

# ONLINE DATA APPENDIX FOR “MULTILATERAL TRADE BARGAINING: A FIRST LOOK AT THE GATT BARGAINING RECORDS”

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## 1. Data Appendix

In this appendix, we detail the steps we have taken to process the Torquay bargaining records into a format for analysis. The most challenging step in this process was creating a concordance of product descriptions from the Torquay records to the HS6 1988 product codes. Below we define the data elements that we extracted from the bargaining records, and then we discuss the concordance process which we applied to the bargaining records. Finally, we illustrate how the GATT bargaining records make it possible to recover the complete history of offers and counteroffers in the Torquay Round.

### 1.1. Bargaining Records

The first major task in assembling the dataset was to transfer the information from the scanned bargaining records posted on the WTO web site to a workable spreadsheet. We accomplished this in two steps. In a first step we hired transcribers to enter into Excel exactly what appeared on the original scans. Then in a second step, we transferred the raw Excel data into a bargaining record template that we created as a way to standardize the structure of the data for each of the bilateral negotiations.

We used the following set of variables as the template for how each bargaining record was input into the complete spreadsheet. The list below gives the field title (in bold), an example entry (in italics), and a more detailed description of the meaning of the field. The example reproduced below as Figure 1.1 is taken from the negotiations between Australia and the United States.

1. **Bargaining Partners:** *United States and Australia.* Countries engaging in a given bilateral bargain.
2. **Proposal Date:** *10/25/1950.* Date on which the document was submitted.

AUSTRALIA/U.S.A.						
Tariff Item	Description of Goods	Rates at Base Date*		Request	Response	B.P.T.
		M.F.N.	B.P.T.		M.F.N.	
178(C) (1)	Valves for internal combustion engines - The weight of which does not exceed one pound each	D. per lb. 2/9 or ad val. 47½% whichever rate returns the higher duty P. ad val. 10%	1/6 22½% 5%	30% Eliminate specific rate. Eliminate Primage.	D. 2/6 } (b) or 57½% whichever rate returns the higher duty P. Exempt	1/6 22½% Exempt

Figure 1.1: An example item from the US-Australia bargaining records.

3. **Proposer Country:** *Australia*. Country submitting the document.
4. **Proposal Type (Request, Offer, Modification of Request, Modification of Offer, Final Offer):** *Offer*. Nature of the content of the document; in the example, Australia is making an offer to the US.
5. **Target Country:** *United States*. Country to whom the document is being submitted for review/approval.
6. **Currency:** *Australian Pound ("s.d")*. Currency used in the document.
7. **Tariff Item No.:** *178(C)(1)*. If available, item number in the tariff schedule of the tariff-cutting country.
8. **Statistical Class Number:** *(blank)*. If available, the item number for the good of which the concession is requested/offered, taken from the tariff-cutting country's trade data (key in determining negotiating rights through principal supplier).
9. **Description of Products:** *Valves for internal combustion engines - The weight of which does not exceed one pound each*. Description of the product in the bargaining record.
10. **Duty Unit (Specific Only):** *per lb*. Units used for a specific tariff.
11. **History of Tariffs: Act of 1930:** *(blank)*. Tariff resulting from the Smoot-Hawley Tariff Act in 1930 (US only).
12. **History of Tariffs: January 1, 1945:** *(blank)*. Tariff in effect as of the commencement of GATT (in the current dataset, only reported by the US on concession offers made).
13. **Present Duty Rate: MFN Tariff:** MFN tariff rate in effect at the beginning of the round of negotiations. Base date is November 15, 1949 for the Torquay round (GATT/CP/43, page 5).
  - (i) **Specific:** *2/9*
  - (ii) **Ad Valorem:** *0.4750*

