Aggregation of Tariff-Rate Quotas within GTAP Sectors

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Markus Lips and Peter Rieder

Department of Agricultural Economics

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Overview

1 Problem statement

2 Introducing a tariff-rate quota (TRQ)

3 Two aggregation methods

4 An illustrative example

5 Conclusions

1 Problem statement

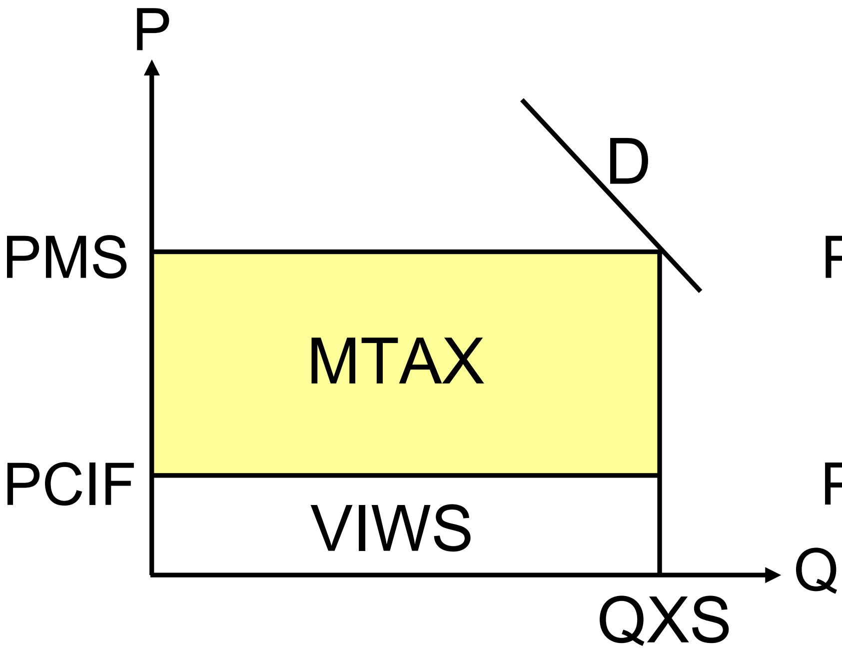
- The approach of Elbehri and Pearson allows the introduction of a tariff-rate quotas (TRQ) for each trade relation; i.e. for a good i transported from region r to region s, whereby good i refers to a sector of the GTAP data base.
- TRQs are applied on a tariff line level.
- If a GTAP sector comprises several tariff lines, the question arises as how to aggregate them.

2 Introduction of a TRQ

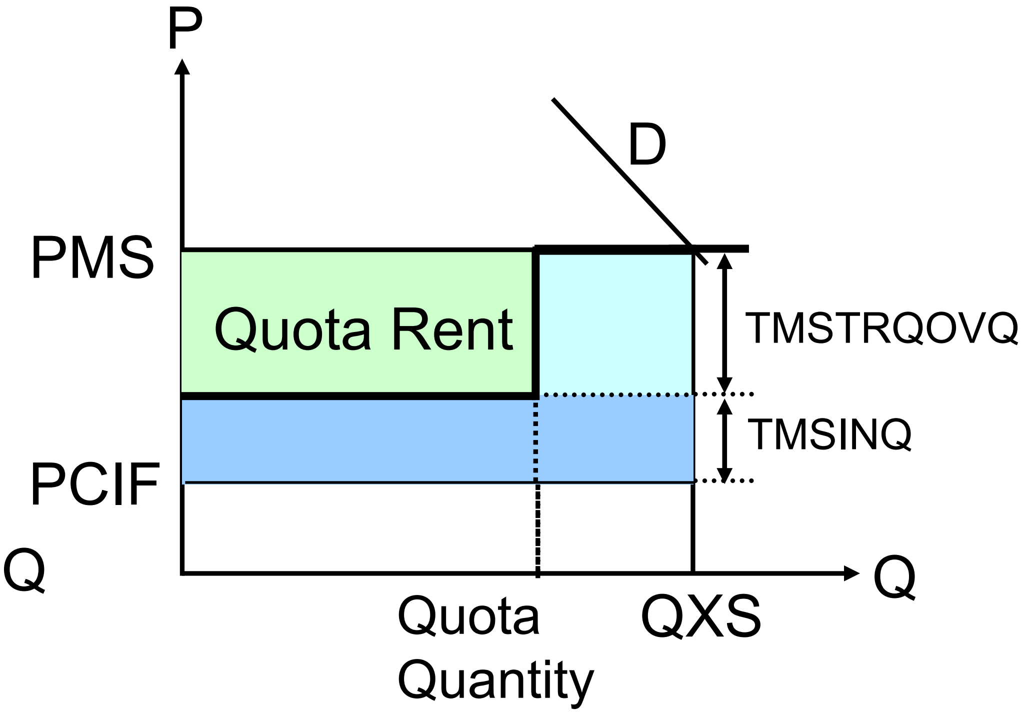
- Beside of a change of the GTAP model for each TRQ three additional coefficients are necessary.
- One indicates the relation of the quota quantity and the imported quantity.
- Two coefficients are necessary to specify in-quota and over-quota tariffs.

