

## **Moving forward: research priorities for global trade analysis**

Overview of a White Paper led by a Committee of the GTAP Scientific Council

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There are great uncertainties facing the global trading system today and the need for quantitative analysis of trade- and trade related policy measures has never been more pressing. The predictability of international trade policies from tariffication, binding and reduction of trade barriers through multilateral agreements has all but vanished. At the same time, jurisdictions around the world have been employing massive behind-the border policies to promote national industries, with significant consequences for international trade. The very nature of international trade has changed, with more and more trade taking place in services, and digital trade increasingly underpinning commercial relations. Multinational service companies, digital and otherwise, increasingly orchestrate activities in global value chains. The global shipping and warehousing industries have been witnessing severe disruptions from the pandemic, wars and natural disaster, and are also struggling to come to grips with this volatile trade landscape. Quantitative trade policy analysis has not been evolving at the same pace as the reality of international trade. This document provides an initial sketch of a White Paper which will call upon our research community to revisit economic theories as well as data and modeling needs to continue our vital support of evidence-based international trade policy. The objective is to lay out a vision for research and applications over the next ten years in quantitative trade-related policy analysis.

The White Paper will address the interests of two distinct audiences. The first is the community of scientists, scholars and analysts undertaking quantitative analysis of trade policies, many of whom are members of the GTAP network. The second audience comprises the decision makers and advisors that rely on this analysis to inform trade-related policies. The latter group includes GTAP Advisory Board members, as well as other national and international agencies, development banks, philanthropic organizations, and central banks. The White Paper will outline the role of quantitative modeling in this rapidly evolving trade policy landscape, paying particular attention to the credibility challenge facing our community.

We are taking as the template for this White Paper, a recent paper published by the climate science community: [“Bringing it all together: science priorities for improved understanding of Earth system change and to support international climate policy”](#). This template was proposed by GTAP Board Member Matthias Weitzel, who pointed out that this type of community-wide effort can be quite influential in shaping future requests for research proposals by key funding entities.

Following the format of the climate science White Paper, we aim to assemble a list of the major projects and institutions (GTAP is one such project) currently seeking to inform trade policy. Emphasis will be placed on those producing replicable, open access quantitative analyses, but we will also include other influential projects.

Figure 1 presents a draft schematic display of a network of linked sector-level models which are currently, or could be in the future, used to address the impacts of trade-related policies (comprising Figure 1 of the White Paper). Here again, the goal will be to solicit community input for refinement of this figure and its components.

