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Welfare effects of TTIP in a DSGE model

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ABSTRACT

We analyze the welfare effects of the Transatlantic Trade and Investment Partnership (TTIP) between the United States (US) and the European Union (EU). Earlier TTIP studies analyze welfare effects in a framework where output and welfare coincide. We believe that the utility function of households, which depends on consumption and employment, is the best criterion for assessing TTIP. We measure the welfare effect of TTIP as the percentage of consumption that households would be willing to pay for TTIP in order to remain as well off with it as without it. The welfare effects of TTIP, which eliminates tariffs and cuts non-tariff measures, are always positive for the US and the EU. The reason is that the welfare gain of higher consumption more than offsets the welfare loss of a change in employment. The policy implication is that the US and the EU should continue the negotiations for the TTIP agreement.

1. Introduction

The Transatlantic Trade and Investment Partnership (TTIP) is a comprehensive agreement being negotiated between the European Union (EU) and the United States (US). According to the European Commision (2017), the aim of TTIP is "to help people and businesses by: opening up the US to EU firms, helping cut red tape that firms face when exporting, and setting new rules to make it easier and fairer to export, import and invest overseas." It also notes that TTIP could help the EU affect global trade rules. The Office of the United State Trade Representative (2017) says that TTIP is an opportunity for American people and businesses to get better access to EU markets, which would support the US economy. Both the European Commision (2017) and the Office of the United State Trade Representative (2017) argue that imported products meet high standards that protect not just people's health and safety, but also the environment.

The pros and cons of TTIP are debated. Felbermayr et al. (2015a), for instance, agree that advantages have both economic and geostrategic components: the elimination of tariffs and non-tariff measures (NTMs) between the US and the EU should increase trade and output, while regulatory cooperation should help to impose Western standards on the world trade system. Felbermayr et al. (2015a) emphasize that critics claim that the possible benefits are modest and fear that TTIP may trigger a race to the bottom in health, safety, labor, and environmental standards.

Trade economists typically use static models to evaluate the consequences of trade agreements (see e.g. Costinot and Rodriguez-Clare, 2014). The focus is on a detailed sectoral structure in a large set of countries. The trade literature analyzes long-term effects, arguing that trade liberalization affects the structure of the economy in the long term. It typically does not study adjustment dynamics of endogenous variables and ignores the fact that trade agreements are typically phased in over a number of years. Existing TTIP studies belong to this tradition.

The main contributions of our paper are to analyze adjustment dynamics and the welfare effects of TTIP in a New Keynesian dynamic stochastic general equilibrium (DSGE) model. Our DSGE model, based on Ganelli and Tervala (2015), is different from those used in the existing TTIP literature by allowing us to analyze transition dynamics of TTIP.[1] Petri and Plummer (2016) emphasize—in the context of the Trans-Pacific Partnership—that trade policy is gradual. Ghironi (2016) argues—in the context of the Trans-Pacific Partnership—that it is important to account for the adjustment dynamics of major trade deals, which extend far beyond reductions in tariffs. In contrast, all other main TTIP studies use static trade models and, therefore, are unable to analyze adjustment dynamics to gradual trade liberalization. The earlier TTIP literature evaluates the long-term *trade* and *output* effects of TTIP (Aichele et al.,

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[1] Capaldo (2014) uses an old Keynesian model to analyze TTIP. However, Bauer and Erixon (2015) highlight that the model Capaldo (2014) uses is not designed to analyze the effects of trade agreements. Most notably, Bauer and Erixon (2015, 2) note that it is "a demand-driven model that does not make efforts to capture the supply-side effects of trade which are the effects that are proven to be the core positive effects of trade liberalization".

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2014; Berden et al., 2009; Felbermayr et al., 2015b; Fontagné et al., 2013; Francois et al., 2013). Aichele et al. (2014) and Felbermayr et al. (2015b) argue that they analyze the welfare effects of TTIP, but these welfare results come from a modeling setup where real income and welfare coincide. Therefore, their welfare measure is, in effect, the change in real income that is equal to output. Raza et al. (2014) criticize TTIP studies since they neglect or downplay adjustment costs, such as changes in employment. We believe that the utility function of households, not just consumption, is the relevant welfare measure and provides the best objective in terms of which the pros and cons of TTIP should be assessed. In our model, the welfare effect of TTIP depends not only on current and future changes in consumption but also on current and future changes in employment and the initial level of employment. We measure the welfare benefit of TTIP in consumption equivalent terms: as the percentage of initial consumption that households would be willing to pay for TTIP in order to remain as well off with the TTIP case as without it.

Felbermayr (2015) argues that an important feature of the quantitative modeling of TTIP is the scenario definition, because regulatory coherence is the key of TTIP and researchers can only guess the exact nature of the partnership before its conclusion. Following the work of Francois et al. (2013) and Fontagné et al. (2013), our baseline scenario is that TTIP leads to the elimination of tariffs and a cut in NTMs of 25%.

Our simulations show that the welfare effects of TTIP are always positive for the US and the EU. The reason for the positive welfare effect is that the welfare gain caused by higher consumption more than offsets the welfare loss caused by an increase in employment. The policy implication of our results is that the US and the EU should continue the negotiations for the TTIP agreement. The discounted present value of the welfare gain of TTIP is in the range of 1.5%–3.8% of initial consumption. This means that TTIP yields the welfare improvement that corresponds to a one-off 1.5–3.8% increase in consumption. In dollar terms, the welfare gain for a US (EU) citizen corresponds to a one-off 780–2000 (510–1300) US dollars increase in consumption. These welfare results are all new since the existing literature contains no analyses of the welfare effects of TTIP.

