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The Potential Impact of the Fiscal Transfers under the EU Cohesion Policy Programme *

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Abstract

The European Union uses large-scale fiscal transfers to national and regional levels to foster economic and social cohesion. This paper gives an *ex-ante* model-based analysis of the potential macro-economic impact of these fiscal transfers between member states as planned under the Cohesion Policy programme 2007-2013. The simulations show the costs and benefits of Structural Funds spending on beneficiary and donor countries in the EU. The increase in public investment has positive externalities and yields significant output gains in the long run due to sizeable productivity improvements. In the short run it can lead to crowding out of private spending.

JEL Classification System: C53, H50, O11, R11

Keywords: Fiscal transfers, Structural Funds, Cohesion Policy, public investment

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1. Introduction

The European Union uses large-scale fiscal transfers to national and regional levels to foster economic and social cohesion. Over the last two decades Structural Fund programmes supported by the Union have operated at the level of the member states and regions seeking to provide growth and jobs through enhanced competitiveness, with as ultimate objective to achieve real convergence in the Union. The resources are targeted on public and private investment in physical and human capital, and designed to increase economic and social cohesion among member states, enhancing a faster catch-up process of the less developed member states in terms of income per capita.

Together with the Common Agricultural Policy, the Structural and Cohesion Funds make up the majority of EU spending. Around one third of the EU's budget is devoted to Regional policy. In 2007 a new Cohesion Policy programme started covering the period 2007-2013. It is expected that on average a sum of €48 billion euro (in 2004 prices) per year will be allocated to Cohesion Policy for the period 2007-2013.

Empirical evidence on the output effects from past spending on cohesion policy is mixed. Economic theory suggests clear benefits from investment in infrastructure and human capital and there is plenty of empirical evidence supporting this. But many of the assisted regions have remained relatively poor and growth regressions augmented with Structural Fund variables show no significant impact from these transfers (see Ederveen et al, (2002a,2002b).

Some experts have expressed doubts about the effective and productive absorption of these large scale transfers and challenged the belief that these fiscal transfers are likely to achieve economic convergence. They question is to what extent these transfers will contribute to an increase in production capacities in the recipient countries. Following the classification in Hervé and Holzmann (1998) one can distinguish several reasons why the actual increase in (physical and human) capital could be considerably smaller than what would be expected under an optimal use of transfers:

- (1) Waste of transfers. Due to lack of adequate administrative environment, transfers may be used for investment projects with zero or negative economic return.
- (2) Administrative costs to ensure the best possible use of transfers. Extra resources needed for programming and monitoring that cannot be used for increasing the productive capacity of the economy. This should at least seek to avoid waste of transfers, and aim to avoid sub-optimal use.
- (3) Rent-seeking activities. Transfers provide an incentive to economic agents in public and private sector to invest resources in directly unproductive activities to catch a rent in the form of a share of the transfers. Competition for resources absorbs resources that can no longer be used productively.
- (4) Diversion of funds to consumption. Positive income shocks affect consumption-investment decision of private and public sectors. Because of consumption-smoothing behaviour, the increase in future consumption possibilities will lead to higher consumption on impact, to the detriment of investment.¹

¹ In addition to these factors, the authors list other "absorption problems" that could lead to a *sub-optimal* investive use of transfers; timing related problems (due to considerable time lags before returns to investment materialise, opportunity costs are high and private investment decisions may be delayed), information disadvantage of the disbursing authority (leading to support of sub-optimal investment projects), public choice considerations (leading to intentional support of suboptimal projects). Finally, changes in relative prices could lead to Dutch disease type phenomena (rising factor demand non-tradable sector leading to decline in tradable sector), immiserising growth phenomena (industrial restructuring in favour of protected subsectors, with harmful

Hervé and Holzmann (1998) argue that for the EU cohesion policy programmes absorption problems are of empirical relevance and that their scope may be very high. They conclude that in some cases, transfers "may be unquestionably detrimental to economic growth and real convergence" (ibid, p.14) with as most likely cause rent seeking, protectionism and market rigidities. They also argue that absorption problems are likely to increase with the amount of transfers.

Assessment of Structural Funds programmes has taken the form of impact evaluation at the micro level, examining impacts of individual projects or measures and conventional cost-benefit analysis has calculated the economic or social rate of return of individual projects. However, it is difficult to take into consideration externalities and spillover effects of individual projects onto the rest of the economy. Macro economic evaluation studies on the other hand can assess the economy-wide feedbacks and interactions of the fiscal transfers at the aggregate level and the structural changes in productive potential of the economy as a whole. But when macro economic models have been used in past evaluations of Structural Funds, these have been macroeconomic models in which the demand side is essentially Keynesian in nature and no crowding-out appears (e.g. Bradley (2000), Bradley, Morgenroth and Untiedt (2003))

This note uses the QUEST II model to evaluate the potential impact of the Cohesion Policy programmes under the convergence objective foreseen for the period 2007 to 2013. The QUEST II model is a global macroeconomic model with strong micro-foundations. The model contains a well specified supply side, allowing for the modelling of the productive impact of investment in infrastructure and human capital. Behavioural equations for households and firms are derived from the intertemporal optimisation problem for utility and profits. Hence, the model captures the response of private sector agents to the fiscal injection and allows for the possibility that public spending crowds-out private investment spending and leads to lower total investment spending due to consumption smoothing. On the basis of assumptions on the productive impact of the additional spending, the model provides an estimate of the potential benefits of the Cohesion Policy programmes. The following section briefly discusses the Cohesion Policy programmes and the fiscal transfers involved. Section 3 discusses how an impact analysis can be carried out with a macro-economic model like QUEST. The simulation results are described in section 4 and the impact on growth and other main macro-economic variables are discussed there for both the beneficiary countries and the donor countries. As model results depend crucially on assumptions on the productive impact of the additional spending, a sensitivity analysis is also included in section 5. Section 6 concludes.

consequences for long run growth) and worsening of negative effects of market failures (polarisation effects of transfers due to increasing returns to scale and labour market distortions).

2. The European Union's Cohesion Policy programme 2007-2013

The European Union's policy for economic and social cohesion is the second largest item in the budget after the Common Agricultural Policy. For the period between 2000 and 2006, more than €250 billion was spent in total on structural instruments for the 15 Member States, pre-accession aid and structural interventions for the new member states. This amounts to approximately 37 percent of the EU budget.

For the period 2007 to 2013, a new generation of Structural Funds programmes are being prepared with a total budget of €308 billion (in 2004 prices). The structural and cohesion fund will be concentrated on the following redefined objectives:

- a "convergence" objective (251.3 bn), to support growth and job creation in those member states and regions whose development is lagging behind (GDP per capita less than 75% of EU average)
- a "regional competitiveness and employment" objective (48.9 bn), to strengthen the competitiveness and attractiveness of regions as well as employment
- a "European cooperation" objective (7.8 bn), to enhance cross-border cooperation along land and sea borders, transnational cooperation on strategic priorities (research, information society and the environment) and interregional cooperation

Although the exact allocation of funds has not been decided yet, estimates were provided by DG REGIO of cohesion policy interventions under the convergence objective per member state, in millions of euros (2004 prices), assuming 2006 exchange rates (Table 1). Note that this covers approximately 80 percent of the total cohesion policy spending.

Table 1 Estimated Structural and Cohesion Funds Interventions

	2007	2008	2009	2010	2011	2012	2013	Total
Poland	7680	8025	8366	8405	8748	9074	9401	59699
Czech	3136	3223	3306	3391	3472	3548	3622	23697
Cyprus	158	129	100	70	41	41	41	581
Estonia	356	380	405	433	463	494	527	3058
Greece	2915	2804	2693	2582	2471	2408	2345	18217
Spain	5947	5330	4713	4196	3880	3784	3687	31536
Ireland	200	167	135	102	70	70	70	815
Italy	2774	2869	2753	2744	2690	2724	2714	19268
Latvia	480	513	549	584	619	655	691	4091
Lithuania	725	772	820	868	918	971	1023	6097
Hungary	2868	2991	3121	3227	3303	3414	3527	22451
Malta	108	109	109	109	109	109	108	761
Portugal	2807	2783	2759	2735	2711	2687	2663	19147
Slovenia	524	527	531	534	538	541	544	3739
Slovakia	1228	1303	1386	1480	1558	1632	1678	10264
Germany	2310	2264	2234	2196	2157	2118	2079	15358
Bulgaria	486	683	901	929	974	1017	1057	6047
Romania	1261	1774	2339	2753	2907	3063	3219	17317
Total	35963	36645	37219	37340	37628	38350	38998	262143

Mln. € 2004 prices; Source: DG REGIO

Due to inevitable delays in member states submitting programmes and delays in decision taking, the actual payment profile is likely to differ substantially from the profile in Table 1. Past experience of previous programme periods have shown payments are typically spread over a longer period, and continue for up to two more years. Therefore in this exercise a payment profile is assumed based on the payment profile for six member states for the programming period 2000-6, and this payment profile covers the period 2007-2015. The Commission pays an inflation "supplement" (2% flat rate) and the adjusted interventions for the period 2007-2015 in "programming prices" are listed in Table A1 in the annex. To calculate model inputs, these transfers have been converted from euros into domestic currencies using average 2006 exchange rates.

The fields of interventions are divided into three main categories and the following sub-categories:

1. Infrastructure
 - a. transport,
 - b. environmental,
 - c. telecommunication,
 - d. urban rehabilitation,
 - e. social infrastructure and health,
2. Human resources
 - a. education,
 - b. labour market programmes,
 - c. social inclusion,
 - d. entrepreneurship
 - e. actions for women
3. Productive environment
 - a. business support,
 - b. tourism,
 - c. RTDI

Infrastructure investment receives the largest share of funds, most of which is allocated to transport, but the fields of intervention cover a wide range of policy programmes. Details on the assumed fields of interventions, based on spending in the 2000-2006 programmes, are shown in the annex (Table A2)

3. Macro-economic impact analysis

This section describes how the macro-economic impact analysis of the proposed cohesion expenditure is carried out. The model used for this impact analysis is DG ECFIN's macro-economic model QUEST II. The QUEST model is a global macroeconomic model, containing structural submodels for each of the member states of the European Union, the United States and Japan, and smaller "trade-feedback" models for remaining countries and regions of the world (Roeger and in 't Veld (1997,2004)). The model used for this exercise is an extended version which includes detailed submodels for the 10 new member states that joined in 2004.

Bulgaria and Romania are not modelled in detail, but only as separate trade-feedback models. For this reason no detailed country results are reported here for these two countries².

