



Book of Abstracts

**WIOD Conference: Industry-Level
Analyses of Globalization and its
Consequences
Vienna, May 26-28, 2010**

Day 2

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Session: Session 5A (Parallel)
Date: Thursday, May 27
Time: 9:30-11:00
Location: Hall 1

The Choice of Type of Input-Output Table Revisited: Moving towards the Use of Supply-Use Tables in Impact Analysis

Jose Manuel Rueda-Cantuche & Joerg Beutel

Abstract:

The construction of symmetric input-output tables (SIOTs) is a controversial issue as regard the choice of model to construct both product by product and industry by industry SIOTs, especially the former ones. However, there has been so far little attention paid by the UN and the Eurostat systems of national accounts on the choice of type of SIOT to carry out impact analyses let alone other input-output applications.

In empirical research, the type of SIOT that shall fit best for economic analyses will depend on its objective. Particularly in impact analyses, questions like what fuel price effects would generate an increase in the labour costs of the electricity industry cannot really be answered by input-output price models as it is generally thought. Moreover, this is even independently of the type of SIOT used. Either one assumes that changes in primary costs (labour) occur in homogeneous branches rather than in industries and therefore uses product tables or one assumes that the price changes of primary factors effectively occur in industries and thus, uses industry tables. Nonetheless, in the latter case the corresponding reported price effects will be those of the fuel industry rather than those of the fuel product itself. As regard input-output quantity models there is also a trade-off related to environment, employment... or any economic dimension for which data are mainly available on an industry basis.

The main shortcoming underlying these two major trade-offs is related to the symmetry of the SIOTs. They are defined as either product by product or industry by industry type. To solve this issue efficiently, supply and use tables are clearly the best choice since they are defined on a product by industry basis rather than solely on a product or industry basis.

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An Empirical Evaluation of Methods to Estimate Use Tables with Imports Only

Bart Los

Abstract:

Nowadays, national input-output tables are usually constructed by combining supply and use tables. If this "best practice" is adopted for the construction of international input-output tables, a first necessary step is to separate use of imports from use of domestically produced products. Since most national statistical agencies do not provide such pairs of use tables at an annual basis, time series of both tables have to be estimated. In this paper, we will introduce and evaluate some methods that could be used for this purpose. Since the availability of benchmark data varies quite a bit over countries, three situations will be taken as a starting point: 1. only a column of imports per product is available in the supply tables; 2. one or more symmetric input-output tables (of the commodity-by-commodity type) are available; 3. one or more benchmark use tables with imports only are at the disposition of the researcher. For each of these situations, a limited number of estimation methods will be proposed. By comparing the performance of the best method for each situation, conclusions can be drawn about the relative reliability of estimates obtained in situations characterized by limited availability of benchmark data.

The relative performance of the methods is evaluated for a number of (heterogeneous) countries for which situation 3 is the actual situation, but for which the other situations can be mimicked. By comparing the estimates with the "true" values contained in the available tables, we obtain indications of the margins of error of the evaluated methods.

Session: Session 5B (Parallel)
Date: Thursday, May 27
Time: 9:30-11:00
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Need for Speed:
The Role of Timeliness in the Trade Effect of EU Accession
Cecilia Hornok

Abstract:

Timeliness has gained growing importance in international trade due to the fragmentation of production and the increasing use of just-in-time logistics. By eliminating the need for customs administration and the customs clearance procedure at national borders, the enlargement of the EU in 2004 can be considered as a large-scale experiment that improved the timeliness in European trade. This paper uses a difference-in-difference econometric strategy to uncover the role of improved timeliness in the EU's effect on trade by applying a new measure for industry-specific trade barriers that was introduced by Novy (2008). The elimination of each additional border is estimated to act like a 2% reduction in ad valorem tariffs. Saving an hour waiting at an inland border has a 0.4% ad valorem equivalent effect. The decline in trade barriers was larger, of the works quality the customs administration was in terms of efficiency and bribery. As expected, trade via inland transportation was affected the most, while improved timeliness seems to have played no role in trade via maritime transport. Finally, findings on whether the decline in barriers was larger in more time-sensitive industries (based on the estimates of Hummels (2001b)) are less conclusive.