Berden et al. (2009), Francois et al. (2013), and Fontagné et al. (2013), who analyze the identical scenario, find that TTIP increases output in the US and the EU on average by 0.2–0.4% in the long term. In our model, the long-term output effect is in the range of 0.2%–0.4%, depending on the parameterization. So our results are fully consistent with earlier TTIP studies.

Following earlier TTIP studies, we also look at the effects of a TTIP agreement that is limited to liberalizing tariffs only. A tariffs-only agreement induces a considerably smaller output effect, which is in line with the other TTIP papers. Our main focus is, however, on welfare. The welfare gain of a tariffs-only agreement is roughly one-third of the welfare gain of the baseline scenario. Therefore, we can conclude that the bulk of the welfare gain of TTIP is induced by cuts in NTMs. This result is new since the existing TTIP studies contains no analyses of the welfare effects of TTIP.

The rest of the paper is organized as follows. Section 2 introduces the model. Section 3 presents the parameterization of it. Section 4 analyzes the effects of TTIP, focusing mostly on the welfare effects. It also examines the sensitivity of the main results to variations in key parameters values. Section 5 concludes the paper.

2. Model

In this section, we introduce a New Keynesian model of trade liberalization that is based on Ganelli and Tervala (2015). We go beyond their approach in that we allow for both tariff and non-tariff barriers, because the latter constitute the major barriers to trade between the US and the EU. Furthermore, we allow trade barriers to be adjusted gradually.

The world is made up of two countries: home and foreign.[2] Firms and households are indexed by $z \in [0,1]$. Households and firms over the [0,n) interval are located in the home country, whereas the rest [n,1] are located in the foreign country. In the description of the model, if the equations are symmetric across countries, we present only domestic ones.

A two-country model implies that there is no third country (or the rest of the world) so that some relevant transmission channels are absent. First, the trade diversion effect of a trade agreement, which Cheong et al. (2015) find important, is absent. This implies that the welfare effect may be overestimated in a two-country model. Second, Li et al. (2016) show that regional trade agreements benefit member countries, in terms of output and trade, while non-member countries typically lose. In the context of TTIP, Felbermayr et al. (2015b) find that the effects on non-TTIP countries' output is on average negative due to the negative trade diversion effect. On the other hand, Francois et al. (2013) find that the effects of TTIP on the rest of the world is positive because the positive trade creation effect outweighs the negative trade diversion effect.

2.1. Households

The domestic household's lifetime utility is given by

$$U_t = \sum_{s=t}^{\infty} \beta^{s-t} \left[\log C_s + \frac{\chi}{1-\varepsilon} \left(\frac{M_s}{P_s(\tau)} \right)^{1-\varepsilon} - \frac{l_s(z)^{1+1/\nu}}{1+1/\nu} \right]. \tag{1}$$

In this equation $0<\beta<1$ is the discount factor, C_t is a consumption index to be defined below, χ is a positive parameter, M_t is nominal money balances, $\varepsilon>0$ is the inverse of the consumption elasticity of money demand, $P_s(\tau)$ is the consumption price index, $l_t(z)$ is the household's labor supply, and ν *is* the Frisch elasticity of labor supply. The expression $P(\tau)$ denotes the fact that the price index is a function of the trade barriers, which we denote as τ. They are the sum of a tariff (τ_t^t) and NTMs (τ_t^{NTM}): $\tau_t = \tau_t^T + \tau_t^{NTM}$. Price indexes and the effect of trade barriers on them are shown below.

The overall consumption index is given by[3]

$$C_t = \left[\kappa^{\frac{1}{\rho}} \left(C_t^h \right)^{\frac{\rho-1}{\rho}} + (1-\kappa)^{\frac{1}{\rho}} \left(C_t^f \right)^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}}, \tag{2}$$

where C_t^h and C_t^f represents the consumption of domestic and foreign goods, respectively, and $\rho > 0$ is the cross-country substitutability (the elasticity of substitution between domestic and foreign goods). $\kappa \equiv n\alpha$ $(0<\kappa<1)$ denotes the share of domestic goods in the consumption basket, which depends on the relative size of the home country (n) and the degree of home bias in consumption ($\alpha > 1$). C_t^h and C_t^f are aggregates of domestic and foreign goods,

$$C_t^h = \left[n^{-\frac{1}{\theta}} \int_0^n c_t^h(z)^{\frac{\theta-1}{\theta}} dz \right]^{\frac{\theta}{\theta-1}} \tag{3}$$

$$C_t^f = \left[(1-n)^{-\frac{1}{\theta}} \int_n^1 c_t^f(z)^{\frac{\theta-1}{\theta}} dz \right]^{\frac{\theta}{\theta-1}}, \tag{4}$$

where $c_t^h(z)$ and $c_t^f(z)$ are the respective consumption levels of differentiated domestic and foreign good z by the domestic household, and $\theta > 1$

[2] The use of a two-country model implies that we ignore the effects on third countries. Li et al. (2016) show that regional trade agreements benefit member countries, in terms of output and trade, while non-member countries typically lose.

[3] The foreign consumption index is $C_t^* = \left[\kappa^{*\frac{1}{\rho}} \left(C_t^{*h} \right)^{\frac{\rho-1}{\rho}} + (1-\kappa^*)^{\frac{1}{\rho}} \left(C_t^{*f} \right)^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}}$, where asterisks indicate consumption by the foreign household. $\kappa^* \equiv n\alpha^* (0<\kappa^*<1)$ denotes the share of domestic goods in the foreign consumption basket. Home bias requires $\alpha^* < 1$.