International trade: a Kantian interpretation

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"treat humanity, whether in your own person or in that of another, always as an end and never as a means only" (Immanuel Kant, *The Categorical Imperative*)

1. Introduction

Our starting point is that so far as international trade is concerned we have no vested interest or preconceived preference. Rephrasing the Kantian moral principle, we could say that from a normative point of view we treat international trade always as mean only and never as an end in itself.

A direct consequence of this stance is that trade liberalization is not necessarily desirable per se. In order to assess the desirability of international trade as a mean, we compare it with other possible means to achieve the same goal. The comparison is in quantitative terms through the use of a global computable general equilibrium model.

The list of possible goals is a long one since in principle it includes all the variables affected by international trade that enter the social welfare function with a positive sign. In our application, we use the following variables:
- overall utility that can be considered as a proxy of the availability of goods;
- per capita utility;
- overall food availability in terms of calories;
- per capita food availability.

The choice of the goals limits the means alternative to trade that can be envisaged. In point of fact, there seem to be only two possible options to move outward the production possibility frontier in the absence of international trade:
- technical progress leading to increases in productivity;
- factor (land, capital, labour) endowments increases.

Our experimental design is the following. For each country/region considered we first (almost completely) eliminate international (i.e., extra-regional) trade. Complete autarky is not feasible if there are complementarity requirements related to some inputs such as oil or minerals. To eliminate these complementarities, we should allow for (even more) extreme adjustments in terms of innovation (e.g., discovery of new energy sources) or factors availability (e.g., if we dig deep enough we could find oil everywhere). It is worth emphasizing that the size of the country/region plays a crucial role since below a minimum size is simply not possible to maintain the initial level of the equivalence variable without international trade.

The international trade reduction is achieved through trade costs increases. We introduce tariff increases and the choice is inconsequential since prohibitive tariffs do not generate any revenue.

A final word of caution regards the trade balances since the baseline includes both surpluses and deficits that are bound to disappear in the absence of international trade. As a consequence the national utility is going to be affected not only by change in trade but also by changes in the transfers to and from the rest of the world. To eliminate this source of bias in the utility equivalence scenarios, we implement a counterfactual baseline where all trade surpluses and deficits are eliminated.

2. Model

MIRAGRODEP is a Computable General Equilibrium (CGE) model based on MIRAGE (Modelling International Relations Under Applied General Equilibrium). It is a recursive dynamic multi-region, multi-sector model. MIRAGE was initially developed at CEPII and was devoted to trade policy analysis.

As opposed to a single-country CGE model, a multi-country CGE model allows for a detailed and consistent representation of economic and trade relations with the rest of the world. International economic linkages are captured through the international trade of goods. A dynamic version of the model is used by solving the model sequentially and moving the equilibrium from one year to another. In our study, we assume perfect competition in all sectors, which enables us to have a detailed geographic and sector decomposition.

In MIRAGRODEP, the government is explicitly modelled as different from private agents. Government income consists of taxes collected on production, on factors of production, on exports, on imports, on consumption, and on households' income. The government is supposed to maximize a Cobb-Douglas utility function: government spending on each commodity is a fixed share, in value, of total public expenditure in goods and services. Government purchases are subject to taxes.

The Consistent Tariff Aggregator approach[1] has been implemented in MIRAGRODEP. This is an important element of the model since the project will be conducted at a relatively low level of sector disaggregation (37 sectors); in terms of import tariffs, it is often stated that the devils are in the details. The Consistent Tariff Aggregator approach allows to take into account the variance of tariffs at the tariff line level.

Social Accounting Matrix (SAM) and trade data in MIRAGRODEP are based on GTAP 8.1 (Narayanan and Walmsley, 2012). The GTAP Database is a fully documented global database which contains complete bilateral trade information, transport, and protection linkages among 130 regions for all 57 GTAP commodities for 2007.

MIRAGRODEP has already been utilized to study issues related to international trade and trade policy in Africa. Bouët et al. (2014), in particular, study the potential evolution of international trade in Africa depending on various trade liberalization scenarios, either regional or multilateral.

The model includes three important assumptions: the external account closure, the government account closure, and the private account closure.

The private account closure assumption concerns the savings-investment closure: either a model is Neo-Classical and assumes that savings determines investment, or a model is Keynesian and it is investment that determines savings. The MIRAGRODEP model is Neo-Classical: the marginal propensity to save is constant such that variation in income leads to variation in savings, which brings variations in investment.

The external account closure concerns the assumption on the current account (the current account includes exports and imports of goods and services, plus public and private transfers from or to the rest of the world). The current account balance could be affected by a trade agreement since this policy reform entails a variation of border tariffs and consequently a variation of imports and exports. One option is to suppose that the current account balance varies and the real exchange rate is unaffected by the reform. A second option is to suppose that the real exchange is affected by the reform in such a way that the current account balance is constant. The adjustment of the real exchange rate could take place through an adjustment of the nominal exchange rate

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[1] See Laborde et al., 2017.