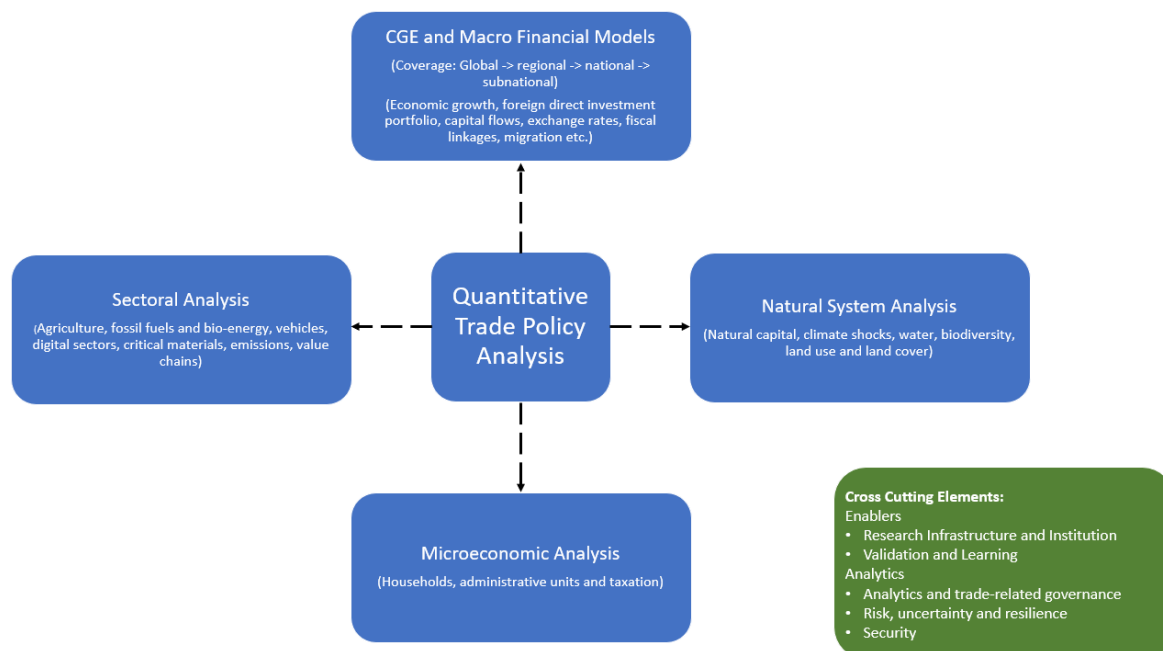


Figure 1. Linking Models to Address Trade-related Policies

Sectoral modeling of the kind mapped in Figure 1 is often too coarse to address questions related to the propagation of shocks or disruptions that occur in some small part of the economy but can nonetheless be ‘critical’. Such criticality may refer to a key input in production – i.e. hard, or not at all substitutable – or it can relate to a critical sales outlet.

One approach is to conceptualize the real supply side of the economy as a network of firms that are heterogeneous in size, sector, production functions and balance sheets (Box 1). Firms are linked in a customer-supplier network that typically is sparse: many firms have only a small number of connections. Firms interact with each other as customers or suppliers and when one critical supply- or demand link breaks the firm will have to look for replacement.

When individual firms are modeled, their production function can include both critical (non-substitutable) and standard inputs. Sourcing can occur domestically or internationally. Firm behavior could be modelled in different ways: as a (non-) linear optimization problem with constraints or using heuristics often found in agent-based-models.-. A key issue here is the mapping of individual firm behavior to aggregate outcomes.

A firm-based network can be represented as a (very big) IO adjacency matrix where each firm has its own input-output structure and individual firm-IO matrices are linked through inter-firm transactions (like a Inter-country IO, but MUCH bigger). However, complete coverage of hundreds of millions of firms in global economy is of course illusionary. But samples of individual firm IO tables can be constructed by combining different sources: firm data (e.g. ORBIS), conventional IO tables and knowledge of firm-to firm transactions (which is available in some countries, e.g. Japan and Belgium). Synthetic samples – i.e., a sample of synthetic firms that matches certain structural characteristics such as size distribution etc. – can be constructed to map crucial characteristics while avoiding modeling individual existing firms.

## Box 1. Networks of Firms

### 1. **Network structure (firm/establishment level)**

A firm-level network consists of nodes (firms/establishments) and edges (supplier/customer links, logistics, ownership/contracting relationships). This is the right level of analysis for chokepoints, market concentration, and many shock propagation pathways—and often where the most policy-relevant “security” questions live. It is similar to a firm-level input–output table at a granular level, but not exactly the same if pass-through across a node is buyer–seller specific. That raises empirical questions: to what extent can we treat all of a firm’s purchases from different suppliers as homogeneous once they arrive at the firm? This embeds assumptions that may not hold, especially for multiproduct firms or customized inputs. It would be useful to mention some of the ways researchers are beginning to tackle these issues.

### 2. **Firm → market analysis (firm-only is not enough)**

Most network analyses (including much of the private-sector/AI-driven work) can identify exposures and chokepoints, but they typically lack the equilibrium objects that discipline substitution and reallocation: price formation, supply responses, demand responses, factor reallocation, and welfare/distributional implications. Without these, it is hard to answer the core counterfactual: if supply doesn’t come from A, where does it come from, and at what cost? Importantly, what looks brittle at the firm level can be resilient in the aggregate—and vice versa. Whether that is the case depends critically on the details of aggregation and overlap across firms. For example, if every firm adopts a “+1” sourcing strategy, resilience depends enormously on whether they diversify toward the same alternative supplier or toward different ones. That is a general equilibrium question, but one for which we need network granularity to answer.