- (iii) **Both (IF BOTH: Maximum/Minimum/Combination):** *Maximum.*
- 14. **Present Duty Rate: Additional Surtax:** *(blank).*
- 15. **Present Duty Rate: MFN Primage:** *0.1000.* Additional ad valorem import duty levied by customs (used exclusively by Australia in current dataset).
- 16. **Present Duty Rate: Preferential Tariff:** MFN tariff rate in effect at the beginning of the round of negotiations.
  - (i) **Specific:** *1/6*
  - (ii) **Ad Valorem:** *0.2250*
  - (iii) **Both (IF BOTH: Maximum/Minimum/Combination):** *Maximum.*
- 17. **Present Duty Rate: Preferential Primage:** *0.0500.* Additional ad valorem import duty levied by customs (used exclusively by Australia in current dataset).
- 18. **Requested or Offered Duty Rate: MFN Tariff:** The requested or offered modified MFN tariff rate. Because the example is of Australia's offer, the remaining parts of this specific record item are all offers (the US request of "*30%. Eliminate specific rate. Eliminate Primage.*" would be listed in the corresponding earlier bargaining record item).
  - (i) **Specific:** *2/6*
  - (ii) **Ad Valorem:** *0.3750*
  - (iii) **Both (IF BOTH: Maximum/Minimum/Combination):** *Maximum.*
- 19. **Requested or Offered Tariff Binding (Denoted by 'b'):** *(blank).* Binary variable indicating if the country specifically requested that the tariff be bound against future increases. In this case, the US did not specifically request that Australia bind the tariff against future increase.
- 20. **Requested or Offered Duty Rate: Additional Surtax:** *(blank).*
- 21. **Requested or Offered Duty Rate: MFN Primage:** *Exempt.*
- 22. **Requested or Offered Duty Rate: Preferential Tariff:** Requested adjustments to any preferential tariff rates.
  - (i) **Specific:** *1/6*
  - (ii) **Ad Valorem:** *0.2250*
  - (iii) **Both (IF BOTH: Maximum/Minimum/Combination):** *Maximum.*
- 23. **Requested or Offered Duty Rate: Preferential Primage:** *Exempt.*

24. **Remarks:** *BPT*. Any additional information included that is beyond the scope of the other entries. The note here is specifying that the above preferential rates are the British Preferential Tariff rates.
25. **Negotiation Status (Continuing/Terminated/Successfully completed):** *Continuing*. An indication of the stage of the bilateral negotiation.

## 1.2. Concoring Bargaining Data to the Harmonized System

We used a multistage process to assign the relevant 1988 HS6 codes to each of the items in the Torquay bargaining records. The first stage consisted of applying existing concordances to the bargaining records. In the second stage, products that were not successfully matched in stage one were matched using an automated string-matching score-function approach. This approach assigned candidate concordances to a bargaining record product description based on the similarity of the description to the HS6 product descriptions. For products still unsuccessfully matched after the first two stages, the final stage was the manual assignment of HS6 codes based on human judgment and research.

**First stage.** Instead of trying to match across the 40-year gap between the Torquay round descriptions and the HS 1988 product descriptions, whenever possible we matched across smaller time gaps using product classifications from four points in time. This strategy enabled us to more accurately match products and it allowed us to use existing concordances to cover part of the time gap. We began by assigning Schedule A 1948 product codes (taken from “Schedule A: Statistical Classification of Imports into the United States”) to the bargaining records.<sup>1</sup> Next, we matched Schedule A 1948 product descriptions to a later version of Schedule A (published in 1963). Matching to different versions of the same classification system was relatively straightforward even with the 15 year time gap. We then matched the 1963 Schedule A codes to the TSUSA product codes from 1972. Once we had concored to the 1972 TSUSA codes, we used the concordance from TSUSA 1972 to HS6 1988 created by Robert Feenstra and his colleagues at the Center for International Data as a part of their work creating the world trade database.

The US included its Schedule A 1948 product codes on the vast majority of its offers at Torquay. This allowed us to directly match almost all US offers to the Schedule A 1948 code. Completion of the remaining concordances (Schedule A 1948 to 1963, Schedule A 1963 to TSUSA 1972) for the products with Schedule A 1948 codes was done by using the matching algorithm described below.

**Second stage.** For product descriptions without existing concordances, we created a score variable for each product-HS6 code combination. This score is a function of the text of the product description and the text of the HS6 code. A higher score indicates that the text in these two fields is more similar on relevant dimensions. To calculate the score between product descriptions and HS6 codes, we took the following steps:<sup>2</sup>

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<sup>1</sup>For simplicity, we refer to the combination of Schedule A 1946 classifications and 1948 updates as “Schedule A 1948.”

<sup>2</sup>Ultimately, we also used the 4-digit level scores. We then found the total score by taking the simple average of the score from the 6-digit HS descriptions and the 4-digit ones.

1. Translate any non-English descriptions to English using Google Translate and run spell check on all words in the bargaining records.
2. Stem all words using the Snowball stemming method.<sup>3</sup>
3. For each word in both the bargaining records and the HS6 product classifications, compute the IDF (inverse document frequency) score as the inverse of the number of uses of that word in the bargaining records.
4. Compute the score for a given HS6 product description as a function of the number of matching words and two word phrases between the HS6 code description and the bargaining record description, with a bonus being added to the score for matching either of the first two words in either description. A more detailed discussion of the score function is given below.
5. Next, given a threshold score (chosen based on manual inspection), any score above the threshold is a “candidate match.” All descriptions whose maximum score is below the threshold are sent back into the unmatched pool of product descriptions.
6. Manually scan the candidate matches for errors, then return any with errors to the unmatched pool.

