Evaluating the Doha Market Access Modalities

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Market access proposals

- The core of the Doha Agenda
- Easy to evaluate the "pain" from reform
- Difficult to evaluate the "gain" from other countries' reforms
  - Depends on actions by over 150 economies
  - Complex tariff-cutting rules
  - Flexibilities in agriculture and non-agriculture
    - Which products will be selected?
    - What impact will this have on market access?
- How to assess the resulting impacts?
  - Weights on highly-protected products too low

Roadmap

- Outline of market access proposals
- How will the flexibilities be used?
- Implications for tariffs levied & faced
- *Ex ante* estimates of welfare impacts

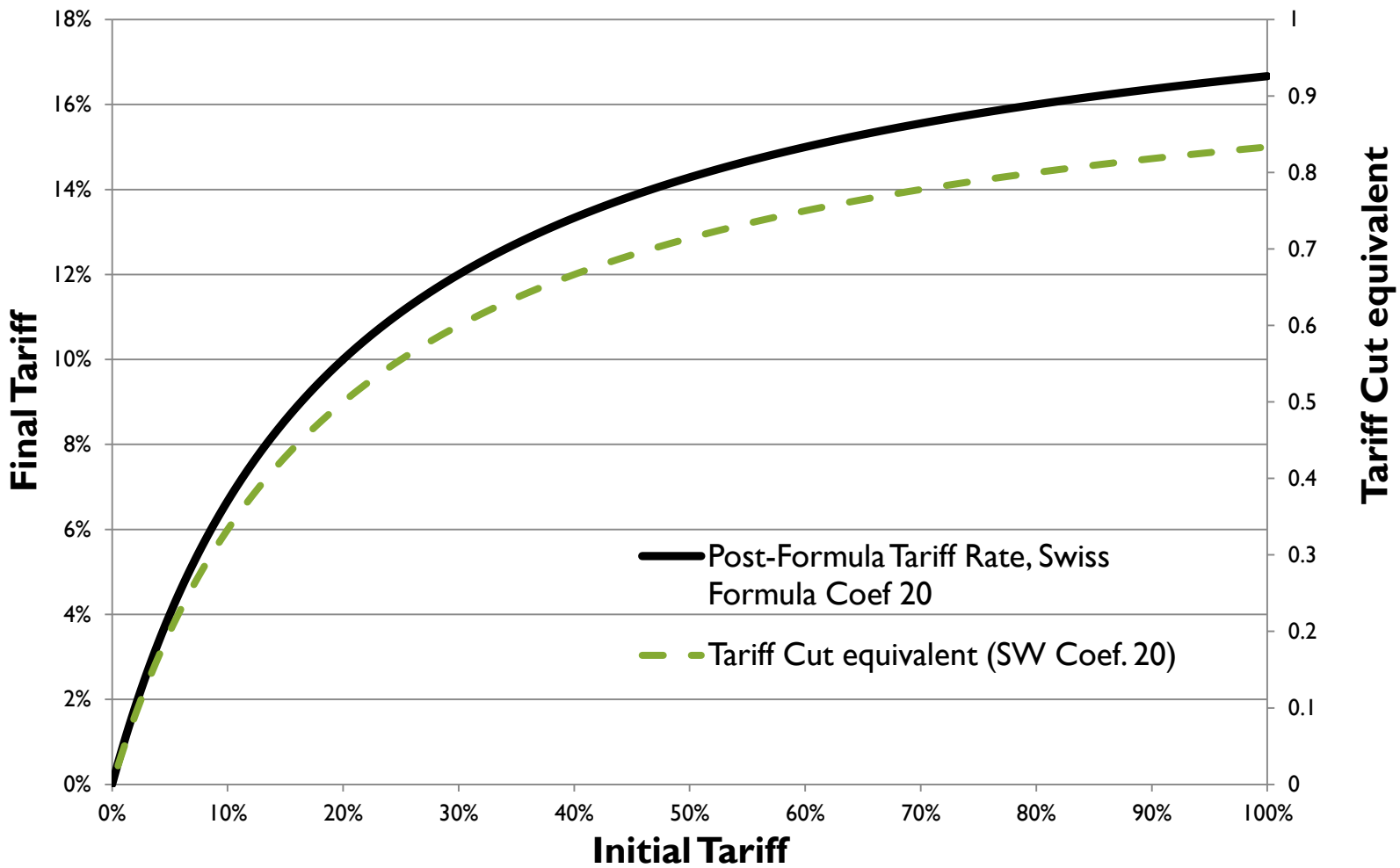
Non-Agricultural Market Access

- Swiss formula for bound tariffs
  - Highest tariffs cut the most
- No final tariff, t_1 above the ceiling, a

$$t_1 = \frac{a.t_0}{a + t_0}$$

- Developed country ceiling of 8%, ceilings for developing countries, 20, 22, 25%
  - Developing countries have flexibilities
    - eg 20% ceiling with zero cuts on 6.5% of tariff lines, no more than 7.5% of imports; 25% ceiling, no flex

