

# **GTAP related activities of CPB Netherlands Bureau for Economic Policy Analysis 2006/2007**

Paul Veenendaal (P.J.J.Veenendaal@cpb.nl)

## ***Introduction***

Below you find a summary of our GTAP-related activities since the 2006 GTAP Board Meeting and our projects for 2007, see also our website: <http://www.cpb.nl/eng/research/sector6/>.

We continued to be active with modelling and software efforts, data work, GTAP-related projects and publications and with maintaining and extending our network.

We published studies on the impacts of globalisation (CPB Document 127) and the modelling of FDI in services (CPB DP 80), on the optimal timing of greenhouse gas emission reductions (TAXBEN Deliverable 14) and post-2012 climate policy scenarios (TAXBEN Deliverable 23b and MNP Report 500114005/2007), and on the interactions of the EU Emissions Trading Scheme with existing energy taxes (TAXBEN Deliverable 20b). Moreover, we presented data issues on services trade, bilateral FDI stocks and energy taxation (CPB Memoranda 160, 164 and 174), a literature review on modelling FDI in applied general equilibrium models (CPB memorandum 169) and alternative statistical approaches to the treatment of reporting discrepancies in bilateral data (CPB Memorandum 179).

Our data work activities did include

- Improvement of bilateral services trade data within GTAP. We have improved the GTAP data on bilateral services trade. Based on the Eurostat/OECD data on “transactions in international services by partner country”, we have introduced for the OECD countries detailed bilateral trade flows in services. We have delivered detailed services trade data to the GTAP Centre for inclusion in GTAP data release 7.

Our planned work for 2007 includes contributions to the EU Models project, especially in the field of targeting employment. Moreover, we will again contribute to the 2007 Competitiveness Report with analyses of policy spill-overs, the future of manufacturing and the biofuel potential. The next few years WorldScan will be used extensively for analysing productivity issues, the EU Lisbon strategies and climate-change policies.

## ***GTAP related publications 2006/2007:***

**Suyker, W. and H. de Groot eds. (2006), China and the Dutch Economy; Stylised facts and prospects, [CPB Document 127](#)**

China's spectacular economic performance over the past few decades has had a positive net impact on the Dutch economy. Imports of cheap Chinese products have lowered Dutch inflation. Increasing Chinese exports to Europe have strengthened the role of the Netherlands as a key European distribution centre. Strongly increasing Chinese exports did not have a noticeable impact on the pace of restructuring in the Netherlands. Nor did this development lead to higher unemployment or did it cause a marked widening of Dutch income differentials. Concerning competition on world markets, Chinese export products are more complements than substitutes for Dutch export products. The Chinese economy is expected to continue its rapid expansion. Over the next five years, Chinese exports are likely to double. Increasing trade with China will continue and is expected to enhance Dutch welfare in the upcoming years and will continue to be associated with modest increases in competition and continued restructuring on some markets.

**Lejour, A., H. Rojas-Romagoza and G. Verweij (2007), Opening Services Markets within Europe; Modelling Foreign Establishments in a CGE Framework, [CPB Discussion Paper 80](#)**

In services, the activities of foreign affiliates often exceed the value of cross-border trade. A complete analysis of services liberalisation therefore requires the modelling of FDI. This paper presents the treatment of FDI in our CGE model WorldScan based on the ideas of Petri (1997) and Markusen (2002). They assume that firms establishing affiliates abroad also transfer firm-specific knowledge. Consequently, capital and products differ from existing capital and products in the host country. As an illustration, we apply this model to assess the proposals of the European Commission to open up services markets. FDI in services could increase by 20% to 35%. However, the overall economic impact is limited. Our assessment suggests that GDP in the EU25 could increase up to 0.4%. These effects could be up to 0.8% higher if foreign capital also increases the overall productivity of the services sector.