The model can be described as a New Keynesian-Neoclassical Synthesis model, which combines the rigours of dynamic general equilibrium models with features of Keynesian style rigidities. The behavioural equations in the model are based on principles of dynamic optimisation of private households and firms, i.e. model equations are for the most part in forms that can be considered as structural equations derived from models of optimising behaviour. Economic agents are assumed to maximise utility and profit functions subject to intertemporal budget constraints. Consumption and investment decisions therefore incorporate forward looking behaviour. The supply side of the economy is modelled explicitly via a neo-classical production function. Firms operate in a monopolistically competitive environment and are able to charge a price mark-up over marginal costs. Labour markets are modelled through a bargaining framework capturing the interactions between firms and workers. Labour market rigidities and therefore involuntary unemployment persist even in the long run. The short run behaviour of the model is influenced by standard Keynesian features since the model allows for imperfectly flexible wages and prices, liquidity constrained consumption, adjustment costs for investment and labour hoarding.

Relative prices on the macroeconomic level move in order to achieve macroeconomic equilibrium. Real interest rate and real exchange rate are determined endogenously in the model and enforce internal and external equilibrium. The real rate of interest is in the long run determined by savings and investment and the real exchange rate by demand and supply of domestic and foreign output. With real interest rates and exchange rates endogenous, possible crowding-out effects of fiscal transfers can be taken into account.

Asset markets are assumed to be fully integrated across all the industrialised regions covered in the model, i.e. there is full capital mobility. Exchange rates are fully flexible and determined endogenously according to the (uncovered) interest arbitrage relation allowing for an exogenous risk premium reflecting the markets' perception of risk differentials. Monetary policy is modelled through a Taylor-type rule, according to which monetary authorities set nominal short term interest rates to target the output gap and (expected) inflation gap. Of the EU member states not participating in EMU, it is assumed that Denmark follows the ECB and keeps the interest rate differential vis-à-vis the euro-area constant. The three Baltic states, Cyprus and Malta peg their currencies to the euro and for these countries a similar assumption is made. Other currencies float freely against the euro³.

For the government sector various expenditure and revenue categories are separately modelled. The government budget constraint is given by the following equation for the change in government debt B :

² For the calculation of aggregates, the impact for Bulgaria and Romania are assumed to be equal to a weighted average of the effects in Poland, Hungary and the Czech Republic, in line with the underlying assumptions on the fields of interventions made by DG Regio.

³ Slovenia has adopted the euro in January 2007. Cyprus and Malta aim to introduce the euro in 2008. Other NMS may well adopt the euro during the programme period 2007-13, but considering the uncertainty surrounding their applications an appropriate modelling strategy would require a multitude of simulation variants with differing exchange rate regimes. This was not a feasible task and flexible exchange rates were assumed for those currencies not pegged to the euro. In anticipation of adopting the euro many NMS participate in the exchange rate mechanism of the European Monetary System (ERM-II). Under the requirements of ERM-II the exchange rate is allowed to appreciate within 15 percent of the ERM-II band. The exchange rate appreciations that are implied by the simulations here are sufficiently small that it can reasonably be assumed that no conflict with these requirements arises.

$$\Delta B_t = i_{t-1}B_{t-1} + C_t^G + w_t^G L_t^G + I_t^G + ben_t U_t + TR_t + ISUB_t - TW_t - TIND_t - TC_t - TRES_t - COH_t \quad (1)$$

On the expenditure side a distinction is made between

1. government interest payments on public debt $i*B$
2. government consumption, subdivided into
 - a. government purchases of goods and services C^G
 - b. government wage bill (public sector employment L^G times public sector wages w^G)
3. government investment I^G
4. unemployment benefits paid to the unemployed $ben*U$
5. other government transfers to households TR
6. subsidies to firms $ISUB$

The government receives revenue from the following sources:

1. wage taxes TW ,
2. corporate profit taxes TC
3. indirect taxes $TIND$,
4. a residual (lump-sum) tax $TRES$
5. and fiscal transfers received from the EU COH (which is negative for *net* contributors) .

The QUEST II model is partly estimated, but for those equations that could not directly be estimated, use has been made of available estimates in the empirical literature⁴. Country differences in the model are data-driven and mainly reflect differences in trade linkages and import shares as well as differences in income shares in national accounts. Structural 'deep' parameters are assumed to be identical across countries but institutional differences (e.g. in labour markets) play a role⁵. The main difference between old and new member states lies in the degree of openness (Table 2). The NMS countries are generally much more exposed to trade than the old member states. This is reflected in a much higher share of imports of goods and services in total GDP. Their intra-EU trade share (data on goods only) is also much higher. Table 2 also shows current GDP growth rates and current account imbalances for the NMS. Many are showing clear signs of overheating. In particular Latvia and Bulgaria face problems with current account deficits close to 15 percent of GDP or higher. Fiscal transfers under the EU Cohesion policy programmes will amount to additional injections of between 2 and 3 percent of GDP in each of these economies. The question is how such large transfers can be efficiently absorbed.

⁴ For the calibration use is also made of estimates of our DSGE model (Ratto et al. (2006)).

⁵ One difference in the model for the NMS is a higher assumed share of liquidity-constrained consumption (0.4 rather than 0.3) and a larger share of "liquidity-constrained" firms that finance their investment out of current profits (0.3 compared to 0.2).

Table 2 Openness, trade, public investment shares and growth in the EU (2006)

	Imports goods and services (% of GDP)	Intra-EU imports goods (% of GDP)	Current account balance (% of GDP)	Government investment (% of GDP)	GDP growth
BE	87.5	62.3	2.3	1.7	3.1
DE	38.1	19.3	4.7	1.4	2.7
EL	28.1	13.2	-11.4	3.6	4.3
ES	31.3	15.3	-8.5	3.9	3.9
FR	29.1	16.8	-2.0	3.4	2.0
IE	67.8	22.5	-2.6	3.9	6.0
IT	28.2	12.8	-2.0	2.3	1.9
NL	68.3	29.7	9.9	3.3	2.9
AT	47.6	33.4	3.7	1.1	3.1
PT	38.8	25.7	-9.8	2.3	1.3
FI	37.0	20.7	5.9	2.6	5.5
DK	45.3	21.7	2.4	1.8	3.2
SE	43.0	22.4	7.0	3.2	4.4
UK	31.6	12.8	-3.4	1.9	2.8
CZ	71.5	51.6	-4.1	5.1	6.1
EE	92.6	57.2	-13.9	3.6	11.4
CY	54.3	27.9	-5.9	3.3	3.8
LV	65.2	40.0	-21.1	3.4	11.9
LT	70.3	35.2	-10.7	4.2	7.5
HU	73.7	43.6	-5.9	4.5	3.9
MT	81.0	48.4	-6.3	4.6	2.9
PL	39.5	27.0	-2.2	4.2	5.8
SI	67.5	47.1	-2.0	3.7	5.2
SK	86.8	60.5	-7.7	2.2	8.3
BG	81.6	--	-15.8	3.7	6.1
RO	44.1	--	-10.3	2.9	7.7

Source: European Commission Spring 2007 forecast.

3.2 Fiscal transfers

The fiscal transfers related to the Cohesion Policy programmes are modelled as lump sum transfers between governments COH^6 . Concerning the financing of these transfers, a technical assumption is made that contributions to Cohesion Policy programmes are levied on the EU 15 member states proportionally to GDP⁷. For those EU15 countries that receive funds for their poorer regions (Germany, Italy, Spain, Portugal, Greece and Ireland) the net contributions are adjusted for these receipts. The assumptions on financing imply that Spain, Portugal and Greece receive more from the Structural Funds than that they would contribute. It is assumed that the additional contributions to the EU budget are financed in the donor countries through an increase in wage taxes TW^8 .

Cohesion policy programmes are subject to the condition of additionality and co-financing. Additionality requires that Structural Funds are additional to domestically-financed

⁶ These foreign transfers also enter the current account identity.

⁷ This technical assumption only serves to guarantee the model is closed as far as fiscal transfers between countries are concerned. A more detailed modelling of contributions to the EU budget falls beyond the scope of this note.

⁸ Alternative scenarios not shown here assume financing through other tax increases or reductions in government consumption or investment.

expenditure and are not used to substitute for it. The co-financing principle means the EU provides only matching funds to individual projects that are part of the operational programmes and that the EU funds are matched to a certain extent by domestic expenditure. The problem with defining a proper benchmark means that in practice this principle of additionality is hard to verify⁹ and is thus not always binding. Member States are not required to create new budgetary expenditure to co-finance cohesion policy support. Existing national resources that were used to finance similar areas of interventions (and are thus concerned by the additionality requirement) can be 'earmarked' to co-finance Structural Fund transfers. Total spending increases only by the amount of Structural Fund transfers. Assume a co-financing rate of c , i.e. the EU transfer COH has to be matched by domestically-financed expenditure $c.COH$. The additionality and co-financing principles can be expressed as the following condition for total government spending in a beneficiary country:

$$TOTEXP_t = COH_t + \max[EXP_0, c.COH] \quad (2a)$$

where $TOTEXP$ is total expenditure, COH is the fiscal transfer received from the EU cohesion funds, EXP_0 domestically-financed expenditure in the counterfactual situation (without Structural and Cohesion Funds), and c is the co-financing rate. Examining the additionality tables of Member States, it is apparent that national public expenditure concerned by additionality usually exceeds the co-financing needs by far. In this case $EXP_0 > c.COH$, and total expenditure is given by¹⁰

$$TOTEXP_t = COH_t + EXP_0 \quad (2b)$$

As spending on infrastructure and education is already high in the NMS countries, this exercise takes domestically-financed expenditure EXP_0 in the counterfactual situation (without structural and cohesion funds) as the benchmark and only examines the impact of the fiscal transfer COH received from the EU cohesion funds (equation 2b). Although this considerably reduces the magnitude of the spending shocks in the model, it should be noted it also reduces significantly the potential for crowding-out effects. If the co-financing need exceeded EXP_0 , the need for budgetary restraint would be exacerbated, and the real exchange rate adversely affected. Model simulations with such co-financing assumptions show stronger crowding out effects (Roeger (1996), Gaspar and Pereira (1992)).

The transfers received by the beneficiary countries are allocated to investment programmes that can roughly be divided into three broad categories (as listed in Table A2):

1. Investment expenditure on physical infrastructure
2. Investment expenditure on human resources
3. Productive environment : expenditure on investment aid to the private sector

The modelling of each of these types of investment are discussed below.