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Measuring the Costs of Trading Services Internationally

Sebastien Miroudot, Jehan Sauvage & Ben Shepherd

Abstract:

This paper presents data and preliminary results from an ongoing research project on trade costs in services. Bilateral trade costs are calculated on the basis of a micro-founded measure proposed by Novy (2009) that infers trade frictions from observable trade and output data. The dataset covers 64 countries and 29 industries over the period 1995-2007, matching OECD and UN bilateral trade statistics for goods and services with OECD Input-Output tables, the OECD STAN database, EU Klems and national sources. Preliminary evidence suggests that trade costs in services sectors are generally much higher than in goods. However, they are also subject to considerable heterogeneity across sectors and countries. The same observation applies to changes in trade costs over time. In addition, the paper investigates econometrically the impact of regional trade agreements (RTAs) on trade costs and the relationship between decreasing trade costs and productivity gains at the industry level. There is evidence that services provisions in RTAs play a positive role in reducing trade costs for services. Mixed results are obtained regarding the impact of trade costs on productivity in services industries.

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Regional Trade Liberalization in Developing Countries and Production-Shifting Effect: Evidence from South-East Asia

Walliya Premchit

Abstract:

This paper analyses the impact of preferential trading agreement in South-East Asia on its spatial distribution of economic activity as consequence of increasing regional trade liberalization. The study focuses on changes in industrial geography of five countries participating in ASEAN Free trade Area (Indonesia, Malaysia, Philippines, Singapore and Thailand) and their major trading partners from European and Asia-Pacific regions (France, Germany, United Kingdom, United States, Japan and China, to name some). I question whether the formation of AFTA favours production-shifting of manufacturing industries causing their delocation from partner countries outside the bloc to agglomeration inside newly enlarged market.

To study this question, I test for the existence of the home-market effect or HME which refers to tendency of industries with increasing returns to concentrate production activity in their large markets. I first calculate HME by using the multi-region HME model of Behrens et al. (2005, 2009) to compute HME indicator for each manufacturing industry. Then, non-parametric sign test and rank test are applied to these indicators to test for industry-level HME existence. The reason to use sign test is to check for predictive power of the HME model, while rank test confirms HME display if the countries ranking of industrial density conform the ranking of relative market sizes. Required data are industry-level bilateral trade flows and output which are available in the Trade and Production dataset developed at the CEPII.

We consider production-shifting of an industry into ASEAN bloc when that industry exhibits the HME and that ASEAN countries are endowed with relatively large market sizes in that industrial goods. Results from this research offer useful suggestions for policy makers from middle-income developing countries in wake of increasing liberalization trend. Indeed, if we observe the HME in an industry, countries with relatively small market size can improve its industrial attractiveness by means of industrial strategies and structural policy. The paper concludes with discussion of these policies.

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Energy and Environment in the WIOD System of Satellite Accounts

Frederik Neuwahl, Aurelien Genty, Alejandro Villenueva & Kurt Kratena

Abstract:

This paper reports on the compilation of the system of energy and environmental satellite accounts in the World Input-Output Database (WIOD, project financed under the 7th European Framework Programme for RTD). These satellite accounts cover the input of 20+ individual energy commodities; the main air emissions relevant for global warming potential, acidification, tropospheric ozone depletion and local pollution; land use; water use; extraction of abiotic resources. In order to bolster the usability of the database in energy-economic modelling, air emissions by industrial sector are derived by an energy first approach; this specification, combined with WIOD's time-series and multi-country setting, will allow new analyses of the interactions of the economy with the physical environment.

The paper presents the results of the first year of work of the WIOD project, resulting in a first complete version of the energy environmental satellite database. We describe the approach adopted for the estimation procedures starting from extended energy balances and energy prices of the IEA, supply and use tables from national accounts, UNFCCC greenhouse gas inventories, and tourism and transport data. Finally, we discuss key empirical and methodological issues such as the bridging between national accounts and energy statistics.