**Böhringer, C., S. Boeters and U. Moslener (2006), Efficient and Transitional Climate Policies; A Combined Analysis Using PACE and WorldScan, [TAXBEN Deliverable 14](#)**

A key challenge for climate policy makers is to provide a politically feasible way leading from the status-quo to an efficient policy in the medium and longer run. A prerequisite to the conscious design of such transitional policies is the consistent measurement of the excess costs associated with alternative policy proposals compared to a hypothetical first-best outcome. We provide such an assessment of relative efficiency costs (PACE) together with a regional and sectoral breakdown of the results (WorldScan). Our policy simulations indicate that short-term transitional policies giving up on environmental effectiveness for the sake of political feasibility may induce substantial excess costs in the long run even if countries may agree on efficient strategies at some later stage. The prospects for resolving the burden sharing debate implicit to the climate policy problem may thus drastically decline, because total costs increase with lax transition scenarios.

**Boeters, S. and G. Verweij (2006), Post-2012 Climate Policies, [Taxben Deliverable 23b](#)**

After the decision of the United States and Australia not to ratify the Kyoto Protocol, the process of an internationally coordinated climate policy seems to be deeply stuck. In this situation, climate policy research can contribute by pointing out possible further steps and analysing their consequences. We contribute to this discussion by sketching a climate policy scenario for the period 2012-2020, building on the CPB-RIVM study of Bollen et al. (2005). We take the already existing climate change policies as a starting point and extend them where we consider this as politically feasible. The long-term 2°C objective is at the background of our discussion, but not directly used for deriving a set of emission restrictions. There are three important building blocks of our post-2012 scenario: The Annex-B countries, excluding the United States, form an abatement coalition in the form of a cap-and-trade system. The United States commit themselves to moderate emission targets, but not partake in the trading system. Non Annex-B regions contribute in the form of a system of Clean Development Mechanism (CDM) projects. As a variant we also consider the case where the US joins the permit trading club.

**Veenendaal, P.J.J. (2006), The EU-ETS and Existing Energy Taxes, [TAXBEN Deliverable 20b](#)**

Imposing emission ceilings with freely tradable permits is an efficient way of meeting climate change objectives in an undistorted world. However, the efficiency of such a system is reduced because of the many distortions that are pre-existing. Of these we focus on existing energy taxes within EU-member states. These taxes differ widely, by energy carrier, by user and by member state. Making use of the global general equilibrium model WorldScan, we assess the efficiency gains associated with tax reforms that bring energy taxes more in line with the objective of abating global warming. Moreover, the overall efficiency of the EU system aiming at emissions reduction is also assessed vis-à-vis a cap-and-trade system that covers the complete economy. Finally, we show the additional benefits of specific forms of revenue recycling when permits are auctioned over and above recycling in a lump-sum fashion.

**Boeters, S., M.G.J. den Elzen, A.J.G. Manders, P.J.J. Veenendaal and G. Verweij (2007) , Post-2012 Climate Policy Scenarios, [MNP Report 500114005/2007](#)**

Many uncertainties are involved in the shaping of post-2012 climate policies. Of these we focus on the uncertainties with respect to the climate policies that may be implemented in other countries. These are predominantly important in the climate policy discussion as the policy question is a global one, whence national policy options crucially depend on the policy efforts of other countries. With four alternative scenarios we sketch possible, alternative developments in the climate policy domain. These four scenarios are characterised by two dimensions: the sense of urgency expressed by the policy goal, and the willingness to resolve the climate problem through concerted action. Together these provide a background that is thought to be relevant for identifying the best mitigation options to reduce future greenhouse gas emissions, both in the Netherlands and the EU, in alternative future states of the climate policy domain. The analysis shows that only if all major countries become actively involved in emissions abatement before 2020, the substantial long-term greenhouse gas emissions reductions can be achieved that are needed to meet the EU climate target of limiting the global temperature increase to 2°C in this century. If coalitions become smaller and reduction targets less binding,

the costs to coalition members and the environmental ineffectiveness tend to increase.