⁹ Ederveen *et al.* (2002b) estimate EU Structural Funds have still crowded out national support to lagging regions by 17 percent on average, in spite of the additionality and cofunding requirement.

¹⁰ Herve and Holzmann (1998) criticise earlier model based studies of structural funds for grossly exaggerating the total impact because they assumed that the full Structural Fund spending is additional to investment in the counterfactual situation $TOTEXP_t = COH_t + EXP_0 + c.COH_t$ while the correct formulation of the additionality principle is given by (2b).

3.3 Investment expenditure on physical infrastructure

In QUEST, investment expenditure on physical infrastructure is modelled explicitly as an increase in government investment I^G . There is a direct demand effect from spending on government investment as I^G enters directly into the GDP identity. But public capital also contributes directly to productivity, as public infrastructure is central to the functioning of the economy and has positive externalities.

Assume a standard production function for private sector output Y

$$Y = AF(K^P, L) \quad (3)$$

where A is an index representing total factor productivity, K^P is the stock of private capital, L is the labour force. Now the productivity enhancing effect of public capital can be captured by expanding the aggregate production function to include the public capital stock

$$Y = A^*F(K^P, L, K^G)$$

where A^* is total factor productivity now excluding any effects from public capital, and K^G the stock of public capital. The assumed technology is Cobb-Douglas with constant returns to scale to private capital and labour. This formulation assumes public investment increases total factor productivity by lowering production costs and shifts the production function upwards. The marginal product of the public capital stock is assumed to be equal to that of private capital in the model.

Government investment accumulates into the public capital stock K^G

$$K_t^G = (1 - dep^G)K_{t-1}^G + I_t^G \quad (4)$$

where dep^G the depreciation rate of public capital. As the public capital stock mainly represents physical infrastructure, the depreciation rate is set at the low value of 4 percent.

There is a large literature on infrastructure investment and economic growth. Interest in this topic increased largely as a result of a series of papers by Aschauer (1989, 1990) which ascribed the slowdown in US productivity growth in the 1970s to lower infrastructure investment. Aschauer found a significant and strong positive impact of public investment on output for the US. He estimated that a 1 percent increase in the public capital stock would raise output by 0.39 percent, implying estimates of the marginal product of public capital of 100 percent per annum or more.

Many economists have questioned these estimates as implausibly high. There are various difficulties with the determination of the productivity impact of public investment with macroeconomic time series¹¹. The main logical problem with the production function approach is related to the difference between *marginal versus average*. All that production studies of this kind can show is that some public investment has been productive in the past. The question is whether new investment in the future will also be productive. Building a network of motorways may have been highly beneficial, but expanding this network further may yield substantially lower benefits. Fernald (1999) reports that once the highway network

¹¹ For an overview see the surveys by Gramlich (1994), Sturm (1998), European Commission (2003) and Romp and de Haan (2005)

in the US was almost completed after 1973 the hypothesis that the marginal productivity of new roads is zero cannot be rejected. In this context it is often argued that the most productive investment projects have already been undertaken and that there is a risk that large transfers from abroad are used for less productive projects. This applies in particular for more developed economies, and it is not a priori clear how relevant this is for the NMS.

There are also various econometric problems with this type of productivity studies. First there is the issue of *common trends*. The public capital stock and productivity may just display common trends for very different reasons and these regressions then overestimate the impact. First differencing time series overcomes this problem and leads to much lower estimates, not significant and often not even positive. Testing for cointegration and adjusting them before estimation also leads to the same conclusion of no significant productivity impact of infrastructure investment. A related problem is *missing variables*. It has been suggested that the other variables may explain the high original estimated impact on US productivity growth. The obvious candidate is energy prices, which increased significantly in 1973 and could have made some private capital obsolete. To overcome this problem, one should control for energy inputs in productivity regressions. But the major problem in estimating a production function is *simultaneity bias* and the potential for *reverse causation*. The question is whether causality runs from infrastructure to economic growth or from growth to infrastructure investment. Production function studies using macro economic time series may also pick up the short-run demand effect of infrastructure investment and so overestimate the productivity effect. However, some of the studies that have tried to correct for these problems have found similar high rates of return. Using pooled time series, cross-section data across states, has generally yielded more sensible estimates with an implied rate of return on public investment equal to the rate of return on private capital or lower. For instance Bougheas et al. (2000) find high output elasticities of transport infrastructure ranging from 0.001 for Finland to 0.183 for Austria, and even more variation, and even negative estimates, in poorer countries¹². Estimated effects of other infrastructure investment like telecommunications are much smaller, sometimes in the order of one-tenth of those of transport infrastructure. Most empirical cross country growth studies have not made a distinction between public and private investment, but those that have included public capital in cross-country growth regressions have generally found significant positive effects from public investment, although with a coefficient smaller than that of private investment.

Summarising these studies it is hard to avoid the conclusion that the extremely wide range of estimates found in the literature makes these production function studies almost useless from a policy perspective (Romp and de Haan, p.43). Implementing the upper range of estimates of output elasticities in micro-founded macro-economic models would imply such high rates of return on public capital that the implied level for the optimal stock of public capital would be implausibly high. It is not clear how one can justify assuming a higher rate of return on public capital than that of private capital in a structural macro model¹³. In the QUEST model

¹² Although the marginal productivity of infrastructure investment may be higher in developing countries, output elasticities need not be higher than those in developed ones because the stock of infrastructure capital is lower in those countries. The explanation for the finding of negative marginal productivities in some developing countries could be related to bureaucratic inefficiencies and corruption (see Bougheas et al, 2000)

¹³ Gramlich (1994) summarises the "logical" problem of the high implied econometric rates of return: "*It is hard to see how the rate of return on public capital measured from output changes could ever lie above that of private capital. The private capital rate shows how private investors are making decisions at the margin, comparing marginal output benefits of their capital with the opportunity cost of their own funds. For public capital, these same investors would compare marginal output benefits with the opportunity cost of somebody else's funds. If public investment really were as profitable as claimed, would not private investors be clamouring to have the public sector impose taxes or float bonds to build roads, highways, and sewers to generate these high net*

therefore an identical marginal product of capital is assumed, i.e. the marginal product of public capital is set equal to that of private capital. This applies to all countries in the model, including the NMS. Note that this does not exclude the possibility that the marginal product of capital (private and public) is higher in NMS.

As is clear from Table A2 in the annex, transport infrastructure forms only one part of total infrastructure investment and the planned fields of intervention cover a much wider range of areas. Not all the planned expenditure under the heading "infrastructure" is likely to be as productive as that on transport infrastructure. Of the Cohesion Funds spending it is assumed half of the planned interventions are for transport infrastructure and the other half to environmental infrastructure (water supply, waste water, waste). Although more than half of the planned Structural Funds spending on infrastructure applies to transport infrastructure, still a large share of spending is reserved for environmental infrastructure, telecommunication infrastructure, urban rehabilitation, social infrastructure and health. It is much more difficult to assess the productive impact of spending in some of these other areas. While these programmes may be justified from a social policy perspective, it is questionable whether the productivity of some of this spending is as high as that of transport infrastructure spending, or indeed of private investment, in economic terms. For instance, Bougheas et al. (2000) report much lower estimated effects of telecommunication infrastructure, sometimes in the order of one-tenth of those of transport infrastructure.

To illustrate the uncertainty surrounding the productive impact of total infrastructure investment, two alternative scenarios are shown in this note. In the first scenario, all infrastructure investment is assumed to be as productive as transport infrastructure. While this may seem too optimistic, it is useful for providing an "upper bound" to the *potential* effects of infrastructure investment. In the second "lower" variant, other infrastructure investment is assumed to be only half as productive as transport infrastructure investment. While one could argue this assumption is arbitrary, it seems likely that the productivity of spending on social infrastructure and urban rehabilitation is lower than that of transport infrastructure, and the sole purpose of this alternative scenario is to show the sensitivity of the results to assumptions concerning the productivity impact.

3.4 Investment expenditure on human resources

Spending on human capital under the cohesion policy programmes covers a wide a range of fields of interventions (education, labour market programmes, social inclusion, entrepreneurship and actions for women). Investment in education is generally recognised as one of the most important drivers of growth. But the impact of increased spending on education is only likely to be reflected in the skill structure of the labour force years later, if not decades, as it takes many years before the labour force has absorbed the higher educated cohorts. Hence, the skill structure of the labour force lags substantially behind educational

benefits? The impact on business profits would be higher than for private capital and the cost to business less. While it is hard to measure the clamor of private business investors, and even harder to determine whether inducing clamor is an efficient modus operandi for business investors, very little such pressure seems to have been observed, even when the implied econometric rates of return were allegedly very high" (ibid., p. 1187) . A simple simulation experiment with the QUEST model illustrates this argument. If the marginal product of public capital is assumed to be higher than that of private capital, it would indeed be optimal to raise corporate taxes to realise a substitution of private capital for public capital. If the marginal product of public capital is set to twice that of private capital, an increase in the public investment share in GDP by 3 percentage points (from 3 to 6 percent of GDP) financed by an increase in corporate profit taxes, would raise the level of output by more than 2.5 percent over a period of 10 years.

spending. The long lags related to this 'cohort effect', combined with the fact that a large part of human resources spending is not on education but on other (social policy) spending categories, makes it extremely difficult to assess the productive impact of this spending in a modelling framework.

In the QUEST model the demand impact of investment on human resources is captured by government consumption and investment. It is assumed spending is equally divided over

1. public sector employment L^G (e.g. employing more teachers),
2. government purchases C^G (e.g. spending on teaching material)
3. government investment I^G (e.g. building of schools).

For the first two components an assumption is made on how this spending impacts on productivity, while for the third component, the productive impact of government investment is described above. A large range of empirical studies show the social rate of return of one additional year of schooling to lie between 6 and 12 percent. To capture this impact on productivity the model has been adapted in the following way. The productive impact of the additional spending on government consumption (public employment and government purchases) is assumed to raise total factor productivity A^* (eq. 3b). The magnitude of this productivity effect of education spending is calibrated on the results reported in the European Commission (2003) study in which the productivity effect of one year additional schooling is estimated to be 0.5 percent after 5 years and 1.4 percent after 10 years (the long run effect was estimated at 12.8 percent). The gradual build-up reflects the time lags between education and the skill structure of the labour force. On the basis of available data on current spending on education (around 5 percent of GDP) and the average years of schooling an estimate can be made of the additional years of schooling that can be financed by the fiscal transfers.