Swiss formula, ceiling of 20%



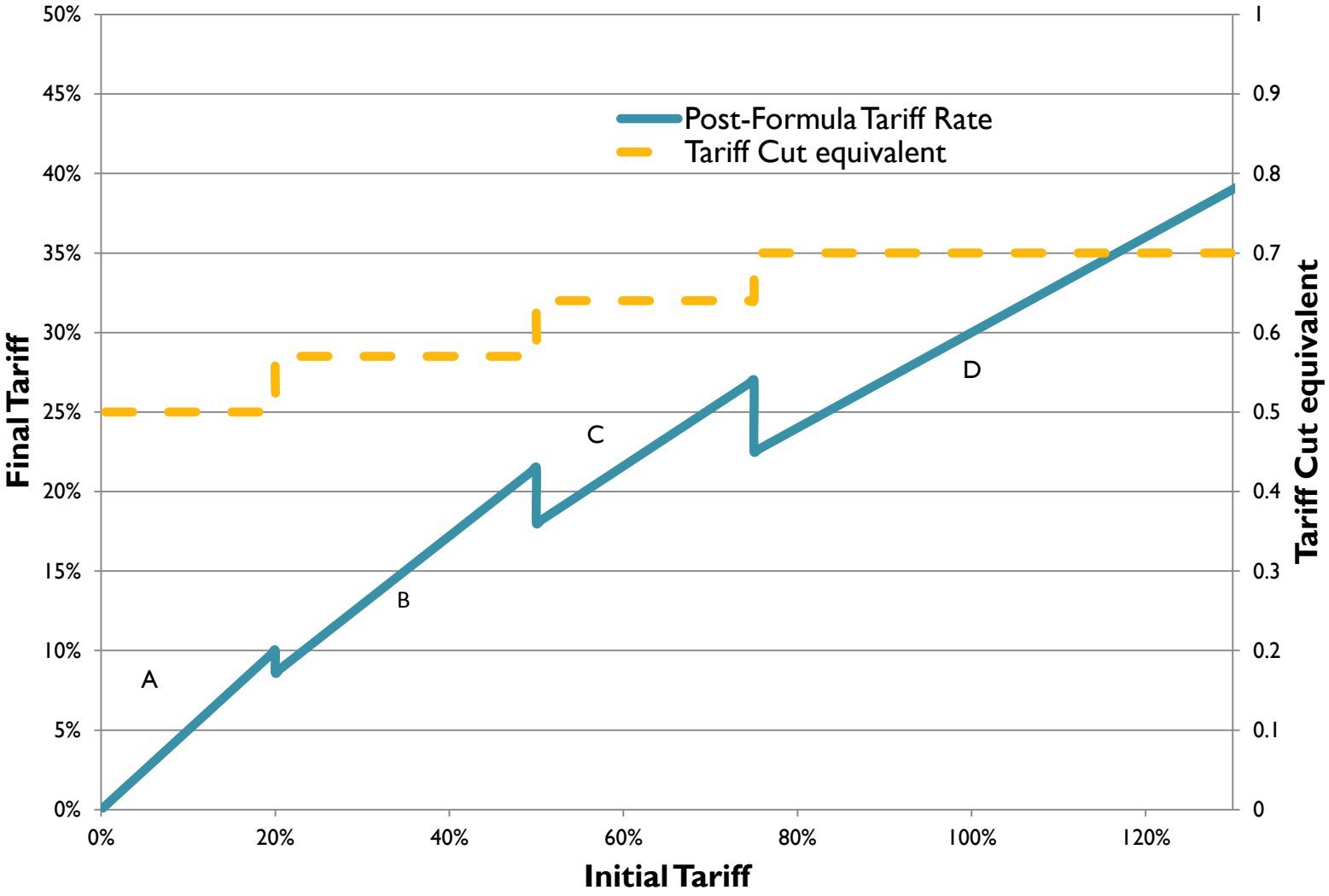
Agricultural market access

- Tiered formula to cut bound tariffs
  - Different coefficients for developed & developing countries
    - Wider bands & smaller cuts in developing countries
- Flexibilities
  - Sensitive products for all countries
    - 4% of tariff lines in developed ctries; 5.3% in developing
      - Assume cuts reduced by one third
  - Special products for developing countries
    - 14% of lines; 40% no cut; average-cut of 11%

Tiered Formula for Agriculture

	Developed		**Developing**	
Band	*Range*	*Cut*	*Range*	*Cut*
A	0-20	50	0-30	33.3
B	20-50	57	30-80	38
C	50-75	64	80-130	42.7
D	>75	70	>130	46.7
Average-cut	**Min**	**54%**	**Max**	**36%**

Agric cuts & final tariffs, %



Selection for product flexibilities

- Highest tariff rule frequently used
  - No conceptual basis
  - Highest bound tariff includes many products with huge binding overhang and no need to cut
  - Many of the highest applied tariffs are on minor products
  - Suggests adverse impacts of flexibilities on average tariffs are very small

- Use Grossman-Helpman political preference function
  - Assume original tariffs reflect political-economy equilibrium
  - Countries select sensitive prods to minimize political costs
  - Get more plausible product lists; large impacts on efficiency; not so large on market access

Grossman-Helpman Preference Fn

$$G(\mathbf{p},u) = \sum_{i \in L} \mathrm{C}_i(\mathbf{p}) \quad + aW(\mathbf{p})$$

- $\mathrm{C}_i(\mathbf{p})$ is contributions by lobby i
- W is aggregate economic welfare
- a is weight on welfare costs relative to contributions ≈ 50

Rearranging & differentiating

$$G^*(\mathbf{p},u) = \frac{1}{a}\iota'\mathbf{C}(\mathbf{p}) + (-z(\mathbf{p},u) + \boldsymbol{z}_p{}'(\mathbf{p}-\mathbf{p}^*))$$

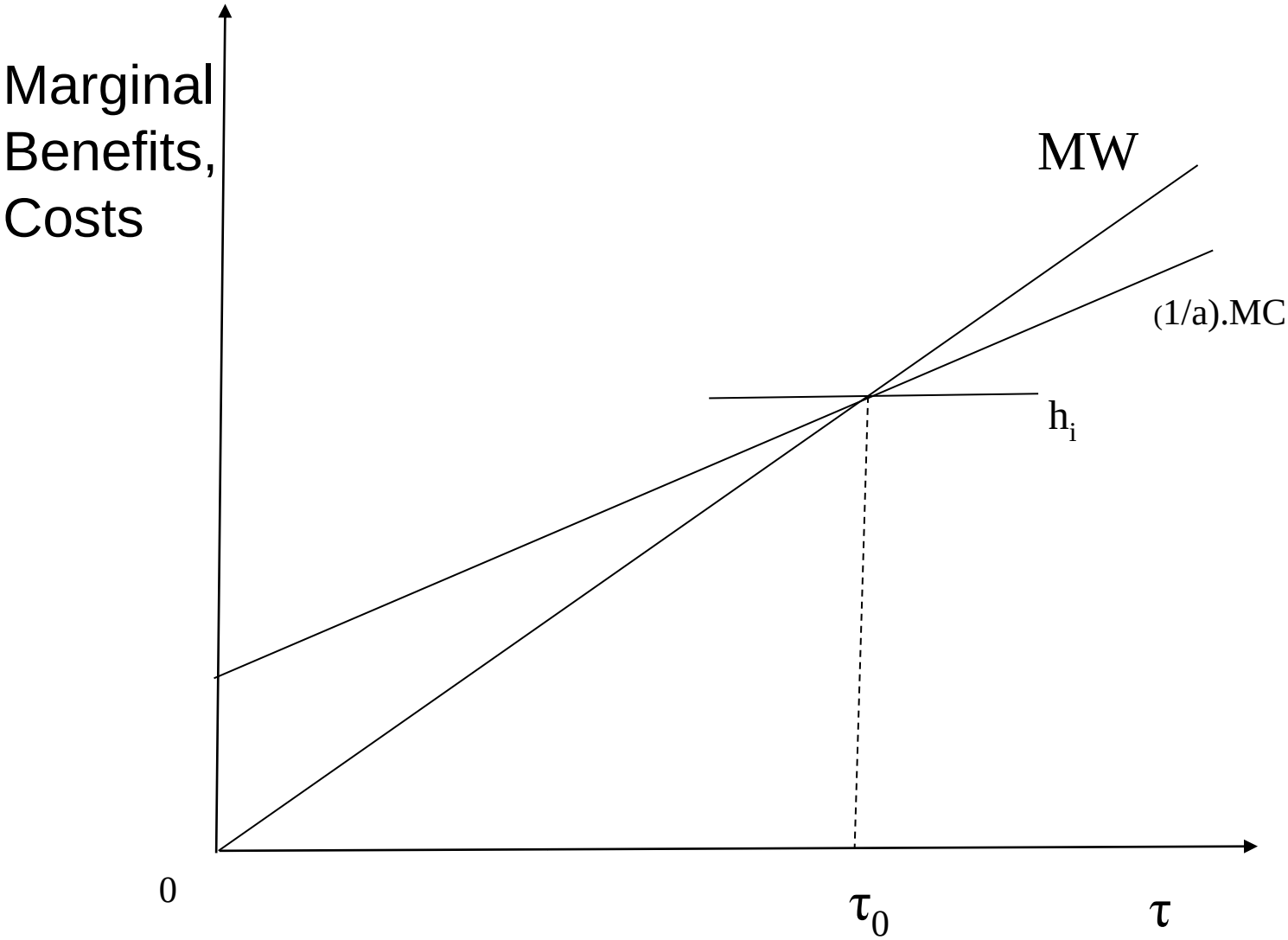
Where z = e(p,u) – g(p)

$$\mathrm{d}G^* = \left[\frac{1}{a}\iota'\frac{\partial\mathbf{C}}{\partial\mathbf{p}} + (\mathbf{p}-\mathbf{p}^*)'\mathbf{z}_{\mathbf{pp}})\right]\mathbf{dp} = \mathbf{0}$$