### 3. **Aggregation and non-marginal shocks (micro → macro)**

The central challenge is how firm-level responses “add up” to sectoral and macroeconomic outcomes. In the contexts we care about—derisking/decoupling, sanctions, major disruptions—large shocks are not linear multiples of small shocks. That’s where our usual calibration approaches become especially fragile: elasticities inferred from marginal variation around the status quo equilibrium may be highly misleading out of sample. What we really need is guidance on the shape of supply and demand responses for non-marginal deviations from the observed equilibrium, including the possibility of multiple equilibria (and path dependence) under fragmentation.

Following the lead of the climate science paper, this White Paper will be broken into nine focus areas (Box 2), each with a distinct team of authors. There will be two lead authors for each topic – one drawn from the research community, and one representing stakeholders with a particular interest in that topic. The White Paper will strive to represent both of these interest groups.

## Box 2. Focus areas for the White Paper

1. Cross-cutting institutional framework governing trade policies
2. Trade, market access uncertainty, geopolitics and economic security
3. Trade policies and the green transition: consequences of these industrial policies for international trade
4. Modeling the digital economy and AI
5. Trade, development, climate resilience and food security in Sub-Saharan Africa
6. Foreign Direct Investment and Multinationals
7. Assessing the local economic, distributional, gender, social and environmental impacts of trade-related policies
8. Addressing the credibility gap: Model validation and intercomparison
9. Research Infrastructure: development of data, documentation of current trade actions, forward-looking scenarios, modeling tools and knowledge to support global trade policy analyses

Each author team will be asked to address a series of questions, starting with a clear statement of the issue to be addressed, what can be done immediately or in the near term with current infrastructure. Are there specific experiments which could be done with existing models and which would shed light on these pressing concerns? Each author team will also be asked to address the extent of our ignorance – what we do not yet know? Finally, they will focus on what can be done in the future, distinguishing the need for new theory from new data requirements, and considering whether there are no-regret investments which can be leveraged in this area. I.e., work that should be done in any case, but which would have a particularly high payoff in the context of this particular challenge area.

Table 1. Chapters of the White Paper: Quantitative Modeling to Support Trade Policy Analysis

| Topic                          | Co-Lead                                   | Co-Lead                                            |
|--------------------------------|-------------------------------------------|----------------------------------------------------|
| Cross-cutting themes           | Channing Arndt (GTAP)                     | TBD                                                |
| Uncertainty/security           | Joe Francois (WTI and Scientific Council) | Emily Blanchard (Dartmouth and Scientific Council) |
| Green transition               | Frank van Tongeren (Scientific Council)   | Sergey Paltsev (MIT)                               |
| Digital Services trade         | Eddy Bekkers (WTO)                        | Javier Lopez Gonzalez OECD                         |
| SSA                            | Stephen Karingi (UNECA)                   | Simeon Ehui (IITA and Scientific Council)          |
| Investment/Multinationals      | Bill Powers (USITC)                       | Robert Koopman (American University)               |
| Local impacts                  | Shenjia Chen (Global Affairs Canada)      | Jeanine Dixon (COPS)                               |
| Addressing the credibility gap | Tom Hertel (GTAP and Scientific Council)  | Lionel Fontagne (Paris 1 and Central Bank)         |
| Research infrastructure        | Erwin Corong (GTAP)                       | Marijke Kuiper (WUR)                               |

*Organized session at the Kyoto Conference on Global Economic Analysis, June 2026*

One vehicle for harvesting input from our research and policy community will be an organized session at the Kyoto Conference this June. The session will be chaired by Matthias Weitzel from the European Commission. (Recall that he was the one to propose the White Paper concept at the last GTAP Board meeting.) Tom Hertel will introduce the session with an overview of the White Paper. This will be followed by deep dives into two of the topics in Box 2, presented by Joseph Francois and Frank van Tongeren. The session will conclude with reactions from GTAP Director, Channing Arndt.