(devaluation, depreciation) or through different evolutions of domestic prices in the different regions (i.e., competitive disinflation).

The first option (rigidity of the real exchange rate and modification of the current account surplus or deficit) has two significant disadvantages. If a country's current account balance, which includes the trade balance, is modified by the reform, this means that the adjustments in the upper part of the balance of payments have to be compensated for by a modification of the capital and financial account balance. The problem is that MIRAGRODEP does not model financial markets[2] so there is no explicit representation of how capital flows will be reallocated at the global level following the agreement or how the sovereign risks of the countries, and the propensity of investors to allocate resources to these countries, will evolve.

Secondly, assuming that a current account balance can vary without constraints means there is no limitation in the import increase. The country consumption, and welfare, is "subsidized" through transfers from the rest of the world; therefore, a welfare analysis is biased: increasing the external debt has no negative consequence on welfare, while the additional imported consumption increases welfare.

The second option (exogenous behavior for the current account surplus or deficit, by default) implies that the real exchange rate is adjusted in such a way that the current account balance is stable (in the model expressed as a percent of global GDP). In a nutshell, when the first-order effect of the reform is increasing imports (higher tariff reduction on the import side than on the export side), the real exchange rate is depreciated such that the competitiveness of this country is improved to ensure that additional imports will be compensated for by additional exports in value, in the long term. Conversely, when the first-order effect of the reform is increasing exports, the real exchange rate is appreciated such that the competitiveness of this country is deteriorated. The key advantage of this assumption is that we can conduct a welfare analysis which is fully representative of how the reform has affected a country's real situation. It also provides a long-run assumption consistent with the CGE analysis.

The government or public account closure assumption concerns how the public balance is affected when taxes are changed by a reform. There are several options:

(i)   When taxes, for example public revenues coming from import tariffs, are decreased, it is possible to not change anything in the public budget. With other tax rates constant and public expenditures (including investment) constant, this implies a growing public deficit and leads to more borrowing from the public sector; since the current account balance is stable, no external savings will finance this growing public deficit. Consequently, it is the private sector that will have to finance the public sector. Since domestic private savings are also assumed to remain stable (no change in people's propensity to save), there is less funding for private investment, which leads to less economic activity in the future. This is the "crowding-out effect" of raising public deficit.

(ii)   Suppose that the public deficit/surplus is constant. In this case, when one source of revenue for the public agent is reduced, then there are two options: either there is another tax which is increased to

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[2] Other multi-country CGEs face the same problem.

compensate for lost public revenues on import tariffs or public expenditures are reduced in such a way that the government account balance is constant.

This last assumption may be interpreted as fewer public expenditures leading to fewer public goods; thus, private agents' welfare is reduced since the public sector provides either fewer health services or fewer education services, for example. In this study, we assume that each government maintains the public balance constant and that after a shock that reduces custom duties, a lump-sum tax (either negative or positive) is established in order to maintain real public expenses per capita constant while public sold is constant in percentage of GDP.

With this assumption, the level of public services in each country is constant and there is no variation of public sold and no associated crowding-out effect on private investment. Of course, this policy option may not appear realistic since a lump-sum tax is regressive. However, this scenario is worth being studied since a lump-sum tax is efficient in the sense that it does not interfere with market mechanisms. Moreover, it is useful for measuring one imperfection associated with the reform: the magnitude of the lump-sum tax measures the cost imposed on each individual to maintain constant real public expenses per capita, and consequently constant provision of public goods.

This assumption may be criticized since a lump-sum tax may be considered politically unrealistic and may be more damaging for the poorest households. This is why we conduct a sensitivity analysis that includes other public closures. In particular, we suppose that real public expenses per capita and public balance are constant thanks to either an additional consumption tax or an additional income tax. We also consider a case in which public expenses adjust such that the public sold is constant.

3. Experiments

Target	Adjustment variable	Current Account imbalances Rule
Representative Agent Utility	Total Factor Productivity	Set to 0 in the pre-experiment
	Capital Stock Increase	
Representative Agent Utility (per capita)	Labor Stock increase	
Calories consumption	Agricultural TFP	Agricultural trade balance set to 0 in the pre-experiment. Trade balance on non Ag. Goods is also adjusted.
	Land stock increase	
	Agricultural capital stock increase	
Per capita consumption of individual food item	Agricultural sector TFP	
	Land stock increase	
	Agricultural capital stock increase	

4. Results

To be added

References

David Laborde, Will Martin, and Dominique van der Mensbrugghe (2017), "Measuring the Impacts of Global Trade Reform with Optimal Aggregators of Distortions", *Review of International Economics*, 25(2), 403–425.

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