2 Introduction of a TRQ

a) Imports in the GTAP data base



b) Introduction of a TRQ



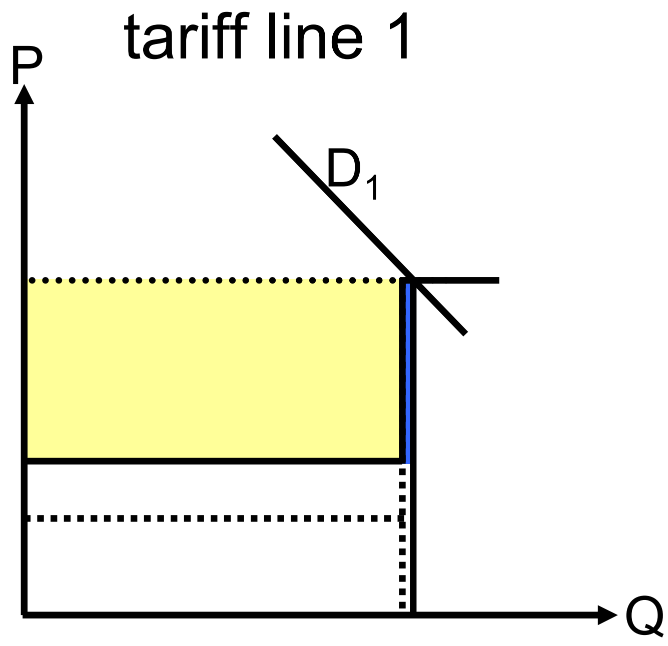
3 Aggregation of TRQs

- The tariff lines are aggregated to a sector-wide TRQ.
- For the relation between the sector-wide import quantity and the sector-wide quota quantity we need an assumption:
  If at least one tariff line exceeds its quota quantity, we assume that the sector-wide TRQ also exceeds the aggregated quota quantity.