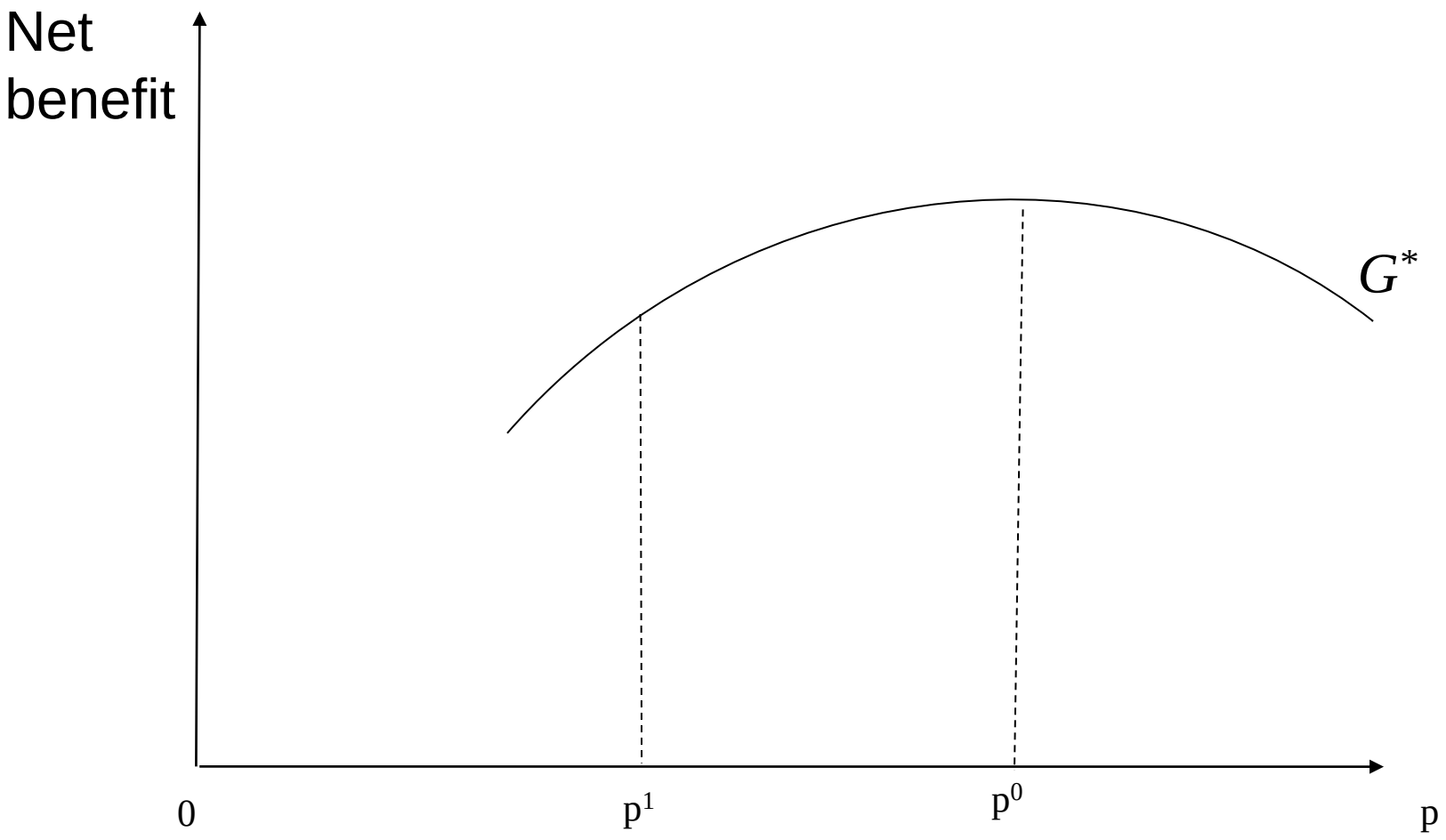
First Order Condition for short-run, where output fixed

$$\boldsymbol{h} + (\boldsymbol{p}^0 - \boldsymbol{p}^*)'\boldsymbol{z}^0{}_{pp} = 0$$

Marginal benefits and costs



Net political welfare



Inferring political costs

$$\frac{\partial^2 G^*}{\partial \mathbf{p}^2} = \mathbf{z}_{\mathbf{pp}} + \mathbf{z}_{\mathbf{ppp}}(\mathbf{p} - \mathbf{p}^*)$$

- Need G^* to be concave in p
  - z is, by definition, concave in **p**
  - But this does not guarantee G^* *is* concave

- Sufficient condition: z is generalized quadratic
  - Fully flexible– 2nd order approx to any function
  - With six-digit tariffs, over 12 million independent coefficients

Implementation

- Apply formulas to bound tariff rates
  - Cut applied rates when new bound below applied
- Include flexibilities
  - Choose lines to minimize loss of political welfare
  - Choose NAMA flexibility regime and products to minimize the loss of political welfare
- Check that agric tariff cuts meet minimum average-cut requirement for developed countries, maximum for developing
  - Adjust cuts if needed