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The Economic Impact of the Green Certificate Market through the Macro Multiplier Approach

Rosita Pretaroli, Maurizio Ciaschini, Francesca Severini & Claudio Socci

Abstract:

In the last decade, European countries adopted several reforms in order to increase the use of Renewable Energy Sources (RES) in electricity production and aiming to reach environmental benefits deriving from the substitution of fossil fuel in electricity production. The major market-based policy used to restore economic efficiency in presence of externalities, such as environmental damages deriving from the production of electricity from fossil fuel, is represented by the Green Certificates market. It represents a mechanism where a quota of renewable electricity is imposed to suppliers in proportion to their sales. To meet this condition, suppliers can produce the quantity of renewable electricity switching their production process to new technologies otherwise they can buy a number of certificates corresponding to the quotas. This mechanism modified the role of energy sectors in promoting the preservation of climate and in the economy as a whole. In fact, both the possibility to reduce CO₂ emissions indirectly from the production of “green electricity” and the increasing investments on renewable energy technologies may lead to a positive change of total output. For this purpose, the paper aims to quantify the economic impact of policy of reform on Green Certificate market for the Italian system by means of the Macro Multiplier (MM) approach. First we constructed a Hybrid Input-Output (I-O) model that allows expressing the energy flows in physical terms measured in energy units (GWh) while all other flows are expressed in monetary terms, and then, through the singular value decomposition of the inverse matrix of the model, we identify all the key structures of the exogenous change of final demand. In this set of key structures we can choose the appropriate key structure of the exogenous variable both to obtain the expected positive total output change and the increase of electricity production from RES.

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Cross-Country Energy Intensity Developments at a Detailed Sector Level: linking EU KLEMS with IEA Energy Data

Peter Mulder & Henri de Groot

Abstract:

This paper provides an internationally comparable assessment of energy intensity developments for 19 OECD countries and 51 sectors over the period 1980-2005. Particularly innovative is our evaluation of energy intensity developments in a wide range of service sectors. The analysis is based on a new dataset that links the recently launched EU KLEMS database with energy data published by the International Energy Agency (IEA). Our analysis includes the following components. First, we document per sector and per country the evolution of energy intensity and its components – energy use and value added. Second, we calculate per sector and per country annualized growth rates of energy intensity. Third, by means of a decomposition-analysis we calculate per country to what extent aggregate energy intensity trends are to be explained from, respectively, shifts in the underlying sector structure (structure effect) and efficiency improvements within individual sectors (efficiency effect); we also examine the role of individual sectors in driving the aggregate structure and efficiency effects. Fourth, we compare energy intensity levels in various countries over time and explore whether these levels converge across countries. Finally, we identify issues and areas of research within the field of energy economics where the EU KLEMS database may be fruitfully applied in the near future.

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The GTAP 7.1 Data Base: How the EU IO Tables were Incorporated

Terrie Walmsley

Abstract:

The GTAP 7 Data Base is the seventh major public release of the GTAP Data Base since the Project began in 1993. A GTAP Data Base cycle typically begins with updating of the data base to a new reference year – 2004 for GTAP 7. The domestic data bases or input- output (I- O) tables are combined with international datasets on macroeconomic aggregates, bilateral trade, energy, agricultural input- output, and protection for the new reference year. Interim releases of the data base are constructed as significant updated datasets become available. Improvements are also made in data sourcing, scope, and construction procedures. One of the major highlights of the forthcoming GTAP 7.1 Data Base is the inclusion of new EU IO tables.

The paper underlying this presentation draws on a number of papers and internal documents by Robert McDougall, Csilla Lakatos, Scott MacDonald, Badri Narayanan, Angel Aguiar and Terrie Walmsley that follow the inclusion of the EU IO tables (Mueller, Dominiguez and Gay, 2009) into the GTAP 7.1 Data Base after their contribution by Marc Mueller (IPTS), Scott McDonald (Oxford Brooks University) and Csilla Lakatos (Purdue University) (Lakatos, McDonald and Mueller, 2008).