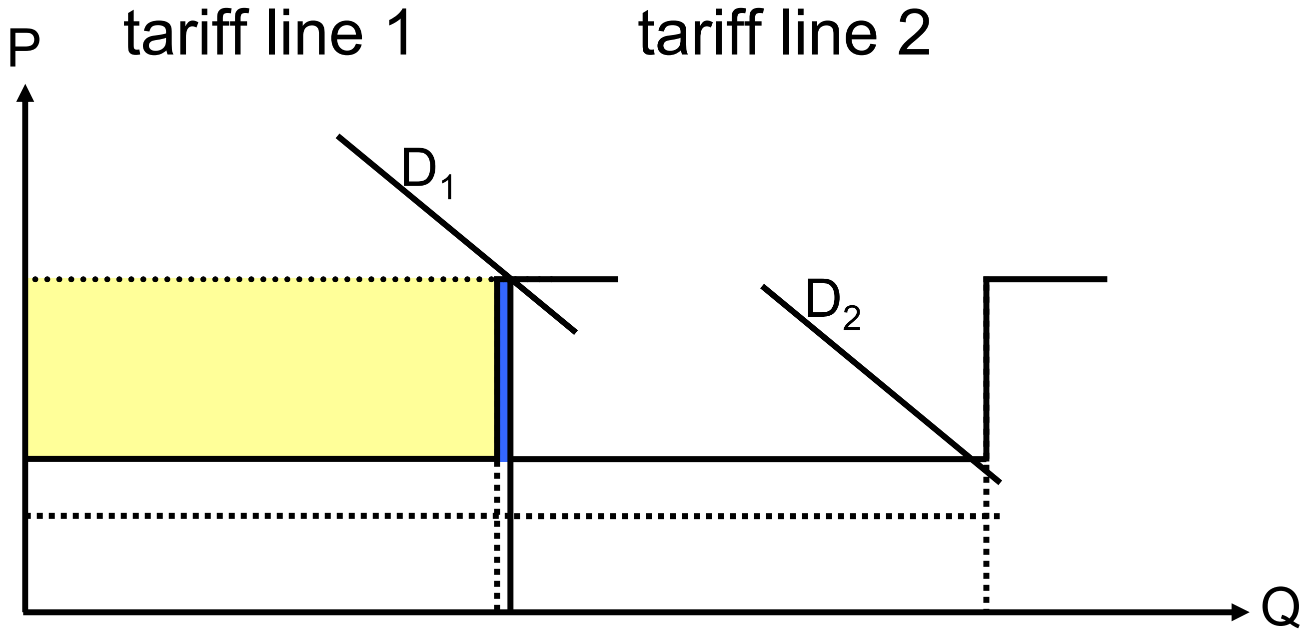
3 Aggregation considering tariffs

- A weighted average based on import volume or imported weights is used for the sector-wide in-quota and over-quota tariffs. This is the first aggregation method considering tariffs.
- Advantage: power of tariffs is rather exact.
- Disadvantage: sector-wide quota rent is not accurate.