These estimates of the productivity effect of education are high. This is particularly true for the long run effect, but even the effect after 10 years (which is more relevant for the current analysis) is on the high side. They lie at the upper bound of the range reported in the survey by Sianesi and van Reenen (2003). There a one-year increase in average education is found to raise the level of output per capita by between 3 and 6 percent according to augmented neo-classical specifications, while it would lead to an over 1 percentage point faster growth according to estimates from the new-growth theories¹⁴. De la Fuente and Domenech (2006) construct estimates of educational attainment for a sample of countries and find a clear positive correlation between data quality and the size and significance of human capital coefficients in growth regressions. They construct a set of meta-estimates of the coefficient of years of schooling in an aggregate Cobb-Douglas production function. Their results suggest that the value of this parameter is higher than previously studies have found, and is likely to be above 0.6.

It should be noted that the studies on which this productivity assumption is based relate to school education (primary, secondary and tertiary) while Structural Fund spending is more directed towards post-school training, special-needs education and social policy measures like social inclusion and actions for women, which is likely to have a lower productivity impact. Hence, it gives an upper bound of the likely effects. To reflect the uncertainty surrounding the productivity impact of spending on these other policies, two variants are shown in this note. In the first most optimistic scenario it is assumed all spending under the heading "human resources" has the same productive impact as educational spending. In the second scenario,

¹⁴ The impact of increases at different levels of education appear to depend on the level of a country's development, with tertiary/higher education being the most important for growth.

the productivity impact of spending in these other fields is assumed to be only half that of educational spending. This alternative scenario shows the sensitivity of the results to the assumed productivity impact.

3.5 Productive environment : direct aid to firms for private investment

The third category of cohesion policy expenditure concerns direct aid to the private sector (excluding agriculture) to support private investment. The investment decision of firms in the model is derived from profit maximising principles

$$\frac{I_t}{K_t} = (1 - lcf) * F(Q_t, PIP_t, \varphi) + lcf * F(PROF_{t-1}) \quad (5)$$

where Q is a measure of (discounted) expected future profitability, PIP the relative investment price deflator (relative to the GDP deflator), φ the adjustment cost parameter, $PROF$ is current profits (gross operating surplus) and lcf is the share of firms that are liquidity constrained and finance investment out of current profits. An increase in investment leads to a higher stock of private capital and so increases the output potential of the economy and has a long run supply effect.

The direct aid from the government to firms $ISUB^G$ adds to the resources of firms from which they can finance investment (demand effect). The direct subsidy to private investment spending does not necessarily lead to a proportional increase in ex-post investment as it can be partially crowded-out by a reduction in private savings and higher interest rates (higher consumption). Increases in government infrastructure spending could also have an adverse impact on private investment due to higher interest rates and higher wage growth, which negatively affects future profits. Hence, private sector investment can be crowded out significantly by the increase in overall government spending.

A small share of total aid to the productive sector is assigned to R&D expenditure, the productive impact of which is potentially much higher than that of other investment. In the model the productivity effect of R&D spending is captured by a TFP shock that is calibrated on the results of a new QUEST model with endogenous R&D. Simulations with this semi-endogenous growth model suggest a permanent increase in R&D investment of 1 percent of GDP raises TFP by 3 percent after 10 years. A proportional shock to total factor productivity (A^* in eq. 3b) is calibrated for the share of structural funds allocated to R&D expenditure. In a sensitivity analysis the assumed productivity effect of the R&D component of spending on the productive environment is set to only half that, to illustrate the uncertainty surrounding the externalities of R&D investment.

4. Simulations

The previous sections have described how Cohesion Policy interventions are incorporated in the QUEST model. This section proceeds with the policy simulations and reports the simulation results of the cohesion policy programmes under the convergence objective for the 2007-2013 programming period.

The scenario described in this section assumes large supply side effects from infrastructure investment, R&D spending and education. In particular for the latter two categories however, time lags are considerable and cohort effects lead to only a very gradual build-up of these positive productivity effects. While their long run effects will be higher than those of infrastructure investment, the transfers are assumed to be phased out after the programming period 2007-2013 and hence the shocks cannot be assumed to be permanent. Nevertheless 7 or 9 years of additional investment results in significant supply side improvements.

Table 4 shows the impact of the cohesion policy interventions on the net beneficiaries (EL,ES,PT,CZ,EE,CY,LV,LT,HU,MT,PL,SI,SK,RO,BG), the new member states (NMS aggregate), the net donor countries (BE,DE,FR,IE,IT,NL,AT,FI,DK,SW,UK) and the EU15 (results for individual countries are reported in the annex). The fiscal transfer received under the convergence objective of the Cohesion Policy programmes amounts to approximately 2 percent of GDP for the NMS on average. The additional spending has an immediate demand impact in the beneficiary countries and builds up over the following years. Consumption is directly boosted by the additional spending and higher permanent income (expected future income is up) also leads to higher spending. Although the business sector receives direct support from the government, encouraging investment, this subsidy is not enough to offset the negative impact of higher government spending on infrastructure and human resources and there is net crowding-out of private investment in the first years of the simulation. Only in later years does investment grow to levels above baseline. The additional spending leads to higher inflation, puts upward pressure on interest rates and leads to a real appreciation in the first years of the simulation. For small open economies import leakage is an important factor that reduces the impact of demand impulses. Imports rise due to higher demand and the trade balance of these countries deteriorates further. Many NMS already have large trade deficits but the demand impulse from these fiscal transfers risks widening these imbalances even further.

The output gains become gradually larger as the supply side effects become stronger, and output rises to more than 5 percent above baseline on average for the NMS. A large part of these gains are permanent as the productive potential of the economy has improved, and even in 2016, when the injection from Cohesion Fund programmes comes to a halt and the direct transfers are discontinued, GDP remains above baseline by more than 4 percent (Figure 1). Employment rises in the first years due to the demand expansion, but the employment effect is much smaller in following years as wages rise and productivity improvements put further upward pressure on real wages. It is only in the longer run that employment gains become larger again¹⁵.

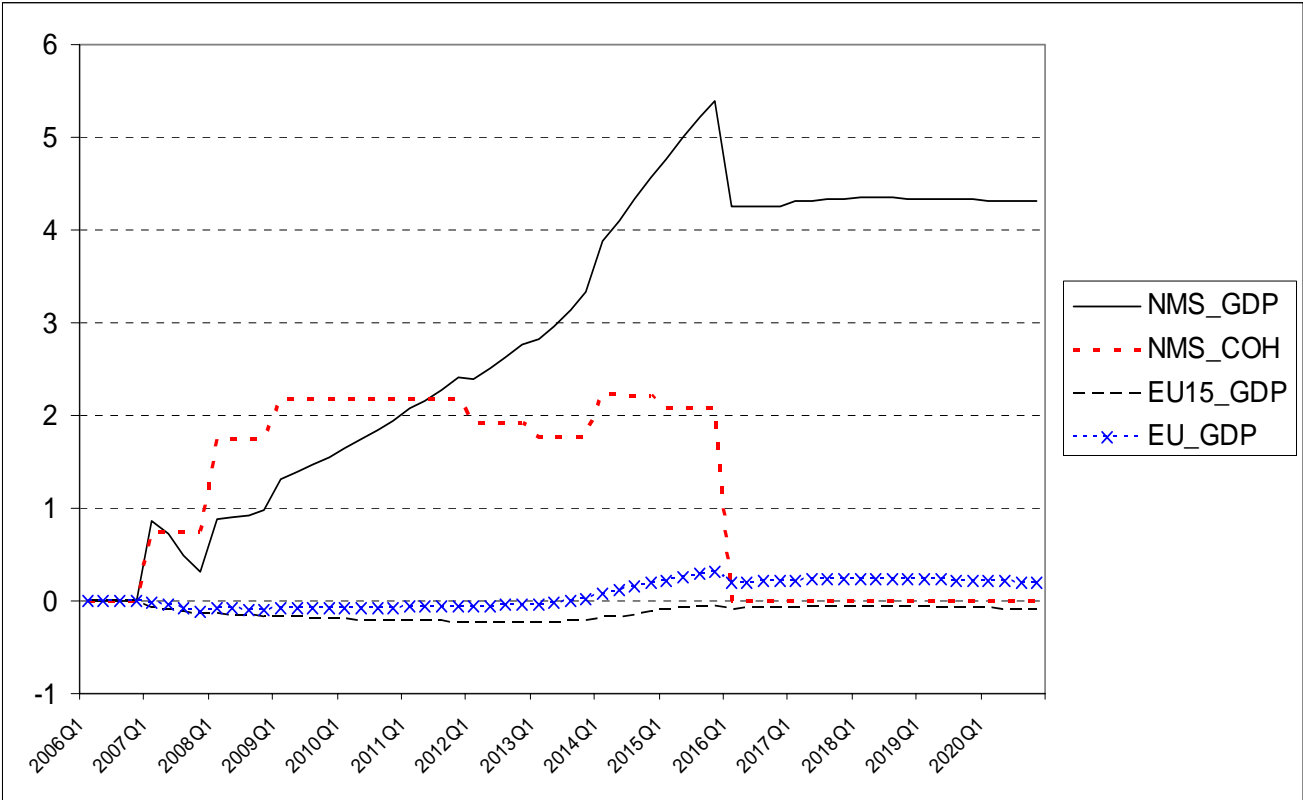
The gap between the transfers received (COH) and the GDP effect in Figure 1 gives an indication of the degree of crowding-out in the short run. In the first years of the programme period, the GDP effect is less than the total injection into the economy. Only in the latter half

¹⁵ It should be noted that this assumes no increase in the participation rate. To the extent that labour market programmes and interventions on actions for women raise labour force participation, the simulations could underestimate the employment effects. In the tables the unemployment rate is reported.

of the programme period do the supply side improvements raise the level of GDP above the level of direct demand injection from the programmes.

Most of the EU15 countries are net donor countries, but the net contributions differ, with Germany, Italy and Ireland receiving funds for their poorer regions. The donor countries face an increase in their tax burden to finance their higher EU contributions. The increase of almost half a percentage point on the tax rate on labour income has a negative impact on consumption and employment. The distortionary effect of wage taxes on employment is captured in the model by the degree to which the reservation wage (unemployment benefits) is affected by the tax increase, and the employment effect is typically stronger in continental European countries than in the Nordic and 'anglo-saxon' economies. The negative effect of the increase in the tax burden is partly offset by an improvement in the donor countries' exports as they benefit from higher demand for their products from the NMS. Countries with closer trade links with the NMS benefit relatively more from this. The net effect for the EU as a whole is negative in the first years, but turns positive as the output improvements in the beneficiary countries become stronger.