Identify sensitive prods in 3 ways

- Use CES to solve simultaneously by nonlinear integer programming

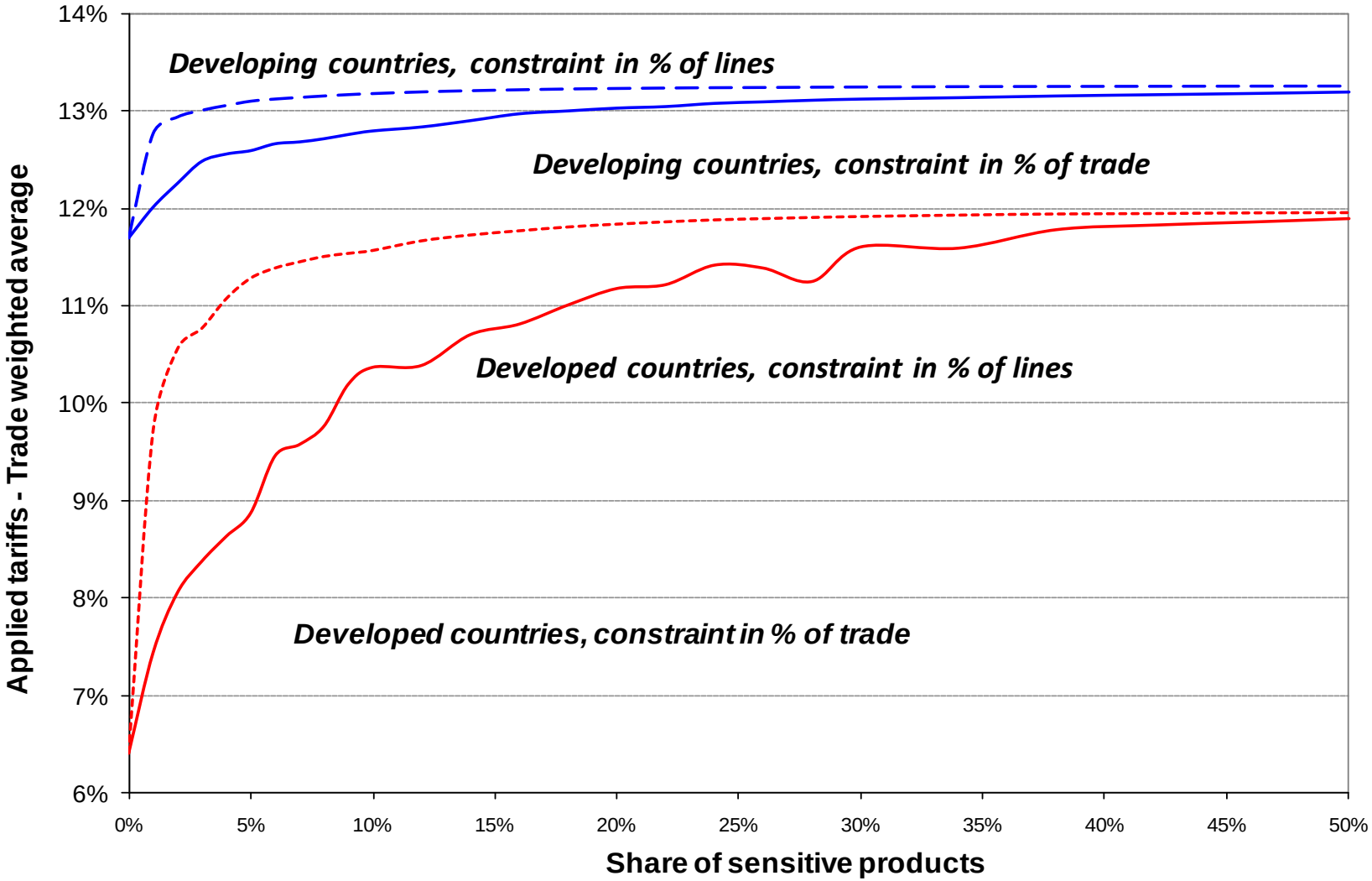
$$G = -z(p, u) + p^{*\prime} z_{pp} p + z_p (p - p^*)$$

  - Subject to restrictions on # or trade share and rules on reduction of sensitive/special products
- One equation at a time solution with CES
- One equation at a time with estimated elasticities

Impact of 2% sensitive agric lines
(base level and changes in pp)

	Base	Formula	2% Sens	2% Sens simple	2% Trade
Developed	14.9	8.5	4.3	4.4	6.8
Non-LDC Developing	14.6	6.0	3.1	3.1	4.8