To further elaborate on the score function discussed in part 4 of the above process, denote the collection of Torquay bargaining record descriptions as  $T = \{T^1, T^2, \dots, T^n\}$  with  $T^i$  being the  $i^{th}$  description/sentence. Denote the  $T^i = \{T_1^i, T_2^i, \dots, T_{n_i}^i\}$  with  $T_j^i$  being the  $j^{th}$  word in sentence  $T^i$ . Thus, we say  $T$  is a collection of sentences, each sentence  $T^i$  is a collection of words. Similarly, denote the collection of HS6 (1988) product descriptions as  $H = \{H^1, H^2, \dots, H^m\}$  with  $H^i$  being the  $i^{th}$  description/sentence. Denote the  $H^i = \{H_1^i, H_2^i, \dots, H_{m_i}^i\}$  with  $H_j^i$  being the  $j^{th}$  word in sentence  $H^i$ . Thus, we say  $H$  is a collection of sentences, each sentence  $T^i$  is a collection of words.

We use the following two definitions of the IDF for the score function. First, define the IDF of word  $x$ ,  $IDF(x)$ , as the inverse frequency of word  $x$  in the universe of words from  $T$  and  $H$ . Next, define the IDF of words  $x_1$  and  $x_2$  as  $idf(x_1, x_2) \equiv \frac{IDF(x_1) + IDF(x_2)}{2}$ .

To complete the definitions for the score function, we use three additional variables. Define for word  $x$  and description  $Y$ ,  $D(x, Y) \equiv 1$  if  $x \in Y$ ,  $D(x, Y) \equiv 0$  otherwise. Also, for words  $x_1$  and  $x_2$ , define  $d(x_1, x_2, Y) = D(x_1, Y) \cdot D(x_2, Y)$ . Finally, define the score function’s bonus weight  $B_k \equiv 3$  if  $k \leq 2$ ,  $B_k \equiv 1$  otherwise.

The score function for the match between description  $T^i$  and description  $H^j$  is

$$S(T^i, H^j) \triangleq \sum_{k=1}^{n_i} B_k \cdot s(T_k^i, H^j) + \sum_{k=1}^2 B_k \cdot s(H_k^j, T^i),$$

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<sup>3</sup>Created by Martin Porter in his paper, “An algorithm for suffix stripping” (1980). Download of code available at <http://snowball.tartarus.org/>.

where  $s(X_k^i, Y^j) \equiv IDF(X_k^i) \cdot D(X_k^i, Y^j) + idf(X_k^i, X_{k+1}^i, Y^j) \cdot d(X_k^i, X_{k+1}^i, Y^j)$ , given word  $X_k^i \in X^i \in X$  and  $Y^j \in Y$ .<sup>4</sup>

There were some commonalities in the products sent back to the unmatched pool during this process. For example, product descriptions hinging on the words “not,” “other,” or another similar term. An example of this is the following product in the US-Benelux negotiations: *Ammonium compounds, n.e.s.: Other than ammonium chrome alum*. In this case, the matching algorithm generated the exact same set of HS6 code matches as the matches generated for *Ammonium compounds, n.e.s.: Ammonium chrome alum*.

**Third Stage.** For all remaining unmatched product descriptions, we manually went through each individual product description and assigned HS6 codes. Manual matching relied greatly on the use of online HS Code search engines and various other websites, as many terms used to describe products in the 1948 data are archaic.<sup>5</sup>

We performed this three-step process on the bargaining records. In the end, we were able to match 97% of the product entries in the bargaining records to a 1988 HS6 code.

### 1.3. Aggregation of Bargaining Records

We aggregate the Torquay bargaining data (originally at eight- to ten-digit level with various country codes) up to the HS6 level. Hence, for any HS6 code, we are typically aggregating multiple records from the more disaggregated product data.

To aggregate the bargaining data, we do the following: (a) unless otherwise indicated, for variables referring to ad valorem or specific tariff levels (initial, offered, requested), we aggregate the tariff level for HS6 product  $i$  as an unweighted average of the tariff levels for the disaggregated products that have been allocated to HS6 product  $i$  (and omit from the average any missing disaggregated-product tariff levels); and (b) unless otherwise indicated, for dummy/indicator variables referring to whether an action (e.g., a request from country  $j$  on HS6 product  $i$ , or a US agreement on HS6 product  $i$ ) has or has not occurred, we define the action as occurring for HS6 product  $i$  if and only if it occurs for at least one disaggregated product that has been allocated to HS6 product  $i$ .