First a brief overview of the IO table contribution processes is provided and the methods involved in processing the contributed EU IO tables are shown, including the types of checks undertaken. Then the problem areas for the IO tables and the ways employed to tackle them are listed and the methods used to combine the EU tables with other external macro, protection and trade data collected for inclusion in the GTAP Data Base are outlined. The pre- and post- EU inclusion GTAP Data Bases are compared. As the process is outlined, some of the issues that have been raised over time and the design decisions made are also included. Finally, some of the current data issues that the GTAP network is currently examining in order to further improve the GTAP Data Base is discussed.

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Dynamic Inter-Regional Econometric IO-Modelling

Kurt Kratena & Gerhard Streicher

Abstract:

This paper builds upon Kratena, Streicher (2009)¹, a paper presented at the 17th input-output conference. The general model structure comprises three blocks: the price and quantity model based on Supply-Use matrices; the production and consumption block (based on econometrically estimated behavioural equation); and a trade matrix, linking commodity demand at the chosen spatial level. The model philosophy can be described as a synthesis between a dynamic Keynesian macro-econometric model and a CGE model. We extend the work in Kratena, Streicher (2009) by describing the general structure for econometric IO models which can be applied at a broad range of spatial levels, from the regional to the supranational. The model structure is implemented in GAMS; with minor modification, this general GAMS structure can be applied to any spatial configuration, by defining structural tables and matrices appropriate for the chosen spatial level. The link between the production block and the trade matrix incorporates various channels how globalization can affect the domestic economy at the industry level.

¹ Kratena, K. and Streicher, G. (2009), Macroeconomic Input-Output Modelling – Structures, Functional Forms and Closure Rules, Working Papers in Input-Output Economics, WPIOX 09-009 (<http://www.iioa.org/working%20papers/WPs/WPIOX09-009.pdf>).

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**Evolution of Trade Costs in Services Sectors:
Gravity Modelling Approach**
Olga Pindyuk & Joseph Francois

Abstract:

We examine the evolution of trade costs between EU partners (new and old) by WIOD sector. The approach involves panel-based gravity modelling at the sector level. We use polynomial specifications of trade costs to capture the evolution of trading costs between individual country pairs. The advantage of the proposed approach is that we can estimate the time path of trade costs between sets of countries, and so identify the impact of the single market program, the enlargement, and earlier EEA-based initiatives on underlying trade costs.

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Does Material and Services Offshoring Improve Domestic Productivity?

Keiko Ito & Kiyoyasu Tanaka

Abstract:

An increasing number of manufactures are shifting some stages of the production processes offshore. This study investigates the effects of offshoring on productivity in Japanese manufacturing industries for the period 1988–2004. Offshoring measures are constructed using data taken from the Japanese Input-Output Tables and Trade Statistics.

Material offshoring, as measured by an import share of intermediate material inputs, has steadily increased during the period, with a pronounced increase in offshoring to Asian countries. In a wide range of specifications, we find significantly positive correlations between the material offshoring and productivity at the industry level. The estimates are particularly robust for offshoring to Asia. These results suggest that Japanese manufacturing firms extensively developed international division of labor in East Asia, which possibly generated a strong productivity-enhancing effect.

In contrast, service offshoring, as measured by an import ratio of service inputs, is not associated with industry-level productivity. The insignificant effect of service offshoring we find in this paper is in conflict with the results of previous studies on the U.S. manufacturing sector, but consistent with results in studies for Italy and Korea. Moreover, no clearly increasing trend in service offshoring can be observed in the Japanese manufacturing sector. However, we find a positive correlation between offshoring and productivity only for information services, suggesting that in this segment, offshoring offers potential benefits.

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What Determines Services TFP Growth: Services Trade or Services-Trade Regulation?

