

Modeling Trade Tensions: Macroeconomic and Trade Models in Different Institutions

Marika Santoro¹

International Monetary Fund

GTAP Conference, June 17-19 2020

¹Co-authors: Eddy Bekkers, Ben Hunt, Jan in 't Veld, Maryla Maliszewska, Rafael Portillo, Andrea Prestipino, Marinos Tsigas, Dominique van der Mensbrugghe, Martino Ricci. The views expressed herein are those of the author(s) and should not be attributed to the IMF, its Executive Board, or its management

Contribution

- Escalation of trade tensions has spurred analysis in most institutions
- In April last year, some of the main institutions met in Washington
- Exchange notes on frameworks and understand different results
- Reconcile/highlight some differences between DSGE and CGE models
- What does drive results in those models?

Motivation

- Reconciling results on tariff policies could be complex
- Policy scenarios can depend on:
 - ① Same tariff increase can be implemented differently
 - ② Retaliatory measures (say if a country retaliates in kind or tries to affect particular sectors)
 - ③ Persistence of the measure (temporary or permanent)
- Results then can differ because of:
 - ① Different frameworks (DSGE versus CGE)
 - ② Within similar frameworks, different ingredients
 - ③ Also different calibration

Simple policy experiment

- In terms of policy scenarios:
 - 1 10-percentage-point increase in tariffs
 - 2 Across the board, on all imports
 - 3 Start with the U.S. increasing tariffs on China's imports
 - 4 Add retaliation
 - 5 Increase the number of countries involved
- To tackle issues of frameworks' comparison:
 - 1 Main framework differences w.r.t. tariff policies
 - 2 Explain the importance of key ingredients
 - 3 Perform same experiment using the same key parameter value

DSGE models: main features

- DSGE used in several institutions (IMF, ECB, EC, FRB)
- Share similar ingredients
 - 1 Multi-country
 - 2 Non-Ricardian households
 - 3 Real and nominal rigidities
 - 4 Role of currency invoicing
 - 5 Dynamic consistency

Results US-China trade tensions: SR

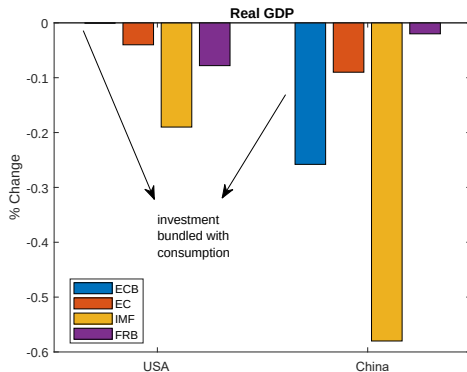
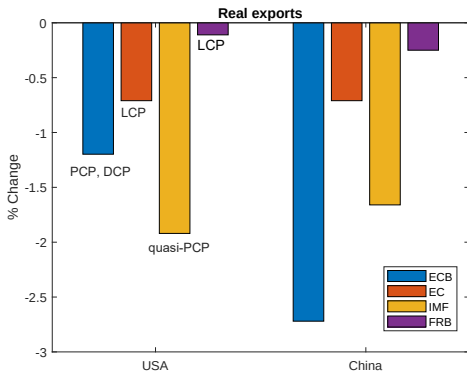
- Response in the SR displays a larger range
- Range depends on:
 - 1 Currency invoicing (rigidities in pricing: LCP vs PCP)
 - 2 Deep and policy parameters
 - 3 Nominal and real rigidities
 - 4 Elasticity of substitution
 - 5 How the revenue from tariffs is used

Why do those matter with tariff policies?

- Key blocks in DSGE models:
 - Relative demand for foreign varieties
 - Balance of payments
 - Intertemporal conditions for bond holdings
- Tariffs do not *directly* affect last block
- ER jumps to preserve consistency
- How much? Depends on highlighted features
- Exports affected by tariffs and ER (currency invoicing)

Results US-China trade tensions: SR details

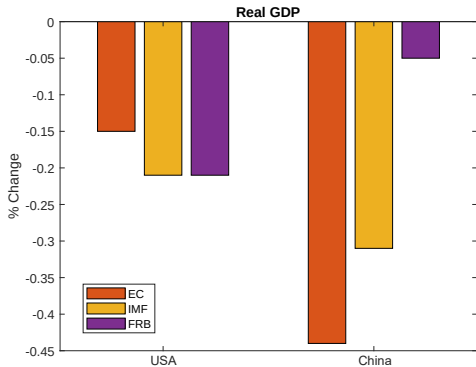
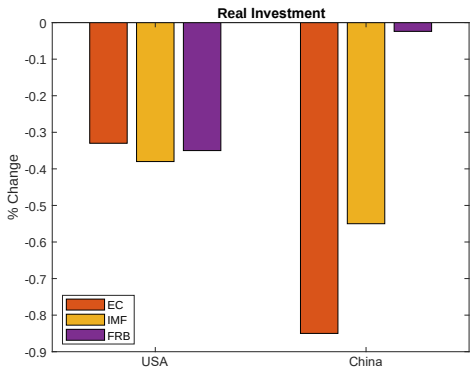
- Exports in year 1 depend on currency pricing
- GDP: size of countries matters (FRB); role of investment (ECB)