**Leeuwen, N. van, and A. Lejour (2006), Bilateral Services Trade Data and the GTAP database, [CPB Memorandum 160](#)**

This paper has two aims. The first is a description of CPB's method to modify the GTAP data base, version 6 with bilateral services trade data. The source for constructing bilateral flows in this paper is a recent comprehensive database from the OECD which was established in cooperation with Eurostat, based on the concepts and framework of trade in services set out by the IMF in their balance of payments statistics. We manage to cover flows between 24 OECD countries and four sectors, which equals approximately 75% of the total flows of services world trade in 2001. On the other hand however, it doesn't cover all GTAP services sectors. The second is our proposal to contribute (updated) bilateral services trade data to the GTAP database, version 7, base year 2004. These data will include 24 reporting OECD countries with 24 to 55 partner countries for 10 services sectors.

**Leeuwen, N. van, and A. Lejour (2006), Bilateral FDI Stocks by sector, [CPB Memorandum 164](#)**

This paper describes the procedure to obtain a consistent data set of Foreign Direct Investments Stocks in 2001 for nearly all EU countries and for 10 sectors of economic activity. Our point of departure are the reported inwards FDI stocks by partner country of the OECD. Then a data set of total outward- en inward stocks by country are constructed by using observations or estimations. Assumptions are made to determine to the total outward en inward stock per sector and country to and from the world, where after the rest of world by sector is determined as a residual. Given these targets an estimation procedure has been developed to calculate the bilateral stocks per sector between the countries / regions.

**Lejour, A. and H. Rojas-Romagosa, (2006), Foreign Direct Investment in Applied General Equilibrium Models, Overview of the Literature, [CPB Memorandum 169](#)**

Global applied general equilibrium (AGE) models focus on the interactions between regional product markets. Many of these models are developed to represent trade flows and evaluate trade policies. Foreign direct investment (FDI) and foreign commercial presence are ignored in most of them, although sales by foreign affiliates sometimes exceed the value of trade flows. This paper gives an overview of the scarce literature on modelling FDI in AGE models. Modelling options, data availability and simulation results are reviewed. Some conclusions are drawn for future work.

**Leeuwen, N. van (2006), Tax rates on energy usage; an adjustment of the GTAP-6 rates, [CPB Memorandum 174](#)**

The tax rates of deliveries of energy products to industry and households in the GTAP-6 database are in some countries for the year 2001 rather different from the ones reported by the

International Energy Agency (IEA). Especially the rates for deliveries to industry seem to be too high. This paper shows the rates derived from IEA with observations from Energy Prices and Taxes statistics and documents a new dataset with adjusted tax rates. Comparison with the GTAP-6 database reveals some striking differences. The rates are further adjusted for petroleum and coal products after comparing the implied taxes calculated as a percentage of GDP with the OECD Revenue Statistics. For other energy carriers we have not corrected the rates any further

**Cate, A. ten, (2007), Modelling the reporting discrepancies in bilateral data, [CPB Memorandum 179](#)**

This paper is about the discrepancies in reported bilateral statistical data ("mirror data"). For example the trade from country A to country B is not reported the same in the two countries. The discrepancies are used to estimate the accuracy of the reporters. The estimated accuracies are to be used to compute optimal combinations of mirror data. Two models of the discrepancies are presented: (a) unbiased reporting with inaccurate reporters having a large variance, and (b) biased reporting with inaccurate reporters having a large bias (either positive or negative). Estimation methods are least squares regression and maximum likelihood. A numerical illustration is given, using data of the international trade in services. It is shown how to judge the two models empirically.

***GTAP-related planned work 2007:***

**The Lisbon employment targets (EC Models tender)**

CPB participates in the consortium for the European Commission's Models tender. Within this framework we are applying and extending WorldScan for policy analyses on behalf of the European Commission. At the moment two projects are on the agenda, but this may change after consultations with the Commission.