Figure 1: GDP effects Cohesion Policy programme 2007Q1-2020Q4: NMS, EU15, EU



Note: GDP % difference from baseline, COH is net-transfers received (as % of GDP)

Table 4. Simulated macro economic effects Cohesion Policy programmes

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Net beneficiaries										
GDP	0.43	0.56	0.80	0.97	1.22	1.42	1.72	2.48	3.07	2.68
Consumption	1.83	1.78	1.80	1.84	1.89	1.93	2.02	2.24	2.50	2.24
Investment	-1.29	-1.88	-2.12	-2.10	-1.94	-1.64	-1.09	-0.23	0.71	2.03
Price level	0.26	0.53	0.84	1.09	1.35	1.55	1.81	2.23	2.81	2.88
Real eff. ex. rate (+ = depreciation)	-0.82	-0.78	-0.55	-0.25	0.09	0.41	0.74	1.19	1.76	2.17
Unemployment rate	-0.12	-0.03	0.01	0.04	0.05	0.05	0.06	0.02	-0.03	-0.08
Net transfers rec. (% of GDP)	0.28	0.65	0.82	0.81	0.81	0.72	0.66	0.83	0.78	0
Trade balance (% of GDP)	-0.78	-1.26	-1.36	-1.35	-1.37	-1.33	-1.39	-1.74	-1.88	-1.04

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
NMS										
GDP	0.59	0.92	1.43	1.79	2.23	2.57	3.07	4.22	5.10	4.31
Consumption	2.90	2.95	3.06	3.14	3.21	3.27	3.39	3.73	4.08	3.39
Investment	-2.08	-2.65	-2.68	-2.39	-1.98	-1.40	-0.47	0.86	2.25	3.84
Price level	0.29	0.67	1.16	1.60	2.06	2.44	2.91	3.60	4.54	4.71
Real eff. ex. rate (+ = depreciation)	-1.11	-0.95	-0.57	-0.12	0.35	0.79	1.26	1.89	2.68	3.12
Unemployment rate	-0.15	-0.05	-0.04	-0.02	-0.02	-0.01	-0.00	-0.05	-0.11	-0.08
Net transfers rec. (% of GDP)	0.74	1.73	2.15	2.12	2.11	1.87	1.70	2.13	1.97	0
Trade balance (% of GDP)	-0.70	-1.18	-1.29	-1.30	-1.34	-1.31	-1.38	-1.72	-1.85	-1.00

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
Net donors										
GDP	-0.16	-0.20	-0.21	-0.23	-0.24	-0.26	-0.26	-0.21	-0.15	-0.19
Consumption	-0.40	-0.46	-0.48	-0.48	-0.47	-0.45	-0.42	-0.40	-0.31	-0.10
Investment	-0.13	-0.30	-0.43	-0.54	-0.65	-0.73	-0.78	-0.77	-0.71	-0.95
Price level	-0.06	-0.12	-0.14	-0.14	-0.13	-0.11	-0.10	-0.04	0.07	0.23
Real eff. ex. rate (+ = depreciation)	-0.01	-0.02	-0.04	-0.07	-0.10	-0.13	-0.16	-0.19	-0.21	-0.18
Unemployment rate	0.04	0.08	0.13	0.15	0.16	0.15	0.14	0.15	0.14	-0.03
Net transfers rec. (% of GDP)	-0.07	-0.17	-0.22	-0.22	-0.22	-0.20	-0.18	-0.23	-0.22	0
Trade balance (% of GDP)	0.10	0.13	0.16	0.18	0.20	0.20	0.21	0.23	0.24	0.16

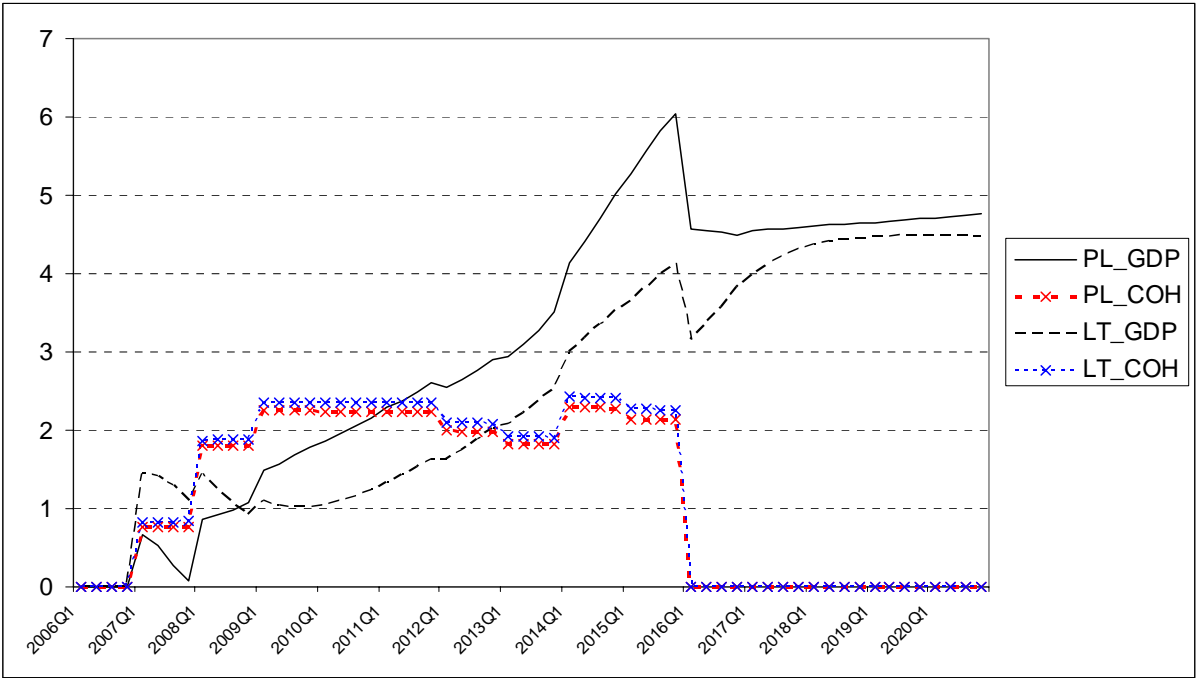
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020
EU15										
GDP	-0.11	-0.16	-0.19	-0.21	-0.22	-0.24	-0.23	-0.16	-0.08	-0.09
Consumption	-0.26	-0.33	-0.36	-0.36	-0.35	-0.33	-0.30	-0.27	-0.18	0.04
Investment	-0.19	-0.44	-0.63	-0.77	-0.88	-0.96	-0.98	-0.92	-0.81	-0.82
Price level	-0.03	-0.06	-0.08	-0.08	-0.08	-0.09	-0.08	-0.04	0.05	0.17
Real eff. ex. rate (+ = depreciation)	-0.06	-0.09	-0.12	-0.13	-0.15	-0.16	-0.18	-0.19	-0.18	-0.10
Unemployment rate	0.02	0.07	0.12	0.15	0.16	0.15	0.14	0.14	0.13	-0.04
Net transfers rec. (% of GDP)	-0.05	-0.13	-0.16	-0.16	-0.16	-0.14	-0.13	-0.17	-0.16	0
Trade balance (% of GDP)	0.06	0.09	0.12	0.14	0.16	0.17	0.18	0.20	0.19	0.13

Note: Net beneficiaries: EL,ES,PT,CZ,EE,CY,LV,LT,HU,MT,PL,SI,SK,RO,BG. Net donors: BE,DE,FR,IE,IT, NL,AT,,FI,DK,SW,UK. Percentage differences from baseline.

Exchange rate regime

Differences among the beneficiary countries are mainly a reflection of differences in fiscal injections. The larger the fiscal transfer received, the larger the initial demand stimulus and the larger the long run supply side effects. But the exchange rate regime also makes an important difference. Slovenia, as part of the euro area, and the three Baltic states, Cyprus and Malta, that peg their currencies against the euro, have relatively large GDP effects in the first year and less crowding out of the demand stimulus, as monetary policy is not responding to domestic inflationary pressures, and the nominal exchange rate vis-à-vis the euro is fixed. However, in following years, the GDP effects are smaller. With a fixed exchange rate, competitiveness can only be restored by relatively more modest wage growth in these countries. The effect of the exchange rate regime is best illustrated by comparing Poland (flexible exchange rate) and Lithuania (fixed exchange rate). Both receive roughly similar amounts in transfers, as percentage of their respective GDP. In the first year the GDP effect is much larger in Lithuania than in Poland, as monetary policy in Lithuania is set to remain its peg with the euro and cannot respond to reduce the inflationary pressures due to the demand impulse. In later years though Lithuania cannot devalue and has to go through a period of disinflation to regain competitiveness. Compared to Poland, its GDP gains are much smaller in following years.

Figure 2: Difference in GDP effects between Poland (flexible exchange rate) and Lithuania (fixed exchange rate)



Note: GDP % difference from baseline, COH is net-transfers received (as % of GDP)

5. Sensitivity analysis

The simulation described above assumes the available funds are used effectively and efficiently to raise the productive potential of the economy. As such, they provide an indication of the *potential* effect of cohesion policy spending, but no judgement on the likely impact. It could be expected that not all transfers contribute to an increase in production capacities. The simulations are based on "optimistic" assumptions concerning the productive impact of all infrastructure investment, spending on human resources as well as support to business for R&D investment.

