



## The effects of multinationals on host economies: A CGE approach

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### ABSTRACT

This paper offers a new perspective regarding the effects on a host economy of the entry of multinational enterprises (MNEs). We use a computable general equilibrium (CGE) approach, through a version of the Global Trade Analysis Project (GTAP) model extended to incorporate MNEs. The analysis is applied to the Czech Republic, a country that has received substantial inflows of foreign direct investment in the last few years. A special attention has been paid to the issue of profit repatriation. We find that the negative effects of profit repatriation are sizeable, and might even offset the positive impact of the entry of MNEs.

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### 1. Introduction

The effects of the multinational enterprises (MNEs) on host economies are the subject of much controversy. But, despite being a much debated topic in the media, most applied trade analyses have not considered the presence of MNEs, due to both data constraints and the theoretical complexities related to the modelling of MNEs (Markusen, 2002).

Until very recently, the study of the effects of MNEs on host countries has been based mainly on either partial equilibrium econometric techniques or descriptive studies; see Latorre (2008) for a review. Although still providing helpful results, these studies constitute a body of research mostly fragmented into separate parts, according to the particular effect analyzed. The use of a general equilibrium approach, instead, will allow one to concentrate on a set of effects arising from the presence of MNEs, and derive their economy-wide impact (on factor and commodity markets, trade flows, and so on) in a unified setting. More specifically, in this paper we will follow a computable general equilibrium (CGE) approach, which incorporates real data into a robust theoretical framework, namely, the Arrow-Debreu general equilibrium model. As an extension of this model, we will be able to present the interactions among economic agents as a system of equations derived from microeconomic optimization theory

(Shoven and Whalley, 1992), where these microeconomic optimization decisions are embedded into the National Accounts identities. Thus, the potential of CGE models lies in their ability to integrate micro and macro elements (Devarajan and Robinson, 2005). As an additional advantage, CGE modelling allows the evaluation of consumers' welfare, "one issue that is missing from the discussion of effects of foreign direct investment" (Lipse, 2002, p. 60).

Studies of MNEs and foreign direct investment (FDI) within CGE models are scarce in the literature, though. Petri's (1997) paper is, to the best of our knowledge, the first CGE model incorporating FDI, and is concerned with the effects of FDI liberalization (i.e., the lowering or removal of barriers to FDI). This author analyzes MNEs in a 3-sector, 6-region, perfect competition setting, where FDI flows are allocated endogenously in the model responding to the fall in investment barriers. The results show that welfare increases in the Asia-Pacific Economic Cooperation (APEC) area, where FDI liberalisation takes place, but decreases in the rest of the world.

Following Petri's pioneering work, a research team in Australia's Productivity Commission developed a CGE model of FDI with different levels of sectoral disaggregating; see Verikios and Zhang (2001) and Dee et al. (2003). This model adopts large-group monopolistic competition within a Dixit-Stiglitz framework; however, as noticed by the authors, this feature does not seem to be important for their results. One reason for this may be the assumption of symmetry across all kind of firms, which does not allow discriminating between MNEs and national firms' different technologies; the latter, however, makes up a central feature of the present paper (see below). The authors

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analyse the impact of FDI liberalisation in the telecommunications and financial services sectors, which results in a reallocation of the world capital stock. Developed regions, which had lower levels of protection, lose capital which accrues to developing regions. While all regions gain from liberalisation, the gains in the developing areas are higher.

The paper by Jensen et al. (2007) also introduces FDI in order to analyze the impact of Russian accession to the World Trade Organization (WTO). They derive the effects of a trade and FDI liberalization in services sectors by means of a monopolistic competition, 35-sector, Dixit-Stiglitz setting. By assuming that MNEs produce using both domestic and imported inputs, unlike national firms that only use domestically produced inputs, this paper means an important step forward in order to model MNEs as a “peculiar” type of firm, technologically differentiated from domestic firms. The authors obtain that the fall in barriers to MNEs in Russia increases their profitability in that region, which results in an increase in the number of MNEs operating in Russia. A liberalisation of FDI barriers is estimated to increase Russian consumption by 5.2%, which would amount to 70% of the total gains to Russia from WTO accession. However, since their focus is on the presence of MNEs in services sectors, they do not consider their impact in other sectors of the economy. Furthermore, as they simulate a reduction in FDI barriers in all services sectors simultaneously, they do not derive any differential effect across the various services sectors. Our approach, however, will be different since we are interested in analyzing the differential impact of the MNEs activities across sectors, both manufacturing and services. Rutherford and Tarr (2008) is a variant of the model in Jensen et al. (2007), where it is shown that WTO accession would be beneficial for 99.9% of the households.

A first attempt of incorporating dynamics together with FDI in a CGE framework is Bchir et al. (2002). Note that these authors include FDI in a framework where MNEs are absent, i.e., FDI is modelled as mere capital flows crossing borders in response to different rates of return. Again, all firms are symmetric and there is no technological differentiation between MNEs and domestic firms. They simulate the impact of trade liberalisation between the European Union and its periphery, where the presence of FDI flows is a source of gains for the periphery. There is an increase in capital profitability in that region due to trade liberalisation, which attracts FDI flows, and, in turn, increases the number of firms (and product varieties), as well as wages for both skilled and unskilled workers. GDP and, to a lesser extent, welfare, increase compared to the results in which FDI flows are absent.