Erik van der Marel

Abstract:

What determines the growth of total factor productivity (TFP) in services? This question is important because a large part of the services sector, such as health and education, show a clear productivity lag which could possibly slowdown the real growth of the overall economy. In contrast to previous studies which only look at the intensities of production factors such as capital and labor to explain TFP growth, I focus on services trade and specific sectoral regulations governing services trade to answer this question. To do this I first use four indicators of international trade in services – namely FDI inward stock, services imports, domestic sales of foreign affiliates (FATS) and FDI inflows – to see what type (and what mode) of services trade directly affects TFP growth. Then I analyze what type of trade-related regulation with relation to what type of services trade has an inhibiting effect on services TFP growth. My main conclusions are that not trade but regulation forms a significant determinant for services TFP growth, and that this effect is more pronounced for services sectors that are more distant from the technology frontier, i.e. less technologically advanced than their competitors. By contrast, restrictions that are targeted to FDI seem to have a larger effect for those services that are closer to the technology frontier; presumably because spill-over effects from high-skilled labor are held up to create higher TFP growth. This article finally sets out what these empirical conclusions imply for the services liberalization of health services.

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Measuring the Benefits of Global Liberalization with Consistent Aggregators of Trade Distortions

David Laborde, Will Martin & Dominique van der Mensbrughe

Abstract:

Traditional weighted-average measures of trade distortions have long been known to be deficient as indicators of trade restrictiveness, but have continued to be widely used in trade modeling. Replacing these measures has proved difficult as the aggregators needed to capture the restrictive impacts on trade are different from those needed to measure impacts on tariff revenues. In this study, we use the broad approach to aggregation developed by Bach and Martin (2001) to deal with the problem of aggregation when protection rates vary substantially within the groups used in the analysis. We use the technique developed by Anderson (2009) to allow this approach to be applied to a global model, rather than only to a single-country model as in earlier applications. This ingenious technique restores global market clearing by taking into account the fact that quantity aggregates at domestic prices differ from quantity aggregates at international prices.

We apply this methodology in a modified version of the LINKAGE global general equilibrium model, taking into account the nested structure of import demand in that model, to aggregate the MAcMapHS6 version 2 database (Boumellassa, Laborde and Mitartionna, 2009) that includes about 140 million rows (bilateral tariff database at the HS6 level)

Using this aggregation procedure with a conservative estimate of the elasticity of substitution between six-digit tariff lines results in a substantial increase in the estimated welfare gains from complete liberalization of global trade barriers. It finds that proper aggregation increases the estimated benefits of global trade liberalization by at least 50 percent, and more than doubles the estimated potential gains to developing countries.

We finally perform sensitivity analysis on key parameters used in this technique.

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The Factor Content of Trade in Value Added: Global Trends Since 1995

Abdul Azeez Erumban, Marcel Timmer & Gaaitzen de Vries

Abstract:

This paper aims to quantify cross-border production linkages by combining input-output, bilateral trade, and production factor data. We interpret the ratio of value added to gross exports as a metric of the domestic content of exports. This domestic content of exports is decomposed into the contribution arising from different skill categories and asset types. We follow the model outlined in Johnson and Noguera (2009) to measure trade in value added, and extend the model with the framework developed by Trefler and Zhu (2010) to measure the factor content of trade in value added.

To implement the model, we combine two data sources. First, international input-output tables are taken from the World Input-Output Database for the period 1995-2006. Second, detailed information on labor skill and capital asset types for the same period are obtained from the World KLEMS database. Both sources provide information for 40 developed and developing countries (including the OECD, Brazil, Russia, India, and China) for about 30 industries. For the presentation at this conference, use will be made of a preliminary and incomplete dataset to illustrate our methodology.

We expect the analysis to provide new insights into the dynamics of international technology differences and the factor content of trade. In particular, technology dynamics as a result of the entry of the major emerging economies in the world are explored.