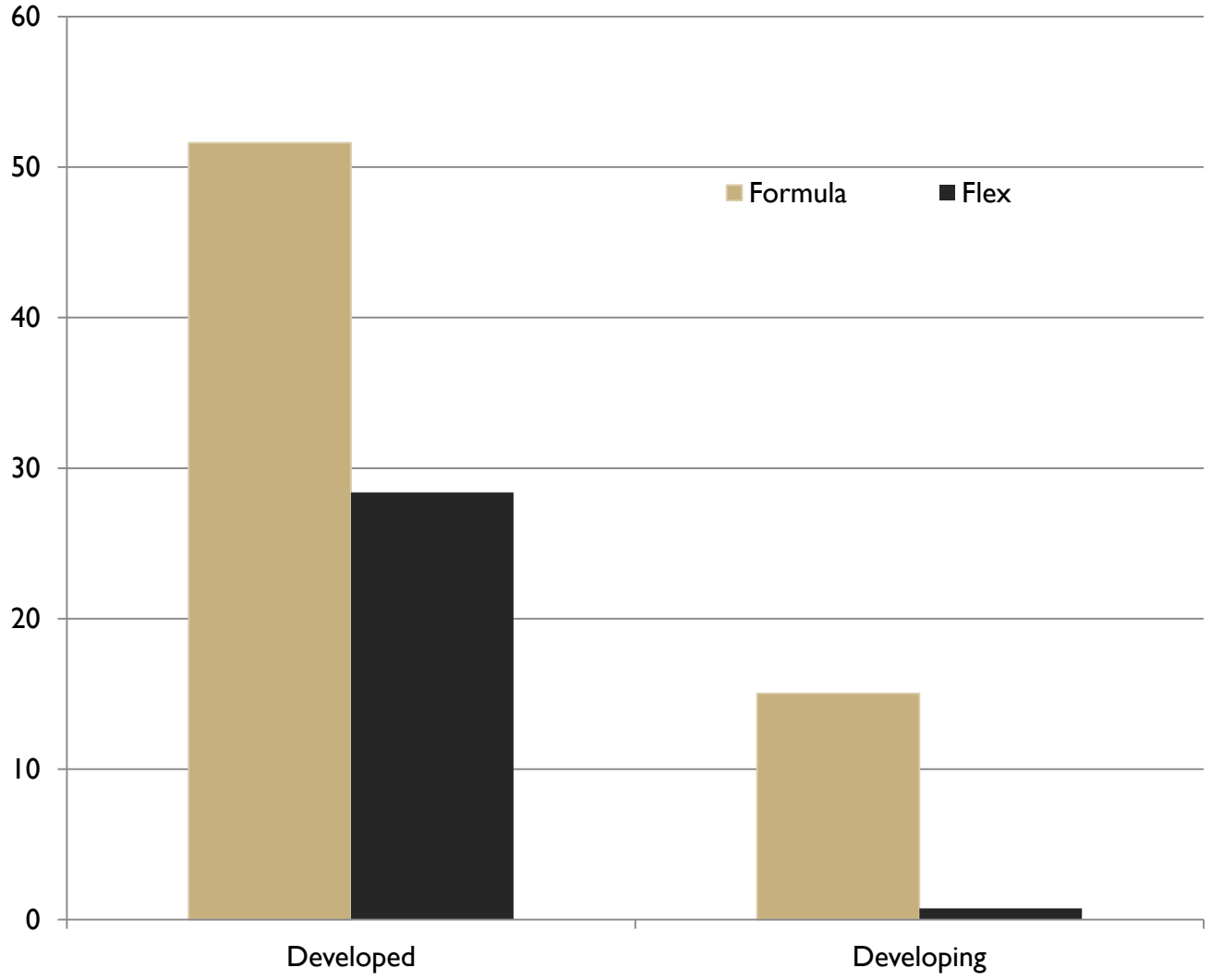
Changing # of sensitive products



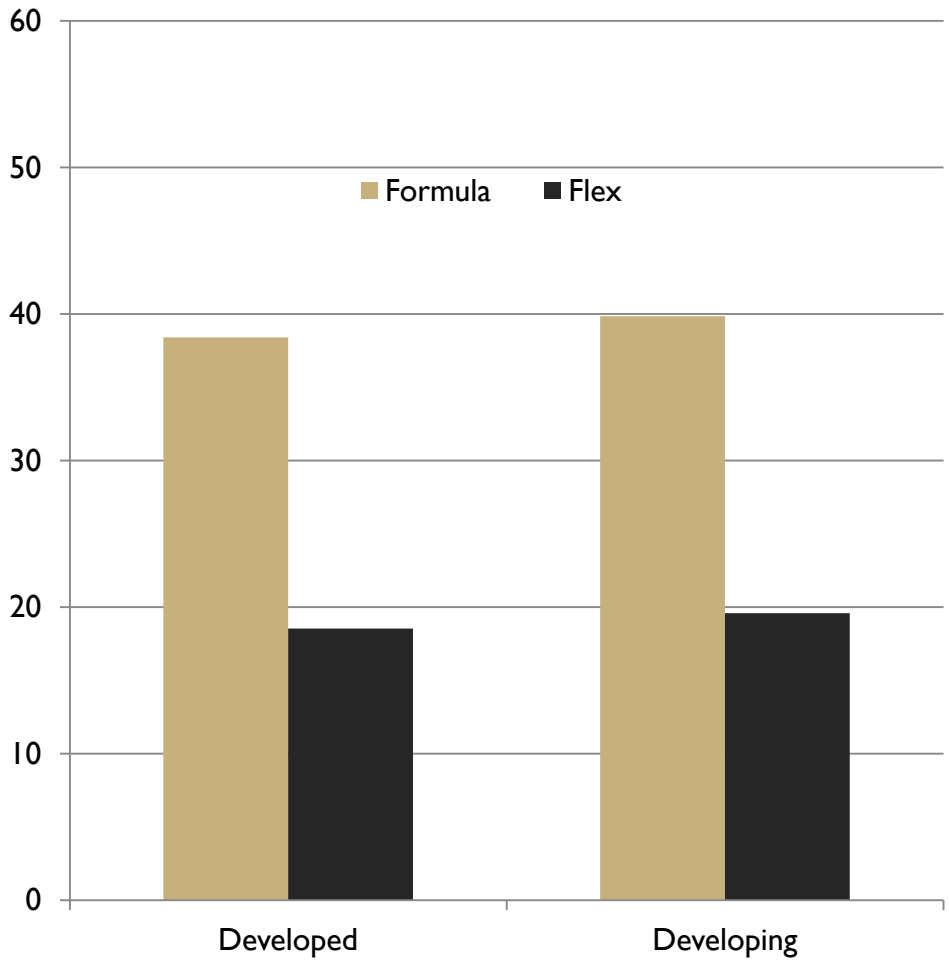
Tariff Scenarios

- Base
- Formula
- Flex—Formula plus flexibilities

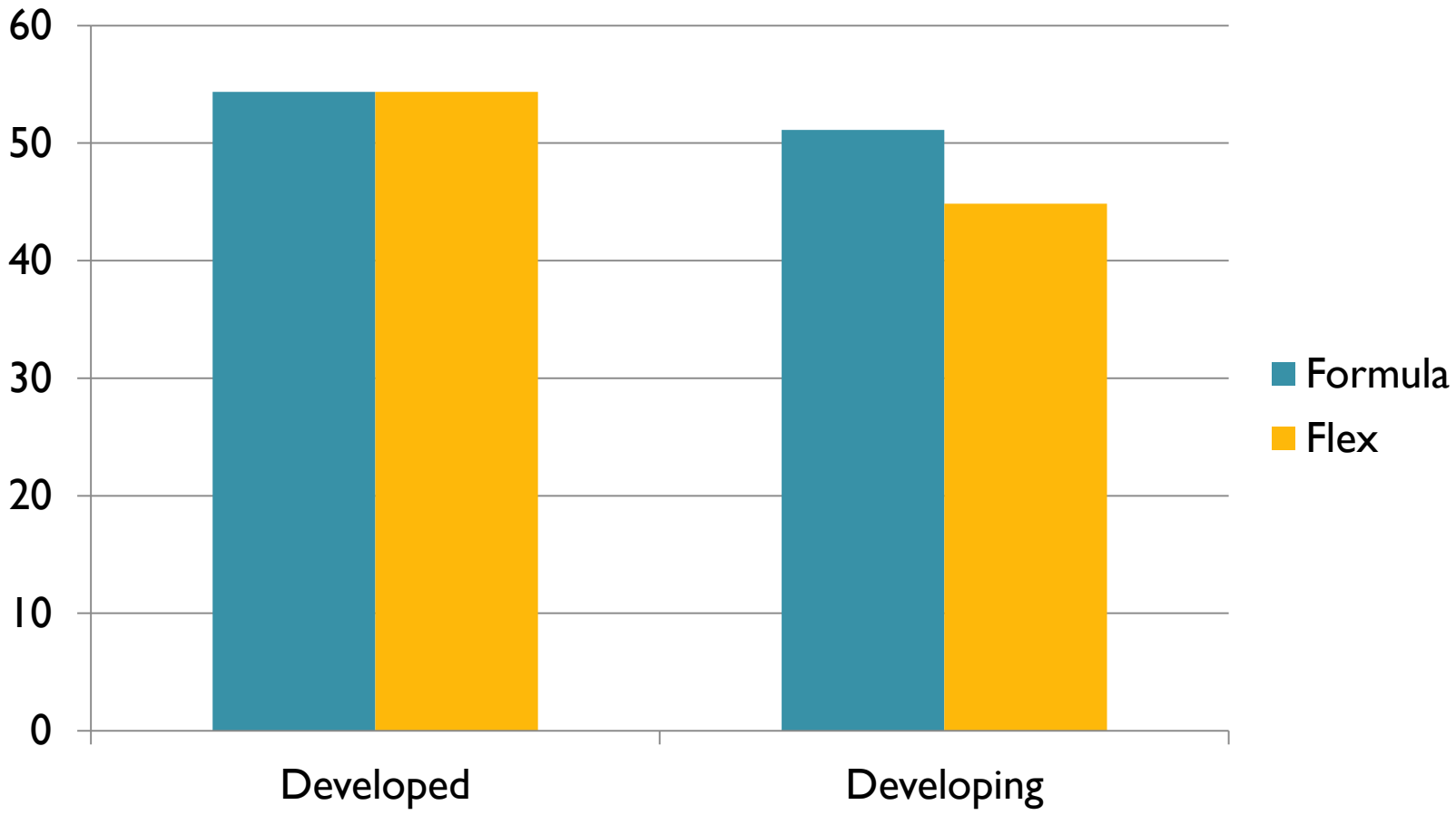
Cuts in agricultural tariffs, %



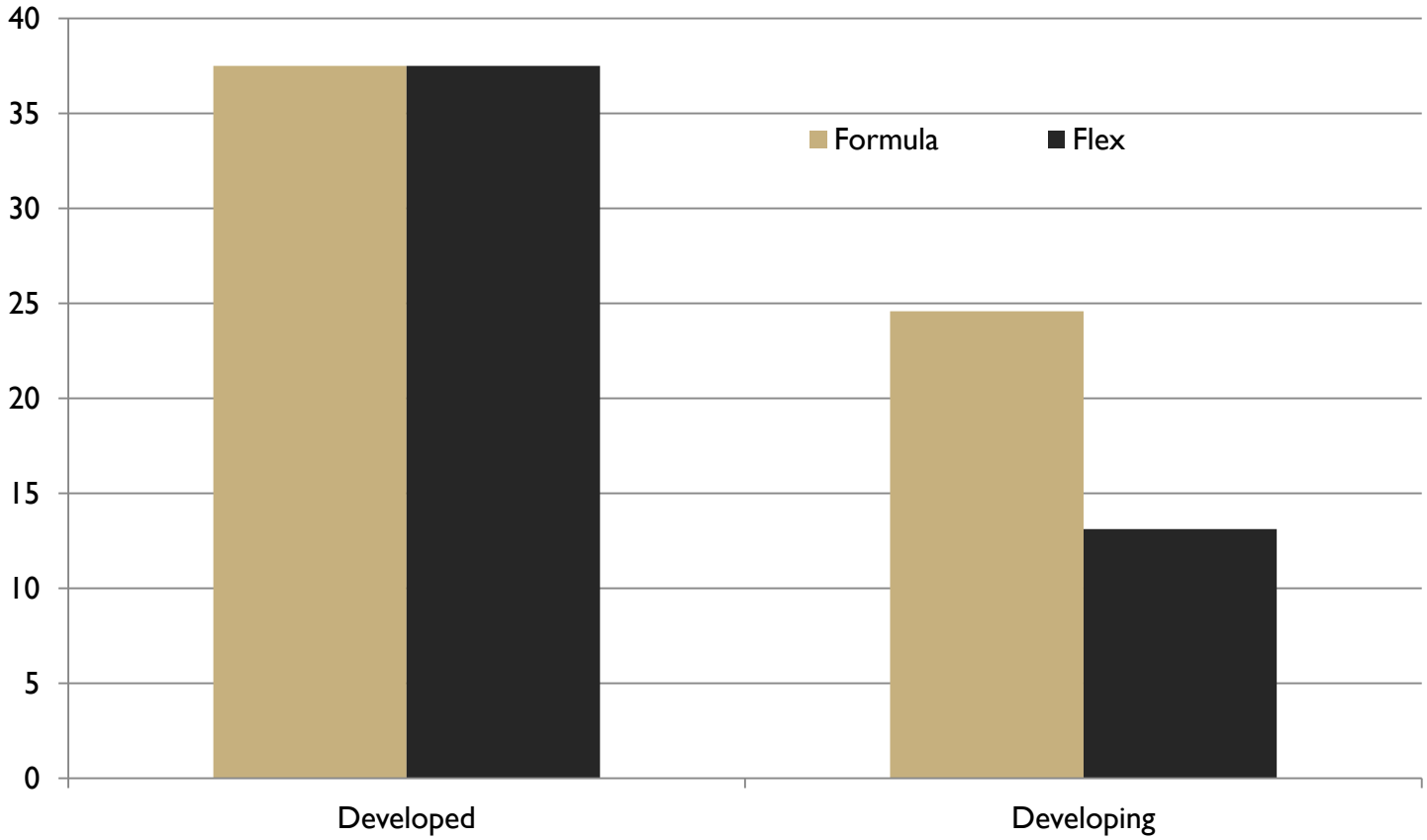
Cuts in agricultural tariffs faced, %



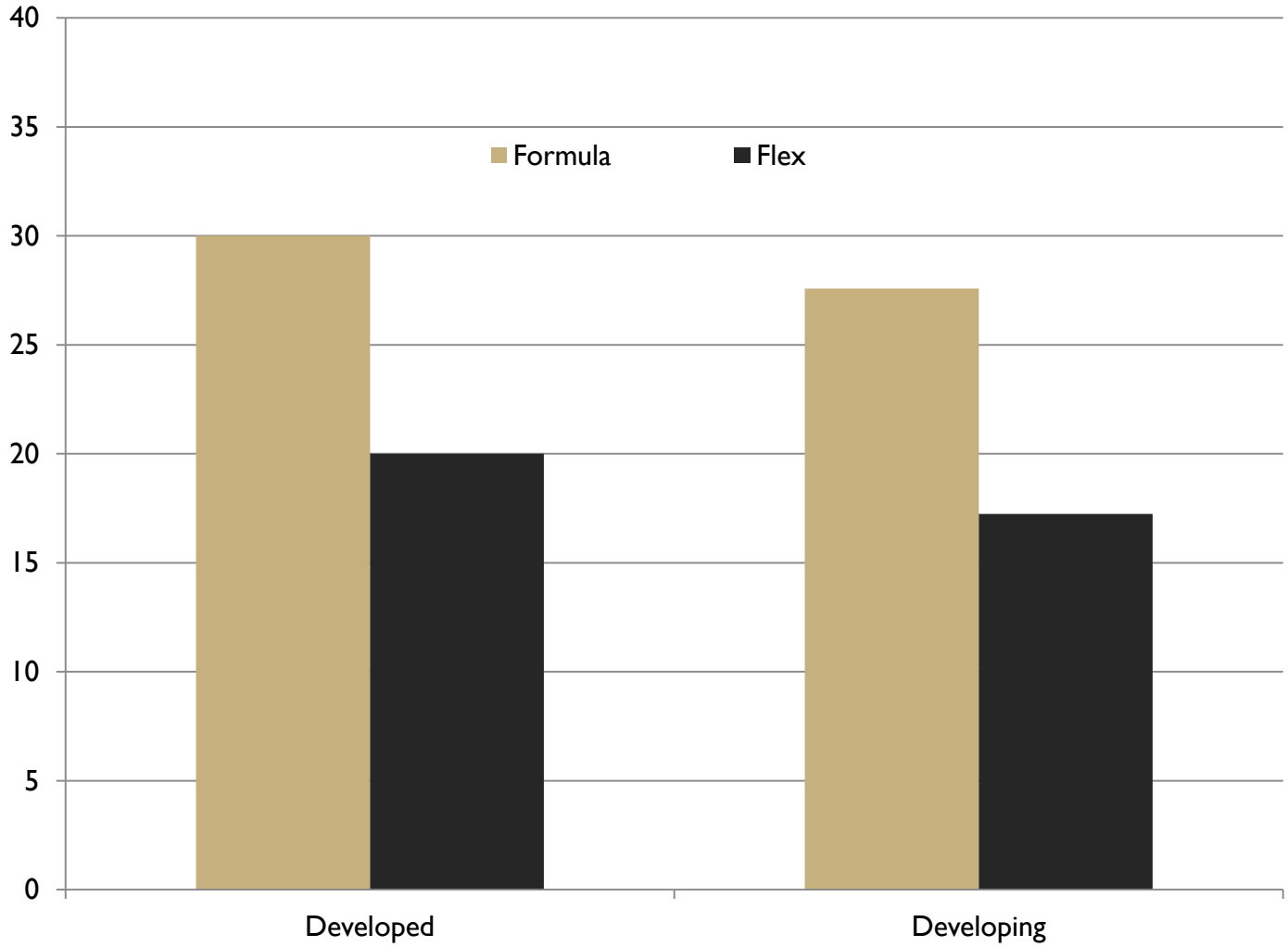
Cuts in NAMA bound tariffs, %



Cuts in NAMA tariffs applied, %



Cuts in NAMA tariffs faced, %



NAMA Tariffs Faced, %

	Base	Formula	Flex
Australia NZ	2.9	2.0	2.6
Bangladesh	3.7	1.7	1.8
Brazil	2.6	1.9	2.2
Canada	0.4	0.3	0.3
China	3.8	2.3	2.5
EU-27	3.6	2.7	3.0
India	4.6	3.1	3.6
Indonesia	3.4	2.2	2.5
Japan	4.5	3.0	3.5
Korea & Taiwan Pr.	3.8	2.6	2.9