Unlike most of the above models, which explore the role of FDI liberalisation across large areas, our aim in this paper will be analysing the effects of the entry of MNEs on a particular (and small) host economy. To this end, we will make use of a well-known and widely-used CGE model, namely, the Global Trade Analysis Project (GTAP) model (Hertel, 1997; Rutherford, 2005), extended to incorporate MNEs. GTAP is a global network of researchers conducting quantitative analysis of international policy issues, by way of a unique dataset for the world economy, the GTAP Data Base version 6 (Dimaranan, 2007). Notice that, since the GTAP model is continuously used and checked by many CGE modellers around the world, this provides a rich empirical literature making up a framework in which results can be better analyzed. Furthermore, the model is able to accommodate a number of possible extensions, already undertaken in the existing literature (trade liberalization, changes in taxation, and so on). Also, the GTAP model allows for different levels of regional and sectoral disaggregating, and is flexible enough to incorporate publicly available data on the activities of MNEs for several countries (OECD, 2005). This contrasts with most of the models above, which rely to an important extent on datasets originated in the activities of particular research teams. Finally, it is also important to notice that, since CGE models have been criticized for having weak econometric foundations and performing poorly in some cases (see, e.g., Jorgenson, 1984), the latest

version of GTAP incorporates a more careful econometric estimation of trade elasticities. The methodology behind these estimates is presented in Hertel et al. (2007).

A central feature of the approach in this paper is that, unlike previous CGE models, we do not simulate the impact of MNEs through a reduction of the (estimated) barriers to FDI. While being crucial to properly derive the effects of MNEs, an accurate estimation of these barriers to FDI proves to be a very difficult task, so assessing the impact of FDI through this procedure may introduce biases into the analysis. Our approach will be based instead on the assumption that FDI inflows lead to an increase in the capital stock of the host economy (i.e., FDI is of a greenfield type). Notice that the idea of MNEs leading to an inflow of capital, instead of a mere change in ownership resulting from mergers or acquisitions, proves to be particularly appropriate in the case of transition economies (as will be the case analyzed in this paper), at least for three reasons. First, because the weight of greenfield investment among FDI flows is larger than for developed countries (Schöllmann, 2001). The second reason lies in the evidence on large amounts of obsolete capital stocks (Bornstein, 2001; Lizal and Svegnar, 2002) so that even the flows linked to acquisitions need to replace the existing capital stocks and are, consequently, linked to an increase in capital. Third, it has been found, in the case of the Czech Republic, that foreign investors exhibit the highest propensities to invest in gross capital formation (Lizal and Svegnar, 2002).

More specifically, we will simulate an increase in the capital stock of the MNEs operating in the host economy, which will be assumed to have a different production technology vis-à-vis its national competitors. This distinction between domestic firms and MNEs' technology is in accordance with the idea that MNEs are a peculiar type of firm since, as emphasized in the literature, they have a “very distinctive bundle of capacities” (Barba Navaretti and Venables, 2004, p. 278), “proprietary assets” (Caves, 2007), “ownership advantages” (Dunning, 1977, 2000) or higher productivity levels (Markusen, 1995; Helpman, 2006).

On the other hand, FDI inflows may have very different impacts depending on the sector to which they are addressed (see, e.g., Smarzynska, 2004; or Barba Navaretti and Venables, 2004). Hence, the simulations will be performed in five particular sectors of the host economy under study, including both manufacturing and services activities. Then, the differential impact across the rest of sectors of an increase in the capital stock of each of the above sectors will be analyzed, where the disaggregating level is 20 sectors.

A special attention is also paid to a mostly neglected aspect of the impact of MNEs, namely, profit repatriation. Data from the UNCTAD's 2006 *World Investment Report* suggest that, since the mid-1990s, MNEs tend to repatriate more than 50% of the total income they generate. Despite its relevance for MNEs activities, to the best of our knowledge, no study has offered a thorough quantitative analysis of the general equilibrium impact that profit repatriation may have on the host economies, and the results from our simulations indicate that such effect may be quite relevant indeed. In particular, we will evaluate the effects on the main variables according to the relative amount of profit repatriation, from zero to 100%, which will allow us to find a threshold value where the sign of the results is reversed.

Finally, the empirical analysis is applied to the case of the Czech Republic, a country that has received substantial FDI inflows in the last few years, being for a long time the top recipient of FDI flows when measured in per capita terms in Central and Eastern Europe. In addition, this country provides the most comprehensive dataset on FDI and MNEs among transition economies. It is important to note, however, that our extension of the GTAP model is able to be applied to the analysis of MNEs in other countries, since it makes use of publicly available data on the MNEs' activities.

The rest of the paper is organized as follows. A description of the model is provided in Section 2. The data and the simulations

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