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Vertical Intra-Industry Trade, Unit Values of Commodities, and Factor Contents: An Empirical Analysis Based on Micro-Data of the Census of Manufactures

Kyoji Fukao & Keiko Ito

Abstract:

In this study, using micro-data of the Census of Manufactures (CM) for Japan and comparing the factor inputs of factories producing the same goods, the authors estimate the relationship between the unit values of gross output and factor contents and test whether factories that produce goods with a higher unit value tend to input more skilled labour and capital stock services. To do so, they treat factories producing the same commodity according to detailed commodity classifications as producing the “same” goods. Using the results of the relationship between unit values and factor intensity, the authors then estimate the factor contents of Japan’s trade with the rest of the world. For the analysis, micro-data of the CM and Japanese trade statistics is used. Factor intensities such as capital-labour ratios and skilled-unskilled labour ratios are calculated at the 6-digit commodity-level using the micro-data of the CM, an establishment-level annual survey conducted by the Ministry of Economy, Trade and Industry.

Commodity-level unit values for products made domestically are calculated using the micro-data of the CM, while unit values for exports and imports are calculated using Japan’s Trade Statistics. Finally, using the estimated relationship between unit values and factor intensities and unit value data on Japan’s international trade, the factor contents of Japan’s exports and imports are estimated.

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Semi-Endogenous Growth Theory vs. Fully Endogenous Growth Theory: A Sectoral Approach

Jaime Sanau, Sara Barcenilla-Visus & Carmen Lopez-Pueyo

Abstract:

In the last decade endogenous growth theory has generated a second generation of models to give an answer to empirical paradoxes that sprang with reference to the first generation.

These models are developed around two theoretical approaches: semi-endogenous growth theory and fully-endogenous growth theory, with dissimilar assumptions as to the main driver of economic growth: technical progress. This research offers for the first time an analysis of the validity of the aforementioned theories in a sectoral context, applying the most modern tests and estimation procedures for the treatment of panel data.

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Modelling Global Innovation Networks Using Input-Output Analysis

Mark Knell

Abstract:

This paper will investigate the global location of research and development activities using input-output analysis. While data on employment, trade and FDI shed some light onto global value chains and the corresponding offshoring, they do not provide a complete picture of how this fragmentation process generates and diffuses new knowledge. The harmonized tables of the OECD Input-Output database distinguish between domestic and imported inputs and contain information on domestic and imported exports, which makes it possible to develop indicators on global linkages and offshoring (OECD 2007; Feenstra, 2010). This database includes tables for Brazil, China, India, and South Africa, in addition to virtually all OECD Member States. By integrating R&D activity contained in the ANBERD database, or similar databases, it is possible to measure direct and indirect flows of knowledge as disembodied and product-embodied technology flows between countries as well as the impact of user and producer linkage (Hauknes and Knell, 2009). The bilateral trade database can supplement the analysis by providing a more general analysis of the globalization of production, jobs (off-shoring), and technology (R&D). The paper is a planned deliverable in the 7th Framework large-scale integrating project, Impact of Networks, Globalisation, and their Interaction with EU Strategies (INGINEUS).

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R&D During the Crisis and Beyond

Paul Zagame, Pierre Le Mouel & Arnaud Fougeyrollas

Abstract:

The objective of this paper is to present results of simulations of a detailed econometric model with endogenous technical change, NEMESIS, in order to reveal the links between R&D and crisis.

Starting from a modification of the model in order to grasp the first three years of the crisis, the model reveals on the medium and long term (up to 2025) the durability of the crisis: at the end of the period, the gap between the former GDP (due to potential growth without crisis) and the new one resulting from new forecast including crisis is increasing, and this shows the necessity to implement Research Policies that can boost R&D effort.

Then is run a scenario with a Counter cyclical R&D effort that shows that the GDP could be restored in the long term and that the employment gap could vanish more quickly (2015): because the crisis has lowered the wages and then the labour costs, the growth is more labour intensive.

These results show that the needs for R&D policies in order to wipe-off the crisis consequences on GDP or employment.

Then the model is used to run a simulation in order to answer the question: if we tried to make a Barcelona objective of 3% with a new agenda (up to 2020) what would be the consequences?

New simulations show that the results are better than the former assessments: the new situation resulting from crisis (unemployment, capacities utilization...) lower the costs of such policies in terms of deficits.

At the end, are assessed policies aimed at make incentive for R&D expenses: two policies are examined, the increase of European Frameworks Programs for R&D, and the reallocation of European Finances for R&D.