Sub-Saharan Africa	2.1	1.4	2.0
USA	1.8	1.4	1.5
World Bank Groups			
All countries	2.9	2.0	2.3
Developing (non LDC)	2.9	1.9	2.1
High income	3.0	2.1	2.4
LDCs	2.8	1.5	1.8

Welfare evaln: need to aggregate

- Tariffs (and tariff equiv) are highly diverse
- Typically aggregate from 10,000 tariff lines to 20-25 for quantitative modeling
  - Weighted averages are flawed
    - The higher the tariff, the smaller the weight
  - Enormous waste of information
  - Have the theory and the data to do better
- Anderson-Neary insight
  - Choose aggregators to reproduce the function of interest

National model for aggregation

- Characterize each economy using a *Balance of Trade* function
- $B = e(p,u) - \pi(p) - z_p(p-p^w)$
  - $e(p,u)$ = Expenditure need to achieve utility *u*
  - $\pi(p)$ = Profit (GDP) at price p
  - $z(p,u)$ = Net expenditure = $e - \pi$
  - $z_p(p,u) = (e_p - \pi_p)$ = Net imports
  - $z_p'(p-p^w)$ = Tariff revenues

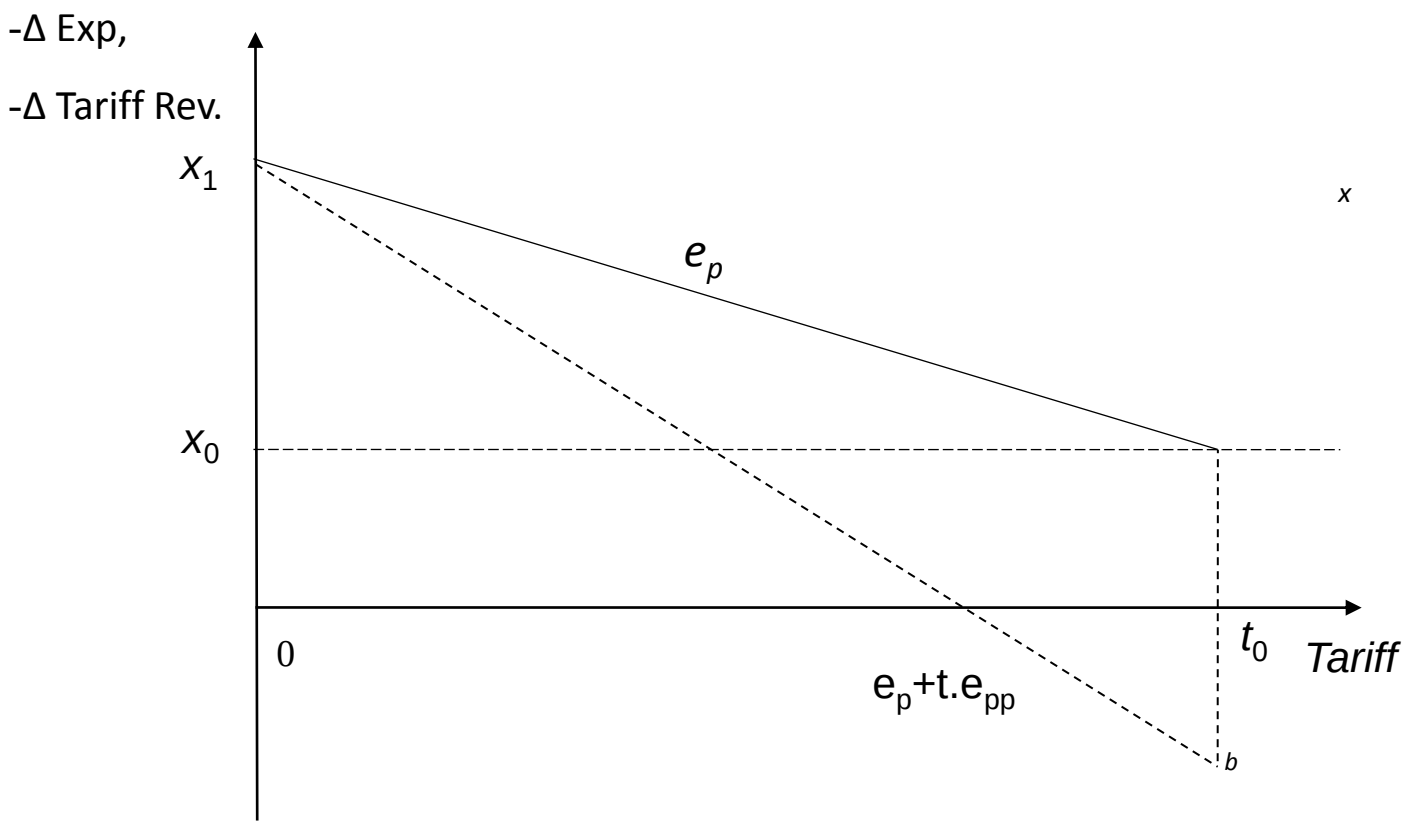
Expenditure & qty aggregators

- Assume imperfect substitution between different goods at tariff line or HS 6 category
  - For 2-stage budgeting, utility functions must be weakly separable & the sub-utility functions homothetic
    - But we assume this every time we use an aggregate
  - Then can write the expenditure function in terms of aggregated prices and quantities
- Within the group, expenditure increases with the price of the good, but at a decreasing rate
  - Slope = e_p