Results US-China trade tensions: LR

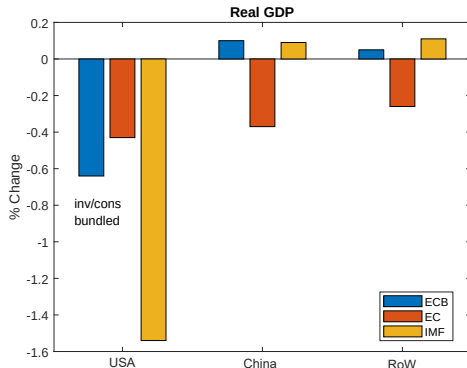
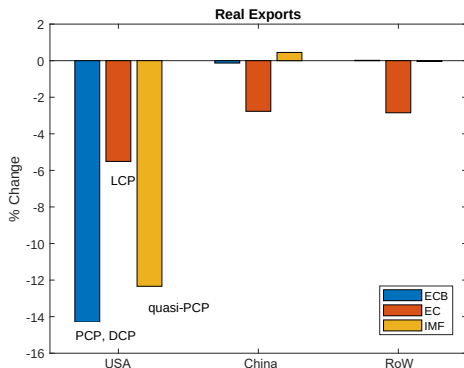
- Absent rigidities or frictions, models are more aligned
- Tariffs introduce a distortion on investment
- GDP response mainly tracks investment's
- In addition, appreciation of the dollar weighs on U.S. exports

Results US-China trade tensions: LR(2)



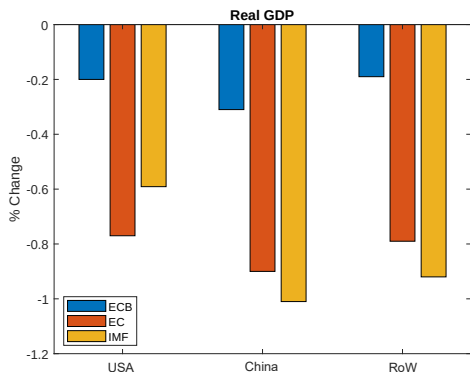
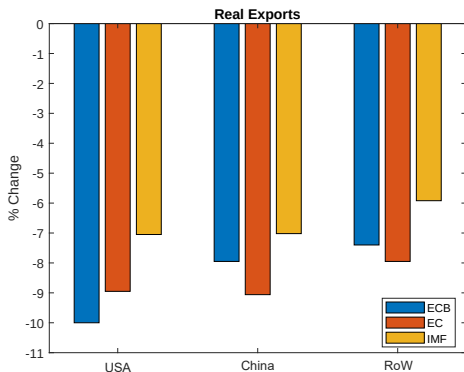
Shock: US and Partners increase tariffs 10 ppt

- Largest losses for the US, smallest for China: U.S. least important partner, China exports more to others
- SR results mostly driven by exports (except for ECB)



Results global trade war: SR

- Largest loss for China: the most open large economy
- ER changes are modest: rigidities and currency pricing weighs less on differences in exports



CGE models

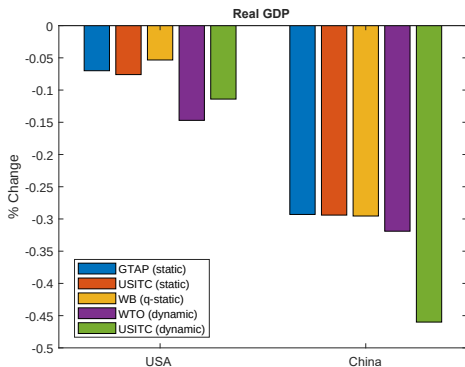
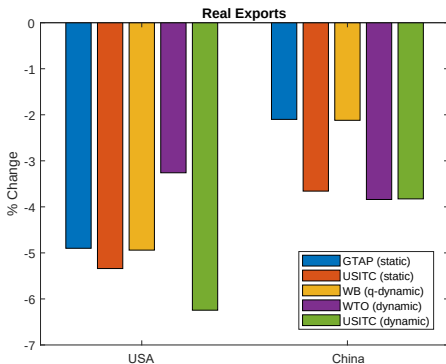
- CGE used in several institutions (WTO, WB, Purdue, USITC)
- Share similar ingredients
 - 1 Complex system of equations
 - 2 Multi-country
 - 3 Sectoral disaggregation
 - 4 Input/output structure
 - 5 Fixed endowment of factors [most closures in static models]
 - 6 In dynamic versions, capital is endogenous

CGE results: mechanisms

- Tariffs introduce a wedge on relative prices
- Sectors more exposed to trade lose competitiveness
- This generates a contraction of production factor demand
- If total stock of factors is fixed (at regional level), prices fall
- Demand for other sectors may increase
- Resources reallocate across sectors
- Factor returns measure inefficient reallocations caused by tariffs (translates into GDP)
- Crucial: factor reallocation, dynamic response, elasticities, closures

