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Welfare implications of trade liberalization and fiscal reform: A quantitative experiment☆

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ABSTRACT

This paper studies the welfare implications of revenue-neutral trade liberalization and fiscal reform programs for developing economies using a multi-sector dynamic general equilibrium model of a small open economy. We analyze how different combinations of tariffs – on imported consumption goods, intermediate inputs, and capital goods – and taxes – on consumption, labor income and capital income – affect the transitional and long-run welfare. We report three main findings. First, trade liberalization programs financed by consumption and labor income taxes tend to result in substantial welfare gains, but financing the lost tariff revenue through capital income taxes can have an adverse impact on welfare. Second, a significant fraction of welfare changes is due to transitional effects stemming from the allocation of resources in response to changes in tariffs and taxes. Third, trade liberalization and fiscal reform programs often translate into much larger welfare gains in countries that are more open to international financial markets.

1. Introduction

Trade liberalization has been a central component of economic reform programs in a number of developing economies since the mid 1980s.[1] Trade liberalization is theoretically associated with better allocation of resources and improved growth prospects, but its implementation presents serious fiscal challenges to many of these countries where import tariffs often constitute a major source of government revenue.[2] Tariffs are relatively easy to collect whereas it is costly to expand fiscal revenues through taxation of domestic resources because developing countries often lack the necessary capacity to effectively monitor, administer, and collect taxes. Recognizing their severe budgetary consequences, trade liberalization programs have often been complemented with fiscal reform initiatives.[3]

In light of these observations, we ask a fundamental question: "What are the welfare implications of trade liberalization and fiscal reform programs in developing countries?" In order to answer this question, we undertake a quantitative experiment and study the welfare effects of revenue-neutral changes in policies involving a rich menu of tariffs and taxes. Specifically, we employ a multi-sector dynamic general equilibrium model of a small open economy to evaluate the transitional and long-run changes in welfare in response to adjustments in tariffs

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[1] The wave of unilateral trade liberalizations started with the Uruguay Round in 1986 and then continued with the proliferation of preferential trade agreements (Kose and Prasad, 2010). The fraction of countries with a liberalized trade regime increased from roughly 30% in 1985 to about 70% in 2008. The number of preferential trade agreements has skyrocketed over the same period going up to roughly 170 from just 10.

[2] Tariff revenues account for more than 25% of total tax revenue in many low-income countries (Kubota, 1999 and World Bank, 2009). In contrast, only a minor fraction of tax revenues in the core OECD countries is due to tariffs (IMF, 2009).

[3] Caprio et al. (1998), Ebrill et al. (1999), ATPC (2004), and Bilal et al. (2012) discuss experiences of countries that have difficulties in implementing the joint trade liberalization and fiscal reform programs.

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(on imported consumption goods, intermediate inputs and capital goods), and taxes (on consumption, labor income and capital income).

We report three main results. First, revenue-neutral trade liberalization and fiscal reform programs can lead to sizeable welfare gains depending on changes in taxes and tariffs. A full-fledged trade liberalization, i.e., elimination of all tariffs, is associated with welfare gains of up to 2.8% of lifetime consumption when the lost tariff revenue is financed by a consumption or labor income tax. In contrast, if taxes on capital income are increased to compensate for the lost tariff revenue, this can translate into smaller welfare gains or outright welfare losses. These findings are intuitively appealing as they emphasize the magnitude of the dynamic efficiency gains stemming from capital accumulation over time.

Second, the welfare implications of various types of trade liberalization and fiscal reform programs we analyze indicate that financing through capital income taxes is the least preferred fiscal tool to recover the lost tariff revenues. In contrast, financing through consumption taxes is the best fiscal policy tool. Irrespective of taxes used to finance lost tariff revenues, the elimination of tariffs on imported factors of production, i.e., capital goods and intermediate inputs, results in the largest welfare gains implying that it is the most preferred dimension of trade liberalization. The removal of tariffs on imported consumption goods generates the smallest welfare gains irrespective of the type of financing employed. These results are robust to a wide range of sensitivity experiments.

Third, the welfare implications of liberalization and reform programs depend on a country's degree of access to international financial markets. We find that trade liberalization and fiscal reform programs result in larger welfare gains in economies that have a higher degree of access to international financial markets. These results collectively emphasize the importance of complementarities between trade and financial integration in the context of the liberalization and reform programs.