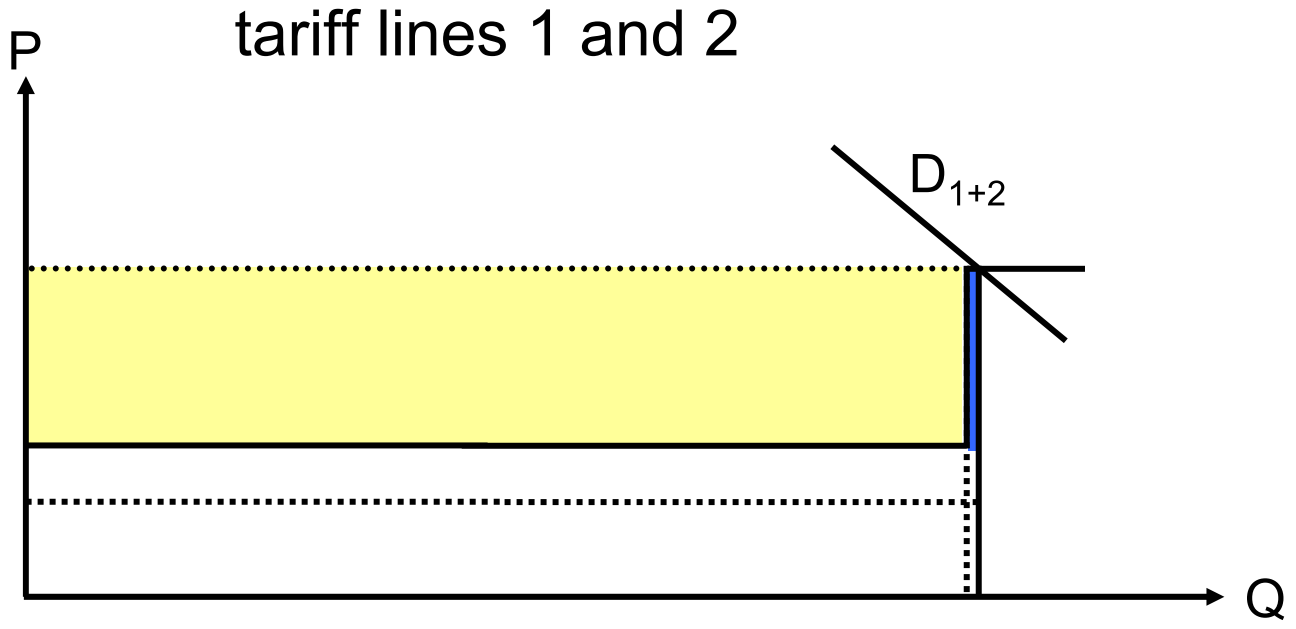
3 Aggregation considering tariffs



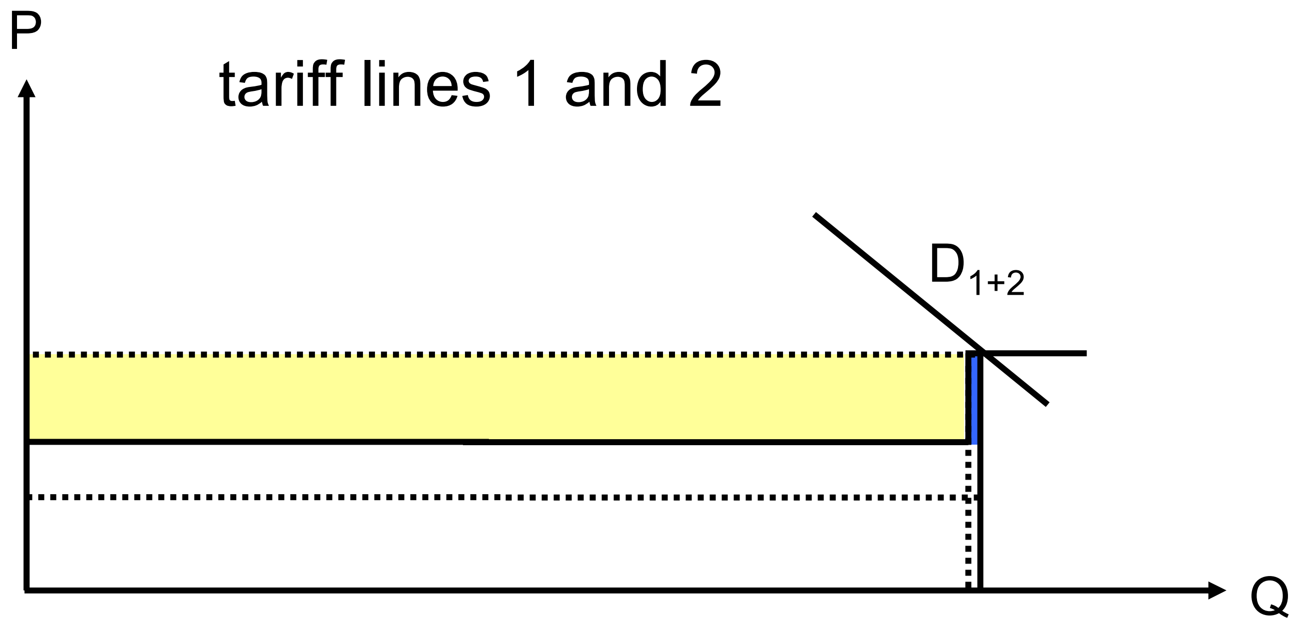
3 Aggregation considering tariffs



3 Aggregation considering tariffs



3 Aggregation considering tariffs



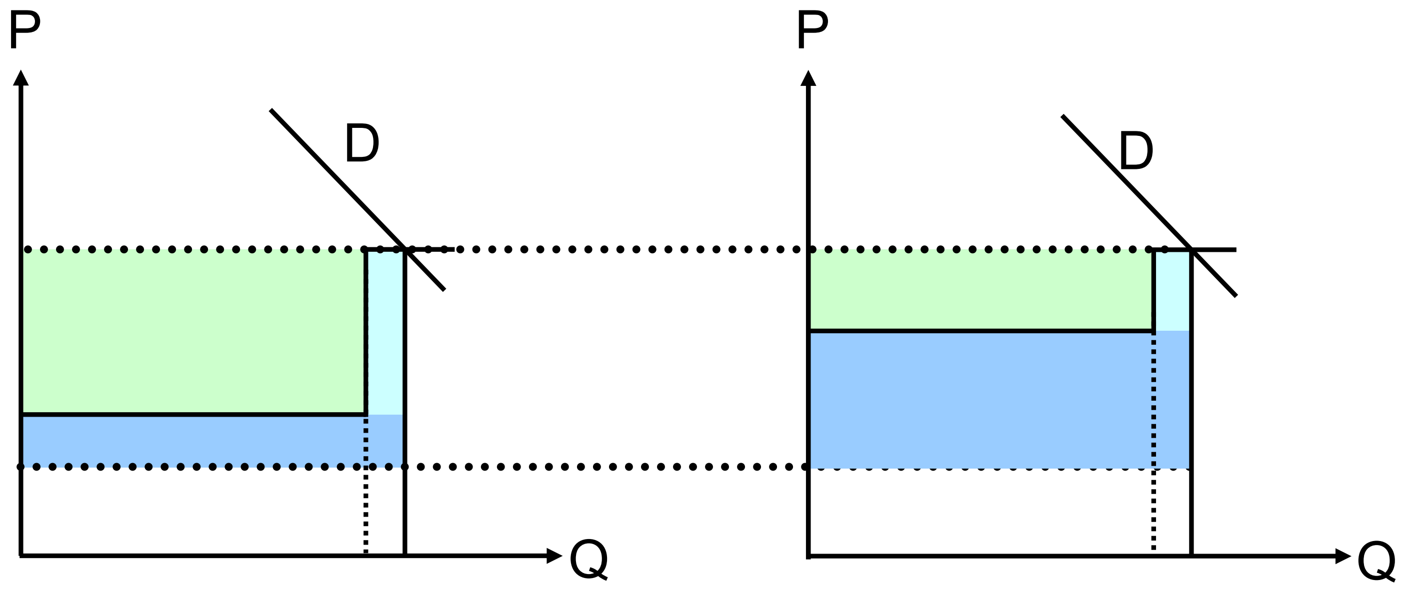
3 Aggregation considering quota rent

- The sector-wide quota rent is calculated and used for the sector-wide in-quota and over-quota tariffs.
- Advantage: sector-wide quota rent is rather exact.
- Disadvantage: power of tariffs is not accurate.
- Remedy: To use both aggregation methods.