### 1.4. Recovering the History of Offers and Counteroffers

The GATT bargaining records make it possible to recover the complete history of offers and counteroffers in the Torquay Round. To illustrate, we highlight in Figure 1.2 below the bargaining behavior of the US with regard to one particular 6-digit product, HS 843319 (Mowers for lawns, other than powered and with a horizontal rotating cutter). Specifically, this figure depicts the complete request-offer sequence involving the tariffs on such lawn mowers between the US and each of the five countries whose bilateral bargains with the US involved a request and/or offer on this product. We denote by the symbol R a request, by O an offer, by OW a withdrawn offer and by A an agreement. These symbols are positioned at the height of the tariff request or offer, so that a horizontal line between any two symbols indicates that the

<sup>4</sup>For the last word in  $X$ , ignore the second term.

<sup>5</sup>One of the most useful search engines, the Schedule B Search Engine (created by 3CE Technologies) is available at <https://uscensus.prod.3ceonline.com>.

tariff level across those two actions is the same, while an upward sloping (downward sloping) line between any two symbols indicates that the tariff level across those two actions increased (decreased).

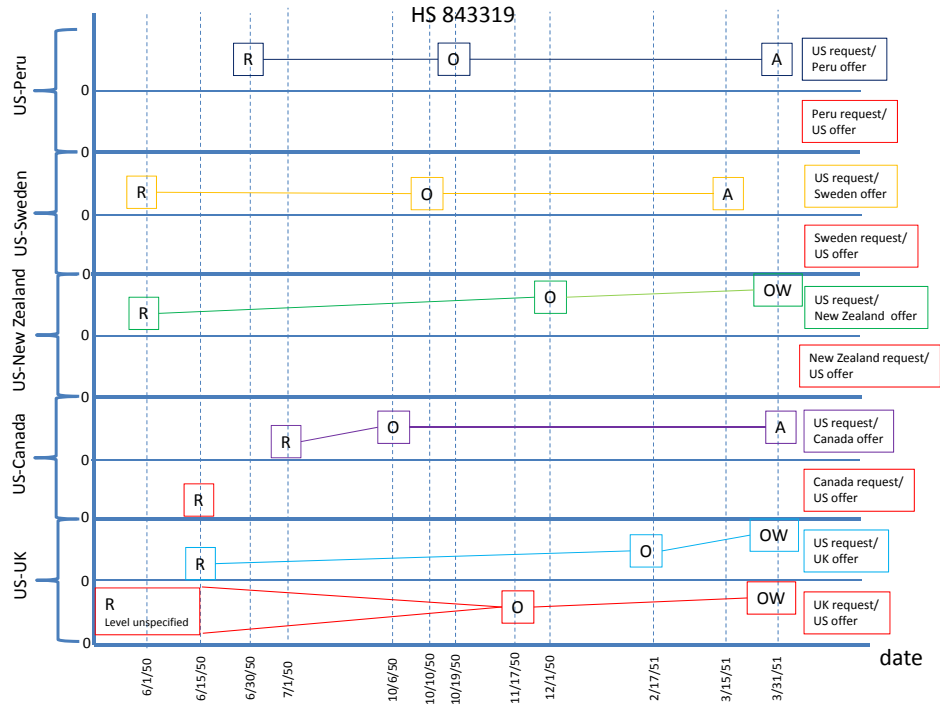


Figure 1.2: Requests and Offers on Lawn Mowers in US Torquay Bilaterals.

Notes: This Figure depicts the complete request-offer sequence between the US and each of the five countries whose bilateral bargains with the US involved a request and/or offer on lawn mowers (HS 843319). The symbol R denotes a request, O an offer, OW a withdrawn offer and A an agreement. These symbols are positioned at the height of the tariff request or offer, so that a horizontal (upward/downward sloping) line between any two symbols indicates that the tariff level across those two actions is the same (increased/decreased).

As reflected in the figure, between June 1 and July 1, 1950, the US made requests of all five of these countries (Canada, New Zealand, Peru, Sweden and the UK) to reduce their import tariffs on such lawn mowers, and the US received requests to reduce its own tariff on these lawn mowers from two of the countries (Canada and the UK). In the months that followed, Peru and Sweden each made offers to the US at a level which met the US request, while New Zealand, Canada and the UK each made offers to the US at a level which did not go all the way to meet the US request and New Zealand and the UK subsequently withdrew their offers; and for its part, the US did not respond to the Canadian request but did make an offer to the UK to cut its tariff on this product, an offer that the US subsequently withdrew. The final commitments on HS 843319 tariffs emerging from these five bilaterals were three: a commitment by Canada negotiated with the US to reduce the Canadian tariff on lawn mowers; a commitment by Peru

negotiated with the US to reduce the Peruvian tariff on lawn mowers; and a commitment by Sweden negotiated with the US to reduce the Swedish tariff on lawn mowers.