Tariff revenue aggregator

- Want a measure that takes account of the fact that increases in high tariffs reduce revenues by more than the quantity loss
- Slope of the tariff revenue function
  - $e_p + (p-p^w).e_{pp}$
  - Becomes negative for large enough tariff
    - The "Laffer curve"

Marginal impacts of tariff change



Implementation

- Use 6-digit tariff and trade data from MAcMapHS6 v2.1 dataset
- Assume CES sub-aggregators,
  - Closed-form solution for the expenditure aggregator
- The tariff revenue aggregator
  - Must assume imports separable from domestic goods
  - Use weighted-average with weights adjusting
- CES aggregators allow extensive-margin growth
  - As long as the model can represent this

In a global model

- Walras' law a problem at the global level
  - Can't solve as income doesn't equal expenditure
- Distinguish quantities at domestic (u_i) & world prices (x_i^*)
- $u_i = x_i^*(1+\tau_i^R)/(1+\tau_i^e)$
- Which allows global adding up
  - $u_i(1+\tau_i^e)p^w = x_i^*(1+\tau_i^R)p^w$

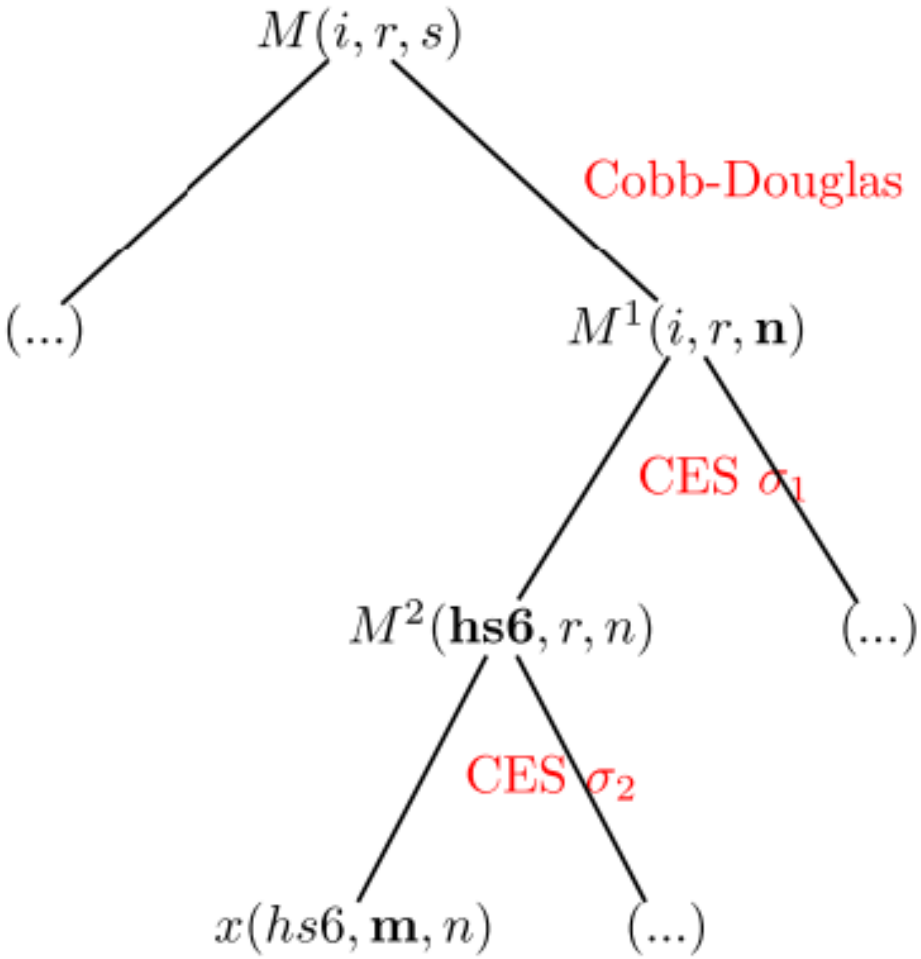
Computing aggregates

- Compute the expenditure tariff aggregator y using a domestic price index
  - P = PCIF * $\left(\sum_i \alpha_i (1+t_i)^{1-\sigma}\right)^{1/(1-\sigma)}$
  - So τ^e = P/PCIF -1

Implementation

- Modify the World Bank LINKAGE model to distinguish quantities at domestic and at world prices
- Calculate the expenditure & tariff revenue aggregators
- Simulate impacts of changes
- Could add modeling of increases in variety

Nesting structure



Parameter estimates

- Great uncertainty about the elasticity of substitution at the six-digit level.
- Averages:
  - Kee, Nicita & Olarreaga $\eta = 3.12$
  - Hummels & Klenow $\sigma_2 = 7.5$
  - Broda and Weinstein $\sigma_2 = 13$
- Consider $\sigma_1 = 2$ or 5 in this initial study
- Use σ_2 twice as large (not influential)
- We ignore effects of new varieties
  - Standard models doesn't allow us to model changes in the number of varieties

Welfare gains, optimal weights, σ=2, $bn

	Full	Formula	Flex
Australia/N Zealand	16.8	4.8	2.4
EU 27	180.4	58.7	39.3
USA	53.8	14.5	9.9
Japan	64.9	29.2	21.8
Korea & Taiwan	98.7	21.2	9.8
Bangladesh	0.2	-0.2	-0.2
Brazil	30.8	9.8	4.7
China	-8.6	9.7	8.9
India	24.3	6.1	2.4
Indonesia	3.9	1.5	1.0
Thailand	8.7	4.5	2.6
High income countries	484	141	91
Developing Countries	241	61.5	31
Sub Saharan Africa	30	6.6	0.6
World total	725	202	121

Impacts of σ_I, DDA

	Weighted Ave	σ =2	σ=5
Australia/NZ	1.9	2.4	3.6
EU 27	30	39	53
USA	6.4	9.9	14.1
Japan	18.4	21.8	26.1
Korea/Taiwan	9.3	9.8	10.5
Bangladesh	-0.4	-0.2	-0.3
Brazil	4.2	4.7	6.0
China	5.7	8.9	13.9
India	2.5	2.4	2.4
Indonesia	1.0	1.0	1.0
Thailand	1.8	2.6	4.2
High income ctries	*71*	*91*	*118*
Developing ctries	*22*	*31*	*44*
SS Africa	*0.1*	*0.6*	*1.5*
World total	*94*	*121*	*161*

Conclusions

- Modalities involve deep and sharply-harmonizing cuts in tariffs
  - Together with flexibilities that reduce cuts on self-selected products
- Need careful approaches to predict products for flexibilities
  - Adverse impacts much larger than suggested by *ad hoc* rules like highest-tariff
- Optimal aggregation of distortions increases the estimated real-income gains