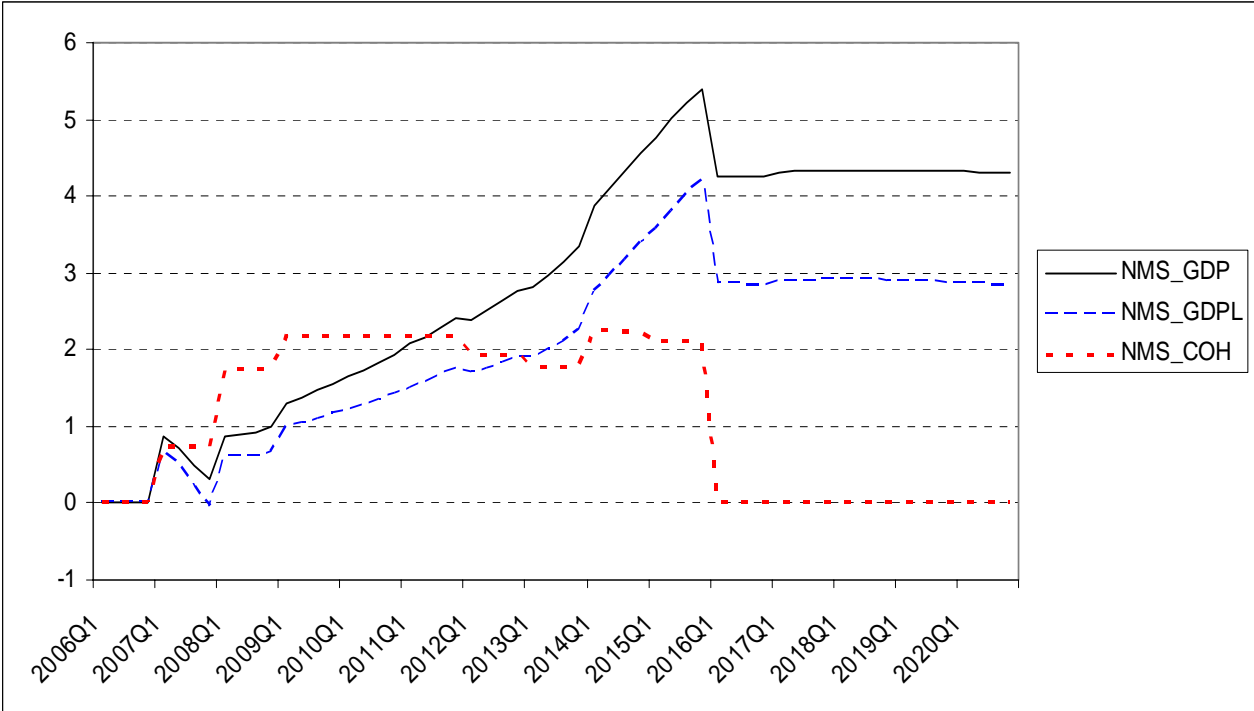
In this section an alternative scenario is shown in which a lower productive impact of some of this spending is assumed. In the scenario described in the previous section, all infrastructure spending was assumed as productive as transport infrastructure and all human resources investment as productive as educational spending. The alternative scenario assumes a lower productive impact of spending on other categories than transport and education. More specifically the supply side assumptions in this variant are as follows:

1. Infrastructure investment: investment in transport infrastructure is assumed to have the same marginal product as that of private investment. All other infrastructure investment (environmental infrastructure, telecommunication infrastructure, urban rehabilitation, social infrastructure and health) is assumed to be only half as productive
2. Human capital: educational investment is assumed to have the productive impact as described in section 4.3 above, all other human capital investment (labour market programmes, social inclusion, entrepreneurship and actions for women) is assumed to have only half the productive impact.
3. Productive environment: investment support leads to a higher capital stock, but R&D investment has only half the impact on TFP as assumed in the first scenario.

While one could imagine worse case scenarios, of e.g. zero productive impact of transfers (total inefficiency) or even a negative impact (transfers are detrimental to economic growth), this scenario is still optimistic as it assumes a significant positive impact of the transfers on the productive potential of the economy, but is arguable more realistic than the scenario described in the previous section. A comparison between these two scenarios gives an indication of the sensitivity of the outcomes to the assumed externalities and illustrates the uncertainty surrounding the long run supply side impacts of structural funds.

Figure 3 shows the GDP effects under the two variants (GDP and GDPL). Transport infrastructure investment forms a large share of total spending under the cohesion policy programmes and is in this alternative scenario still assumed to be as productive as private investment. The long run GDP effect is reduced by approximately one quarter under these less optimistic assumptions. For the NMS aggregate, the GDP is about 4 per cent higher in 2015, and falls back to less than 3 per cent when the transfers are discontinued, while the long run supply side effects was about 4.5 percent under the more optimistic assumptions. The dynamic adjustment is also affected, with smaller demand effects in the first years of the simulation due to lower productivity gains and permanent income gains anticipated by forward looking agents. While this scenario still shows sizeable improvements in the beneficiary countries' productive potential, it shows the sensitivity of the results to the underlying assumptions embedded in the model.

Figure 3 Sensitivity analysis (lower productivity assumption)



Note: GDP and GDPL (lower scenario) % difference from baseline
 COH is net-transfers received (as % of GDP)

6. Conclusion

The success or failure of the EU Cohesion Policy programme 2007-2013 in achieving real convergence in the EU can only be assessed *ex post* in the next decade. This note has given an *ex-ante* model-based analysis of the fiscal transfers, under the assumption that these transfers translate directly into productive investment. This gives an indication of the likely and potential effects of the policy on main economic variables. Although large parts of the spending are devoted to social infrastructure, the benefits of which one would not directly expect to be measurable in terms of higher GDP, most of the funds are used for supply side policies that aim to raise the productive capacity of the economies. A quantitative analysis of the macroeconomic impact of the cohesion policy programme is therefore imperative, also considering the importance of Cohesion Policy in the EU budget and the size of the fiscal transfers involved.

Under favourable productivity assumptions, the long run supply side improvements are sizeable. On average GDP is raised by more than 5 percent at the end of the 2007-2013 programming period in the new member states. Initially the transfers lead to higher inflation and a real appreciation of the exchange rate, and they are partially crowding out private spending. In the long run the productive potential of the economy improves and potential output is raised. These gains are permanent, and remain even after the transfers are discontinued. It is also shown how the exchange rate regime matters and the loss of the exchange rate in adjustment to this type of asymmetric shocks induces certain losses.

The financing costs of the EU cohesion policy burden are here assumed to be borne by the old member states, and the increase in taxes to pay for higher EU contributions lead to a permanent output loss. This is the cost of redistribution among EU member states, which itself is based on political and equity considerations. The cost to donor countries is mitigated to some extent by higher export growth due to higher demand in the new member states.

This model-based analysis gives an estimate only of the *potential* effect of Cohesion Policy programme and the long run output gains reflect the assumed productive impact of investment in infrastructure, human capital and R&D in the model. Lower assumptions on the productive impact would yield smaller economic benefits from the transfers. Although the simulations take into account crowding out of productive private investment due to intertemporal consumption-investment decisions, other absorption problems are not explicitly considered. As summarised in the introduction, there are several reasons why one could expect a less than optimal use of fiscal transfers, and such sub-optimal use will reduce the actual effectiveness of these fiscal transfers significantly. Given the importance of EU Cohesion Policy in the EU budget, it is of crucial importance that such absorption problems are as much as possible avoided. It is the identification of factors that give rise to such efficiency losses that should be the focus of evaluations of the EU cohesion policy.

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Table A1: Planned payment profile programming period 2007-15 (mln € programme prices)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	TOTAL
Poland	2196	5541	7388	7811	8323	7851	7662	10341	10341	67454
.SF	1472	3715	4953	5236	5580	5264	5137	6932	6932	
.CF	724	1826	2435	2574	2743	2588	2525	3408	3408	
Czech	871	2198	2931	3099	3302	3115	3040	4102	4102	26759
.SF	583	1472	1962	2075	2211	2086	2035	2747	2747	
.CF	288	726	968	1024	1091	1029	1004	1355	1355	
Cyprus	21	53	70	74	79	75	73	98	98	642
.SF	14	35	47	50	53	50	49	66	66	
.CF	7	18	23	25	26	25	24	33	33	
Estonia	113	285	379	401	427	403	394	531	531	3465
.SF	75	190	253	267	285	269	262	354	354	
.CF	38	95	126	134	142	134	131	177	177	
Greece	666	1682	2242	2370	2526	2383	2325	3138	3138	20471
.SF	546	1377	1836	1941	2069	1951	1904	2570	2570	
.CF	121	304	406	429	457	431	421	568	568	
Spain	1149	2900	3867	4088	4356	4109	4010	5412	5412	35305
.SF	1034	2608	3478	3677	3918	3696	3607	4868	4868	
.CF	116	292	389	411	438	413	403	545	545	
Ireland	29	74	99	105	112	105	103	139	139	904
.SF	29	74	99	105	112	105	103	139	139	
Italy	707	1783	2377	2513	2678	2526	2465	3327	3327	21704
.CF	707	1783	2377	2513	2678	2526	2465	3327	3327	
Latvia	151	381	507	536	572	539	526	710	710	4633
.SF	101	254	338	358	381	360	351	474	474	
.CF	50	127	169	179	190	180	175	237	237	
Lithuania	225	567	756	799	852	803	784	1058	1058	6903
.SF	149	377	503	532	567	534	522	704	704	
.CF	75	190	253	268	285	269	263	354	354	
Hungary	826	2084	2779	2938	3131	2953	2882	3889	3889	25371
.SF	544	1372	1830	1935	2062	1945	1898	2561	2561	
.CF	282	712	949	1003	1069	1008	984	1328	1328	
Malta	28	70	94	99	106	100	97	131	131	858
.SF	19	47	63	66	71	67	65	88	88	
.CF	9	23	31	33	35	33	32	44	44	
Portugal	702	1771	2362	2497	2661	2510	2450	3306	3306	21564
.SF	602	1519	2026	2142	2282	2153	2101	2836	2836	
.CF	100	252	336	355	379	357	348	470	470	
Slovenia	137	346	462	488	520	491	479	646	646	4216
.SF	91	230	307	324	346	326	318	429	429	
.CF	46	116	155	164	175	165	161	217	217	
Slovakia	378	954	1272	1345	1433	1352	1320	1781	1781	11617
.SF	251	633	844	893	951	897	876	1182	1182	
.CF	127	321	428	453	482	455	444	599	599	
Eastern ge	563	1420	1893	2002	2133	2012	1963	2650	2650	17285
.SF	523	1320	1760	1861	1983	1871	1826	2464	2464	
.CF	40	100	133	141	150	141	138	186	186	
Bulgaria	224	564	752	796	848	800	780	1053	1053	6870
.SF	149	376	502	530	565	533	520	702	702	
.CF	75	188	251	265	282	266	260	351	351	
Romania	642	1620	2160	2283	2433	2295	2240	3023	3023	19717
.SF	428	1080	1440	1523	1622	1530	1493	2016	2016	
.CF	214	540	719	761	811	765	746	1007	1007	
TOTAL	9627	24294	32391	34245	36492	34422	33593	45336	45336	295736

Notes: Assumed payment profile based on 2000-2006 programme for 6 main countries, in "programming prices", mln euros.