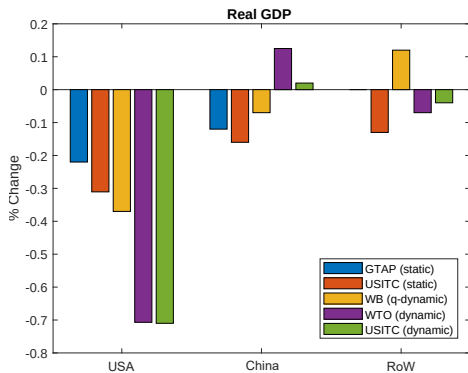
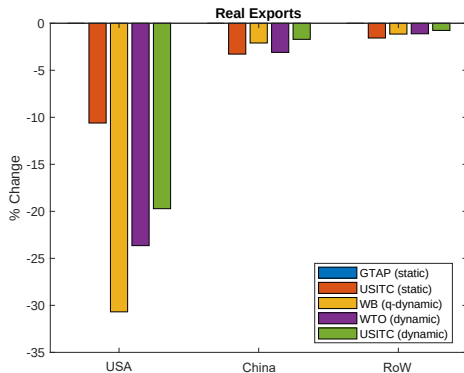
Results US-China impose tariffs

- Dynamic frameworks show larger output loss
- WB: capital cannot freely reallocate across sectors
- WTO: only model with no fixed trade balance



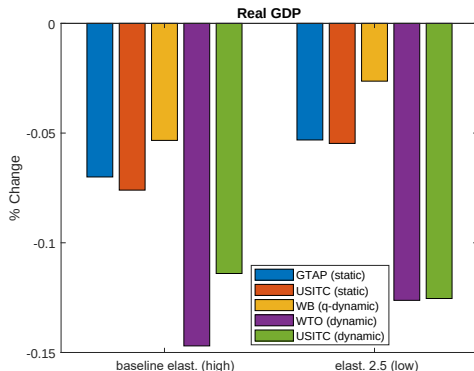
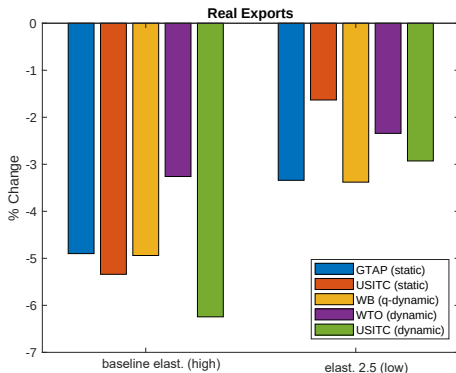
Results US and partners impose tariffs

- Similar results, with dynamic models showing larger output change
- US suffers the largest loss (same as for DSGE models)



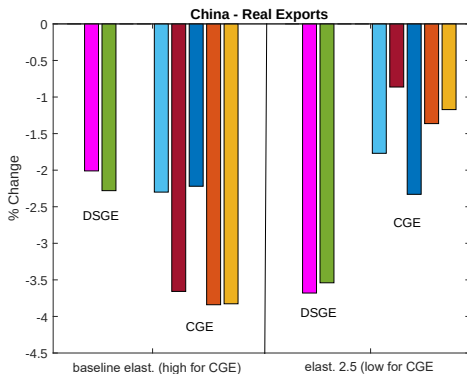
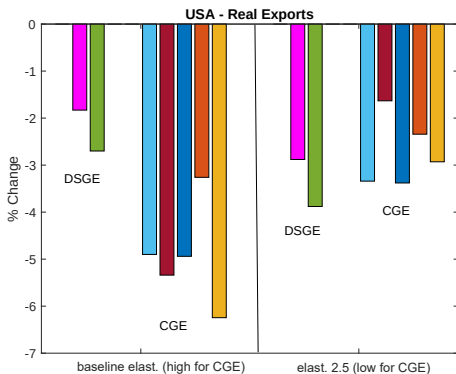
Results US-China impose tariffs: role of elasticities

- Exports' response subdued with lower elasticities (**USA case**)
- Generally, tariffs more distortive with lower elasticities



Results US-China impose tariffs: DSGE and CGE

- Exports particularly more responsive in CGE with higher elasticities



Main takeaways

	DSGE	CGE
GDP, Exports	Contraction (countries imposing tariffs)	Contraction (countries imposing tariffs)
Output loss	Factors contraction	Inefficiency of reallocation, factors contraction (only dynamic models)
Affecting magnitude of results	Deep parameters, size, policy reactions, currency pricing, rigidities, elasticities, trade asymmetry	Elasticities, closures (e.g. trade restrictions), tech. parameters, factors reallocation, trade asymmetry

Concluding remarks

- Analyze results of tariff policies across institutions
- Design simple experiments that allow for comparisons
- DSGE and CGE display negative effects of tariffs arising from different mechanisms
- DSGE: role of exchange rate, distortions/contraction of factors supply
- CGE: distortion of prices, input-output propagation, inefficient reallocation of factors
- Showed the role of key features in both frameworks

BACK-UP SLIDES

Results US-China impose tariffs: role of elasticities

- case of China