Despite the rigorous policy debate on the welfare implications of trade liberalization and fiscal reform programs, the literature has yet to study these issues employing modern quantitative experiments in the context of rich dynamic general equilibrium models. The welfare implications of tax policies have been studied extensively, but there have been only a few papers analyzing the joint implications of tax and tariff policies. Moreover, a handful of previous studies have examined the macroeconomic effects of such liberalization and reform programs using mostly static models and simple empirical methods.[4]

Our multi-sector dynamic general equilibrium model allows us to examine a number of critical factors the earlier studies have not been able to account for. First, the dynamic nature of our model allows us to analyze the intertemporal effects associated with the dynamics of physical and financial assets in response to trade liberalization and fiscal reform programs. Second, we are able to evaluate the welfare changes stemming from the transitional dynamics in addition to those associated with the pre- and post-reform equilibria. Models with static environments can analyze only the welfare changes between the pre- and post-reform equilibria. Third, our small open economy model has a rich production structure as it imports capital goods and intermediate inputs, and employs them to produce export goods. Given the rapid growth of global manufacturing chains involving the trade of intermediate inputs and capital goods across borders, this is another crucial factor necessary to accurately assess the implications of trade liberalization in developing countries.

[4] For studies using theoretical models, see Osang and Pereira (1996), Keen and Ligthart (2002) and Konan and Maskus (2000). Clarete and Whalley (1987) use a simple static model to study commodity and trade taxes. Anderson (1999) provides a static model to characterize welfare improving trade reform. Francois and Reinert (1997) provide a comprehensive summary of several studies on the implications of trade liberalization. In a related paper, Choudhri et al. (2006) consider the short-run and long-run effects of trade liberalization using a dynamic model, but their analysis abstracts from the impact of liberalization on fiscal balances. Using a simple endogenous growth model, Naito (2006) discusses optimal import tariff and consumption tax combinations.

Moreover, we study the implications of the degree of financial openness for the welfare effects associated with the liberalization and reform programs. Although there is a large literature emphasizing the importance of complementarities between trade and financial integration, previous studies on the fiscal effects of trade liberalization fall short of analyzing this dimension. Given the significant role international financial markets play in financing the budget shortfalls of developing country governments, it is natural to evaluate the macroeconomic implications of policy changes in economies with different access to global capital markets.

In Section 2, we present the details of our model. Section 3 describes the model parameters, calibration and solution of the benchmark model for a specific small open developing economy. Section 4 examines the welfare implications of trade liberalization and fiscal reform. In Section 5, we examine how the welfare results change when we vary the degree of access to international financial markets. In Section 6, we study the robustness of our results. Section 7 concludes the paper.

2. Model

We construct a dynamic general equilibrium model of a small open economy that captures the main structural characteristics of a typical developing country. The model provides a laboratory environment in which we are able to conduct computational experiments to evaluate the welfare implications of various combinations of tax and tariff policies.

The model allows for interactions across different agents, including households, firms, and the government. Households consume three types of goods — exportable (x), importable (m) and nontraded goods (n). Their labor income and capital income are subject to taxes, and they also pay taxes on their consumption. Firms produce two types of goods – exportable and nontraded goods – using labor and capital. We assume that the capital goods used for the production of exportable goods are imported whereas capital for the production of nontraded goods is domestically produced. This is a natural assumption given that many developing countries use imported capital goods, such as machinery, to produce and export manufacturing products while they often produce nontraded goods, such as services, using domestic capital. Imported consumption, intermediate input, and capital goods are subject to tariffs. The government must finance an exogenous stream of expenditures through revenues from domestic taxes and tariffs on imported goods.

The benchmark model incorporates both current account and financial account transactions by allowing households to borrow and lend in international financial markets using one-period risk-free bonds. This property of incomplete access of households to international financial markets is a good characterization of financial markets in most developing economies. We experiment with different degrees of access to international financial markets, and also analyze the case of financial autarky where the current account is balanced every period.

2.1. Households

We reduce the three-good optimization problem into a single good problem by defining the composite consumption good c_t with price p_t. A representative household solves

$$\max \sum_{t=0}^{\infty} \beta^t U_t, \text{ where } U_t = \frac{\left(c_t^{\theta}(1-h_{xt}-h_{nt})^{1-\theta}\right)^{1-\sigma}}{1-\sigma}, \tag{1}$$

subject to budget constraint

$$\begin{aligned}(1-\tau_{lt})[p_{nt}w_{nt}h_{nt}+p_{xt}w_{xt}h_{xt}]+\left[(1-\tau_{kt}^{n})r_{nt}+\tau_{kt}^{n}\delta_n\right]p_{nt}k_{nt}\\ +\left[(1-\tau_{kt}^{x})r_{xt}+\tau_{kt}^{x}\delta_x\right]k_{xt}+p_{nt}T_t+B_t\\ =(1+\tau_{ct})p_tc_t+p_{nt}i_{nt}+(1+t_{xt})i_{xt}+R_tB_{t+1},\end{aligned} \tag{2}$$