Table A2: Fields of interventions: assumptions for 2007-2013 programmes SF and CF

	Poland	Czech F	Cyprus	Estonia	Greece	Spain	Ireland	Italy	Latvia	Lithuania	Hungary	Malta	Portugal	Slovenia	Slovakia	Germany	Bulgaria	Romania
SF																		
Productive environment	12.9	24.0	34.5	25.2	12.3	18.7	17.7	33.2	32.1	27.8	23.3	10.7	22.2	41.3	8.4	31.3	20.1	20.1
Business support	10.7	15.0	23.0	10.5	7.2	10.1	8.8	20.0	26.6	11.0	12.8	2.3	12.8	19.0	3.0	19.6	12.8	12.8
Tourism	1.2	7.6	11.5	7.5	2.9	1.4	1.6	8.0	1.9	10.5	4.7	8.4	4.3	15.0	4.2	1.7	4.5	4.5
RTDI	1.0	1.4	0.0	7.2	2.2	7.2	7.3	5.2	3.6	6.3	5.8	0.0	5.1	7.3	1.2	10.0	2.7	2.7
HR	28.3	29.9	44.0	26.6	23.1	30.3	30.3	20.5	27.1	18.6	25.7	15.5	28.6	29.2	34.7	32.2	28.0	28.0
Labour market	7.4	6.8	10.8	6.9	4.7	13.1	1.4	6.0	10.7	4.5	7.3	1.1	2.6	11.0	16.2	12.7	7.2	7.2
social inclusion	2.5	5.3	5.2	2.3	4.2	2.6	7.1	1.1	2.3	1.7	5.0	3.7	4.4	4.1	2.1	6.6	4.3	4.3
education	11.3	12.0	24.2	11.4	7.6	3.6	16.8	7.9	9.7	6.0	8.9	6.3	15.1	10.3	14.3	3.5	10.7	10.7
entrepreneurship	6.1	4.8	0.0	5.6	4.3	9.7	4.6	3.9	3.9	6.0	4.0	1.4	6.1	3.4	1.2	5.7	5.0	5.0
actions for women	1.0	1.0	3.8	0.4	2.3	1.3	0.4	1.6	0.5	0.4	0.5	3.0	0.4	0.4	0.9	3.7	0.8	0.8
Infrastructure	52.5	41.7	15.8	43.7	59.7	50.2	49.8	39.3	34.9	47.9	45.5	68.0	46.5	23.6	44.0	36.3	46.6	46.6
Transport	30.9	18.8	3.3	13.4	33.4	25.4	38.4	16.7	18.2	18.4	16.1	21.8	18.7	3.7	25.1	18.7	21.9	21.9
Telecom	7.5	2.9	5.2	2.3	7.1	2.3	3.4	5.5	3.9	6.7	5.5	1.1	3.4	8.7	1.1	0.9	5.3	5.3
energy	1.5	1.6		2.9	1.0	0.6	0.8	1.4	3.9	7.8	0.9	0.4	0.0	3.7	0.5	0.1	1.3	1.3
environment	5.6	6.9	0.0	1.3	4.7	10.9	7.2	8.3	5.8	0.9	3.7	34.7	4.5	3.7	9.5	7.8	5.4	5.4
urban rehabilitation	3.9	8.4	1.9	5.2	7.2	6.2	0.0	6.0	0.0	1.6	6.3	4.9	9.8	3.8	1.8	5.7	6.2	6.2
social infra +health	3.1	3.1	5.4	18.6	6.3	4.8	0.0	1.4	3.1	12.5	13.0	5.1	10.1	0.0	6.0	3.1	6.4	6.4
Tech. assistance	6.3	4.4	5.7	4.5	4.9	0.8	2.2	7.0	5.9	5.7	5.5	5.8	2.7	5.9	12.9	0.2	5.4	5.4
CF																		
Infrastructure																		
Transport	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
environmental	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Notes: Assumed shares for 2007-2017 programmes based on 2000-2006 Structural Funds programmes.

(1) Technical assistance SF: administrative expenditure, studies, etc.

Table A3 : GDP effects and net transfers received COH (% of GDP):

	2007		2008		2009		2010		2011	
	COH	GDP	COH	GDP	COH	GDP	COH	GDP	COH	GDP
DE	-0.06	-0.05	-0.15	-0.11	-0.20	-0.16	-0.20	-0.22	-0.20	-0.25
FR	-0.08	-0.41	-0.20	-0.43	-0.26	-0.38	-0.26	-0.36	-0.26	-0.36
IT	-0.04	-0.16	-0.11	-0.21	-0.13	-0.21	-0.13	-0.22	-0.13	-0.21
UK	-0.08	-0.19	-0.20	-0.18	-0.24	-0.21	-0.24	-0.24	-0.24	-0.26
ES	0.02	-0.05	0.04	-0.14	0.05	-0.19	0.04	-0.24	0.04	-0.25
NL	-0.08	-0.12	-0.20	-0.15	-0.26	-0.15	-0.26	-0.15	-0.26	-0.15
BE	-0.09	-0.16	-0.21	-0.20	-0.26	-0.20	-0.26	-0.19	-0.26	-0.19
DK	-0.07	0.19	-0.16	0.05	-0.20	-0.07	-0.20	-0.16	-0.20	-0.20
IE	-0.06	-0.03	-0.13	-0.09	-0.16	-0.07	-0.16	-0.06	-0.16	-0.06
PT	0.33	1.30	0.79	1.05	0.99	0.74	0.98	0.58	0.99	0.63
EL	0.22	1.08	0.50	0.85	0.62	0.57	0.61	0.38	0.61	0.36
AT	-0.09	0.18	-0.21	0.08	-0.26	0.02	-0.26	-0.01	-0.26	-0.02
SW	-0.08	0.11	-0.18	-0.10	-0.23	-0.15	-0.23	-0.18	-0.23	-0.21
FI	-0.08	-0.26	-0.20	-0.30	-0.25	-0.28	-0.25	-0.26	-0.26	-0.26
EE	0.76	1.14	1.66	0.92	2.06	0.84	2.04	0.98	2.04	1.34
LV	0.80	3.06	1.65	1.59	2.00	0.68	1.92	0.44	1.89	0.61
LT	0.83	1.30	1.84	1.17	2.30	1.07	2.28	1.18	2.28	1.53
CY	0.14	-0.05	0.33	0.01	0.41	0.08	0.41	0.13	0.41	0.19
MT	0.55	0.22	1.32	0.39	1.65	0.48	1.63	0.58	1.63	0.78
CZ	0.71	0.61	1.67	0.76	2.08	1.25	2.05	1.59	2.04	1.99
HU	0.87	0.37	2.03	1.03	2.50	1.76	2.44	2.30	2.41	2.90
PL	0.77	0.39	1.80	0.96	2.24	1.64	2.23	2.02	2.23	2.44
SI	0.43	0.43	1.01	0.46	1.26	0.49	1.25	0.56	1.26	0.75
SK	0.78	0.81	1.78	1.18	2.18	2.02	2.12	2.72	2.08	3.54
EA	-0.05	-0.10	-0.11	-0.16	-0.14	-0.18	-0.14	-0.21	-0.14	-0.21
EU15	-0.05	-0.11	-0.13	-0.16	-0.16	-0.19	-0.16	-0.21	-0.16	-0.22
NMS	0.74	0.59	1.73	0.92	2.15	1.43	2.12	1.79	2.11	2.23
EU	0.00	-0.07	0.00	-0.09	0.00	-0.08	0.00	-0.08	0.00	-0.06
	2012		2013		2014		2015		2020	
	COH	GDP	COH	GDP	COH	GDP	COH	GDP	COH	GDP
DE	-0.18	-0.27	-0.16	-0.26	-0.21	-0.17	-0.19	-0.08	0.00	-0.05
FR	-0.23	-0.37	-0.21	-0.37	-0.27	-0.34	-0.25	-0.27	0.00	-0.29
IT	-0.12	-0.21	-0.11	-0.18	-0.14	-0.10	-0.13	-0.01	0.00	-0.06
UK	-0.22	-0.29	-0.20	-0.30	-0.25	-0.32	-0.24	-0.32	0.00	-0.31
ES	0.04	-0.27	0.04	-0.23	0.05	-0.06	0.04	0.12	0.00	0.20
NL	-0.23	-0.15	-0.21	-0.15	-0.27	-0.10	-0.25	-0.04	0.00	-0.15
BE	-0.23	-0.20	-0.21	-0.20	-0.27	-0.14	-0.25	-0.07	0.00	-0.16
DK	-0.18	-0.22	-0.16	-0.23	-0.21	-0.20	-0.19	-0.16	0.00	-0.29
IE	-0.14	-0.07	-0.13	-0.07	-0.17	-0.02	-0.16	0.04	0.00	-0.06
PT	0.88	0.72	0.81	0.90	1.03	1.45	0.97	1.80	0.00	2.02
EL	0.55	0.37	0.50	0.47	0.64	0.86	0.60	1.12	0.00	1.24
AT	-0.24	-0.03	-0.22	-0.01	-0.27	0.06	-0.26	0.12	0.00	-0.17
SW	-0.21	-0.24	-0.19	-0.26	-0.24	-0.24	-0.23	-0.19	0.00	-0.29
FI	-0.23	-0.27	-0.21	-0.26	-0.27	-0.21	-0.25	-0.13	0.00	-0.23
EE	1.82	1.69	1.68	2.11	2.13	2.91	2.01	3.47	0.00	3.57
LV	1.69	0.79	1.56	1.08	1.99	1.86	1.87	2.27	0.00	2.13
LT	2.04	1.85	1.88	2.30	2.38	3.22	2.24	3.80	0.00	4.32
CY	0.36	0.24	0.33	0.31	0.42	0.51	0.40	0.66	0.00	0.60
MT	1.46	0.94	1.34	1.15	1.71	1.61	1.61	1.86	0.00	1.87
CZ	1.80	2.32	1.65	2.78	2.06	3.80	1.91	4.58	0.00	3.77
HU	2.13	3.37	1.93	3.97	2.42	5.14	2.24	5.99	0.00	4.52
PL	1.97	2.71	1.79	3.19	2.23	4.55	2.06	5.65	0.00	4.71
SI	1.12	0.91	1.03	1.14	1.31	1.67	1.23	2.02	0.00	1.96
SK	1.82	4.28	1.65	5.17	2.04	6.71	1.88	7.92	0.00	7.27
EA	-0.12	-0.22	-0.11	-0.21	-0.14	-0.11	-0.13	-0.01	0.00	-0.03
EU15	-0.14	-0.24	-0.13	-0.23	-0.17	-0.16	-0.16	-0.08	0.00	-0.09
NMS	1.87	2.57	1.70	3.07	2.13	4.22	1.97	5.10	0.00	4.31
EU	0.00	-0.05	0.00	-0.01	0.00	0.14	0.00	0.27	0.00	0.21