3 Both methods

a) Considering tariffs

b) Considering sector-wide quota rent

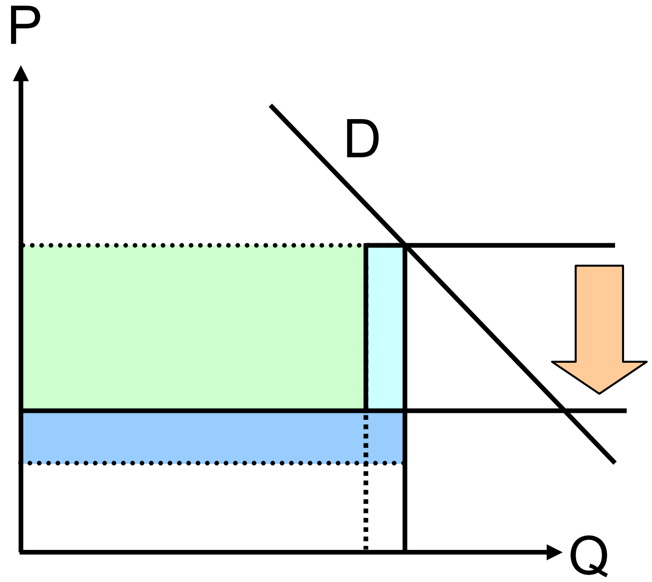


4 An illustrative example

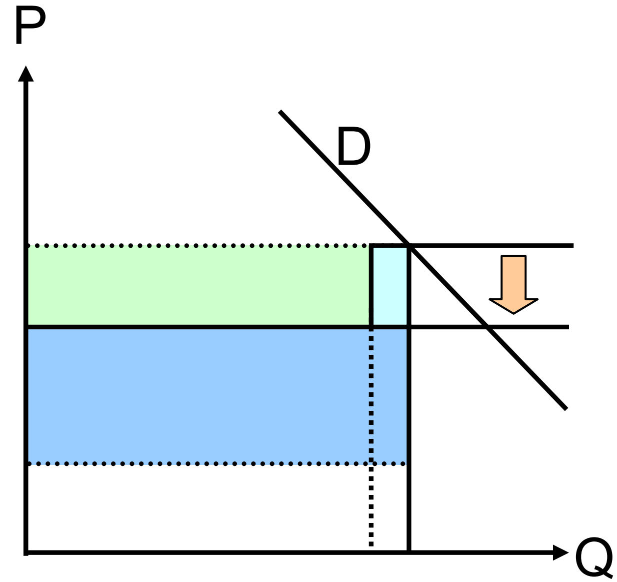
- Unilateral duplication of two Swiss TRQs, meat of ruminants (red meat) and other meat
- Both sectors consists of 16 or more tariff lines. At least 3 of them attain their quota quantities.
- GTAP 5 data base (1997); aggregation of 18 sectors and 3 regions (Switzerland, European Union, rest of the world).

4 An illustrative example

a) Considering tariffs



b) Considering sector-wide quota rent



4 Results: Price changes

aggregation method	considering tariffs	considering quota rent
wheat	-0.3	-0.1
other grains	-0.4	-0.2
vegetables and fruit	-0.1	0.0
oilseeds	-0.3	-0.2
sugar beet	-1.0	-0.4
other crops	0.0	0.0
cattle and sheep	-0.5	-0.3
pork and poultry	-0.3	-0.2
raw milk production	-1.2	-0.9
meat of ruminants	-0.7	-0.5
other meat	-2.3	-1.4
oils and fats	-0.3	-0.2
dairy products	-0.6	-0.4
sugar	-0.5	-0.2
beverages and tobacco	0.0	0.0
other foods	-0.2	-0.1
industry	0.0	0.0
services	0.0	0.0

Results are percentage changes and refer to the situation of the base year (1997).

4 Results: Quantity changes

aggregation method	considering tariffs	considering quota rent
wheat	-0.1	0.0
other grains	-1.6	-0.8
vegetables and fruit	0.1	0.0
oilseeds	0.1	0.1
sugar beet	0	0
other crops	-0.1	-0.1
cattle and sheep	-2.8	-2.0
pork and poultry	-3.2	-1.6
raw milk production	0	0
meat of ruminants	-3.6	-2.6
other meat	-4.1	-1.4
oils and fats	-0.2	0.0
dairy products	0.4	0.3
sugar	0.1	0.1
beverages and tobacco	0.1	0.0
other foods	0.0	0.0
industry	0.1	0.0
services	0.0	0.0

Results are percentage changes and refer to the situation of the base year (1997).

5 Conclusions

- We suggest two aggregation methods, either considering tariffs or sector-wide quota rent.
- The methods lead to different results.
- There is no compelling argument in favour of one method.
- Therefore we recommend to use both methods. This can be regarded as a kind of sensitivity analysis of the aggregation process.

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