- *Productivity of additional employment*

If Europeans were to work as many hours as the Americans, what would be the implications for our productivity? The additional work would be carried out by people who are currently unemployed, do not participate fully in the labour market or have retired early. All kinds of indicators show that the low-skilled constitute a relatively large proportion of these groups. The low-skilled are often less productive in economic terms. What would be the implications if they worked more and/or longer? Would average productivity per worker suffer?

- *Analysis of the employment target*

The Lisbon target for EU labour market participation is 70% by 2010. Leaving aside the specific character of this target, this project examines the possible policy measures to reduce unemployment and raise labour market participation in the EU. How do these measures relate to preferences for work and leisure? The demographic segment in WorldScan shows that achieving the Lisbon target will require a substantial increase in the participation rates of several age and gender cohorts. The European Outlook 2005 showed that Europeans work significantly fewer hours than Americans. A number of reasons account for this: personal and social preferences, labour market institutions, social security schemes etc. If the labour market participation rate cannot be directed towards 70%, then would an increase in the number of working hours per worker be an option? This study will start with an extension of the labour market segment in WorldScan.

### **International spillovers of domestic reforms**

Most European countries want to reform their labour and product markets. Are there advantages and benefits to countries reforming their economies together? For instance, do reforms in large European countries have an impact on other countries, say through terms-of-trade effects or knowledge spill-overs? This study sets out the effects of the achievement of the Lisbon targets in selected EU member states on other member states. This project is a contribution to the European Competitiveness Report 2007.

### **The future of European manufacturing**

The future of European manufacturing is uncertain. The emergence of Asia, growing specialisation, the growing demand for services and high-skilled workers are factors which will influence the future of manufacturing. This project aims to identify, on the basis of a literature review, the key developments for manufacturing. Then it will develop and quantify two scenarios. And finally, it will analyse the effects of policies on the future potential of manufacturing. This project is a contribution to the European Competitiveness Report 2007.

### **Climate change and biofuels**

The European Emission Trading Scheme (ETS) puts a price on CO<sub>2</sub> emissions. If emission prices are high enough, there will be an incentive to develop new emission-reducing technologies. The level of the emission price also provides a reference point for the evaluation of alternative policy measures, as laid down in EU directives, for instance. The key point here is to distinguish between policy measures which influence the emission price directly, such as the subsidised expansion of electricity generation from renewable sources, and those which do not, such as the stimulation of the use of biomass in sectors which fall outside the emission-trading scheme. Promoting the use of biofuels in the transport sector will not undermine the level of the emission price. But such a policy may still be relatively expensive compared to the alternatives, such as raising fossil fuel duties or buying emission reductions from outside the EU (through the Clean Development Mechanism of Joint Implementation). As part of this project, we will analyse the potential for biofuels on the basis of a modified variant of the climate version of WorldScan. This potential will be evaluated for the Kyoto period and for the longer term in terms of its prosperity effects at member state level and in terms of its cost-effectiveness in comparison with other policy options. This project is a contribution to the European Competitiveness Report 2007.

### **Productivity differences and the dynamic effects of trade**

The volume of exports and outward foreign direct investment relate to the productivity distribution among businesses. In 2006 we studied the most relevant literature on the heterogeneity of businesses. In 2007 we want to draw lessons from recent (and still ongoing) work in this area for model-based research. In particular, we want to explore how the modelling of international relations in WorldScan can be improved by taking explicit account of productivity differences of firms within an industry.

### **Consolidation of WorldScan's infrastructure**

Since the delivery of the core version of WorldScan in GAMS to the European Commission's DG Enterprise, the climate version of WorldScan has also been converted to GAMS. Its use in subprojects of the EU TAXBEN project (WP5) and the Interdepartmental Policy Research Group on Future Climate Policy has generated a number of robust and distinct model variants in GAMS. Even so, important model versions or components have not yet been converted to GAMS (including the modelling of research and development spill-overs and foreign direct investment, and the data processing required for the model input into specific classifications of countries and industries). This consolidation project is aimed at integrating the various versions of GAMS, restructuring them, and adding the most important elements that are still missing, in order to enhance the model's efficiency