NA NA NA NA NA        1
##      9       7       909 1936  1 NA NA NA NA NA NA NA        1
##      9      14       909 1943  1 NA NA NA NA NA NA NA        1
##      9       2       910 1948  1 NA NA NA NA NA NA NA        1
##      9       8     911.a 1957  1 NA NA NA NA NA NA NA        1
##      9       2       915 1979  1 NA NA NA NA NA NA NA        1
##      9       9       923 2007  1 NA NA NA NA NA NA NA        1
##     11       9      1108 2167 NA NA NA NA NA NA  1 NA        1
##     11      10      1108 2168 NA NA NA NA NA NA  1 NA        1
##     11      13      1108 2171 NA NA NA NA NA NA  1 NA        1
##     11      14      1108 2172 NA NA NA NA NA NA  1 NA        1
```

```
##     11       2    1109.a 2175 NA NA NA NA NA NA  1 NA        1
##     12       3      1208 2288  1 NA NA NA NA NA NA NA        1
##     14       6      1413 2484 NA NA NA NA NA NA NA NA        1
##     15       5    1504.a 2527 NA NA NA NA NA NA NA NA        1
##     15      10      1506 2556 NA NA NA NA NA NA NA NA        1
##     15       1    1526.a 2692  1 NA NA NA NA NA NA NA        1
##     15       2    1526.a 2693  1 NA NA NA NA NA NA NA        1
##     15       3    1526.a 2694  1 NA NA NA NA NA NA NA        1
##     15       4    1526.a 2695  1 NA NA NA NA NA NA NA        1
##     15       5    1526.a 2696  1 NA NA NA NA NA NA NA        1
##     15       6    1526.a 2697  1 NA NA NA NA NA NA NA        1
##     15       7    1526.a 2698 NA NA NA NA NA NA NA NA        1
##     15       8    1526.a 2699 NA NA NA NA NA NA NA NA        1
##     15       1  1527.a.2 2704 NA  1 NA NA NA NA NA NA        1
##     15       2  1527.a.2 2705  1 NA NA NA NA NA NA NA        1
##     15       2    1527.b 2708  1 NA NA NA NA NA NA NA       NA
##     15       1  1527.c.2 2710  1 NA NA NA NA NA NA NA       NA
##     15       2  1527.c.2 2711  1 NA NA NA NA NA NA NA       NA
##     15       3  1527.c.2 2712  1 NA NA NA NA NA NA NA        1
##     15       4  1527.c.2 2713 NA NA NA NA NA NA  1 NA        1
##     15       5  1527.c.2 2714  1 NA NA NA NA NA NA NA       NA
##     15       3    1530.e 2816 NA NA NA NA NA NA NA NA        1
##     15       4      1535 2869  1 NA NA NA NA NA NA NA        1
##     15       8      1535 2873  1 NA NA NA NA NA NA NA        1
##     15      11      1535 2876  1 NA  1 NA NA NA NA NA        1
##     15       5    1537.b 2889  1 NA NA NA NA NA NA NA        1
##     15       8    1541.a 2919  1 NA NA NA NA NA NA NA        1
##     15       1      1548 2963  1 NA  1 NA NA NA NA NA       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