Table A4 : Detailed tables for NMS

Estonia

EE	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	1.14	0.92	0.84	0.98	1.34	1.69	2.11	2.91	3.47	3.57
PRIV.CONSUM_PCER	5.70	5.22	4.84	4.56	4.34	4.18	4.05	4.05	4.02	2.81
PRIV.INV.I_PCER	-1.07	-2.02	-2.43	-2.35	-2.01	-1.55	-0.94	-0.08	0.83	2.61
EXPORTS_PCER	0.09	-0.39	-0.40	-0.04	0.50	1.07	1.65	2.42	3.17	4.33
IMPORTS_PCER	1.88	1.44	1.40	1.64	2.13	2.66	3.23	4.27	5.07	5.38
EMPLOYMENT_PCER	0.25	0.06	-0.00	-0.03	-0.03	-0.05	-0.06	-0.04	-0.03	-0.04
REAL.WAGE.COSTS_PCER	0.95	1.18	0.98	1.12	1.47	1.84	2.30	3.12	3.54	3.78
PRICE.LEVEL_PCER	0.68	1.04	0.91	0.45	-0.11	-0.71	-1.24	-1.78	-2.25	-3.33
CONS.PRICE.LEVEL_PCER	0.27	0.36	0.27	0.07	-0.14	-0.34	-0.53	-0.68	-0.77	-1.04
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	0.00	0.00	0.00	1.9e-11	3.7e-10	6.9e-12	9.6e-11	-6.2e-13	0.00	-8.9e-13
REER_PCER	-0.77	-1.18	-1.08	-0.65	-0.11	0.48	1.01	1.60	2.21	3.56
	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	0.69	0.36	-0.14	-0.46	-0.56	-0.60	-0.54	-0.54	-0.48	0.05
INFLATION.PC_ER	0.27	0.10	-0.10	-0.20	-0.20	-0.21	-0.18	-0.16	-0.09	0.03
UNEMPL.RATE_ER	-0.24	-0.06	0.00	0.03	0.03	0.05	0.06	0.04	0.03	0.04
COH.GDP_ER	0.76	1.66	2.06	2.04	2.04	1.82	1.68	2.13	2.01	0.00
TRADE.BAL.TO.GDP_ER	-1.83	-1.96	-2.00	-1.96	-1.95	-1.90	-1.88	-2.19	-2.24	-1.28

Latvia

LV	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	3.06	1.59	0.68	0.44	0.61	0.79	1.08	1.86	2.27	2.13
PRIV.CONSUM_PCER	8.72	7.07	6.09	5.67	5.43	5.28	5.17	5.19	5.22	4.63
PRIV.INV.I_PCER	-1.24	-3.32	-4.64	-5.07	-5.02	-4.78	-4.37	-3.73	-2.89	-0.40
EXPORTS_PCER	-0.96	-2.35	-2.68	-2.31	-1.70	-1.08	-0.48	0.15	0.67	1.65
IMPORTS_PCER	3.20	1.55	0.77	0.60	0.74	0.94	1.20	1.88	2.37	2.57
EMPLOYMENT_PCER	0.66	-0.01	-0.11	-0.12	-0.13	-0.16	-0.20	-0.22	-0.23	-0.20
REAL.WAGE.COSTS_PCER	2.55	2.26	0.89	0.64	0.81	1.00	1.38	2.21	2.42	2.39
PRICE.LEVEL_PCER	1.97	3.17	3.28	2.78	2.16	1.51	0.98	0.62	0.35	-0.66
CONS.PRICE.LEVEL_PCER	1.33	2.09	2.14	1.77	1.34	0.89	0.52	0.28	0.11	-0.54
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	3.8e-11	-9.0e-11	3.2e-11	-1.8e-11	4.7e-10	2.1e-12	-6.9e-10	0.00	0.00	0.00
REER_PCER	-2.01	-3.21	-3.36	-2.92	-2.33	-1.72	-1.22	-0.83	-0.45	0.79
	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	2.05	1.24	0.11	-0.51	-0.62	-0.63	-0.52	-0.36	-0.27	0.06
INFLATION.PC_ER	1.37	0.78	0.05	-0.37	-0.44	-0.44	-0.36	-0.24	-0.17	0.05
UNEMPL.RATE_ER	-0.61	0.01	0.11	0.12	0.12	0.15	0.19	0.21	0.22	0.19
COH.GDP_ER	0.80	1.65	2.00	1.92	1.89	1.69	1.56	1.99	1.87	0.00
TRADE.BAL.TO.GDP_ER	-1.92	-1.88	-1.74	-1.50	-1.27	-1.06	-0.88	-0.88	-0.88	-0.52

Note: PCER percentage difference from base, ER absolute difference from base (-.GDP_ER as % of GDP)

Lithuania

LT	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	1.30	1.17	1.07	1.18	1.53	1.85	2.30	3.22	3.80	4.32
PRIV.CONSUM_PCER	3.16	2.95	2.91	3.02	3.14	3.24	3.37	3.61	3.84	3.84
PRIV.INV.I_PCER	-1.15	-2.30	-2.94	-2.97	-2.67	-2.18	-1.46	-0.48	0.65	3.93
EXPORTS_PCER	0.10	-0.59	-0.78	-0.52	-0.03	0.54	1.14	1.85	2.56	4.32
IMPORTS_PCER	1.43	1.09	1.09	1.34	1.80	2.27	2.81	3.79	4.57	5.56
EMPLOYMENT_PCER	0.24	-0.00	-0.07	-0.11	-0.13	-0.17	-0.20	-0.22	-0.22	-0.25
REAL.WAGE.COSTS_PCER	1.16	1.47	1.22	1.36	1.71	2.06	2.59	3.52	3.92	4.57
PRICE.LEVEL_PCER	0.74	1.33	1.35	0.96	0.44	-0.18	-0.73	-1.20	-1.66	-3.29
CONS.PRICE.LEVEL_PCER	0.44	0.73	0.69	0.44	0.13	-0.22	-0.53	-0.78	-1.00	-1.81
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	-2.8e-10	-2.0e-10	5.6e-11	1.6e-11	3.3e-10	9.3e-13	-1.2e-10	0.00	1.8e-13	5.3e-13
REER_PCER	-0.82	-1.45	-1.51	-1.16	-0.66	-0.06	0.48	0.98	1.57	3.49

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	0.74	0.59	0.02	-0.38	-0.52	-0.62	-0.55	-0.47	-0.47	-0.04
INFLATION.PC_ER	0.44	0.29	-0.04	-0.25	-0.31	-0.35	-0.31	-0.25	-0.23	-0.01
UNEMPL.RATE_ER	-0.23	0.00	0.07	0.10	0.13	0.16	0.20	0.21	0.22	0.24
COH.GDP_ER	0.83	1.84	2.30	2.28	2.28	2.04	1.88	2.38	2.24	0.00
TRADE.BAL.TO.GDP_ER	-0.79	-1.07	-1.28	-1.35	-1.38	-1.33	-1.29	-1.48	-1.54	-1.03

Cyprus

CY	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	-0.05	0.01	0.08	0.13	0.19	0.24	0.31	0.51	0.66	0.60
PRIV.CONSUM_PCER	-0.14	-0.11	-0.06	-0.01	0.04	0.09	0.14	0.25	0.34	0.37
PRIV.INV.I_PCER	-0.41	-0.66	-0.79	-0.82	-0.79	-0.71	-0.56	-0.30	0.00	0.33
EXPORTS_PCER	-0.04	-0.07	-0.03	0.04	0.12	0.20	0.28	0.43	0.60	0.76
IMPORTS_PCER	-0.17	-0.09	-0.02	0.03	0.10	0.16	0.25	0.47	0.66	0.65
EMPLOYMENT_PCER	0.01	0.01	-0.01	-0.02	-0.03	-0.03	-0.04	-0.05	-0.06	-0.05
REAL.WAGE.COSTS_PCER	-0.01	0.05	0.13	0.18	0.25	0.30	0.40	0.62	0.73	0.68
PRICE.LEVEL_PCER	-0.05	-0.12	-0.18	-0.23	-0.28	-0.34	-0.39	-0.40	-0.34	-0.27
CONS.PRICE.LEVEL_PCER	-0.10	-0.16	-0.21	-0.25	-0.28	-0.32	-0.35	-0.33	-0.23	-0.10
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	-3.7e-10	-4.0e-10	-2.1e-11	1.6e-11	5.2e-10	9.2e-12	0.00	-3.4e-12	-8.9e-13	4.0e-13
REER_PCER	-0.07	-0.07	-0.05	-0.01	0.04	0.09	0.13	0.19	0.25	0.42

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	-0.05	-0.06	-0.06	-0.06	-0.05	-0.06	-0.04	-0.01	0.06	0.03
INFLATION.PC_ER	-0.10	-0.06	-0.05	-0.04	-0.03	-0.04	-0.03	0.02	0.10	0.04
UNEMPL.RATE_ER	-0.01	-0.01	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.06
COH.GDP_ER	0.14	0.33	0.41	0.41	0.41	0.36	0.33	0.42	0.40	0.00
TRADE.BAL.TO.GDP_ER	0.07	0.01	0.00	0.01	0.01	0.02	0.02	-0.02	-0.04	0.06

Malta

MT	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.22	0.39	0.48	0.58	0.78	0.94	1.15	1.61	1.86	1.87
PRIV.CONSUM_PCER	0.72	0.75	0.76	0.79	0.83	0.86	0.89	1.00	1.06	0.82
PRIV.INV.I_PCER	-0.92	-1.80	-2.33	-2.46	-2.35	-2.07	-1.63	-1.04	-0.27	2.01
EXPORTS_PCER	-0.23	-0.43	-0.43	-0.23	0.05	0.37	0.69	0.98	1.34	2.29
IMPORTS_PCER	0.24	0.35	0.47	0.65	0.93	1.19	1.48	2.05	2.48	2.64
EMPLOYMENT_PCER	0.05	0.02	-0.00	-0.02	-0.03	-0.04	-0.05	-0.03	-0.02	-0.02
REAL.WAGE.COSTS_PCER	0.23	0.46	0.55	0.66	0.85	1.03	1.28	1.72	1.87	1.99
PRICE.LEVEL_PCER	0.09	0.17	0.09	-0.14	-0.42	-0.73	-1.00	-1.18	-1.36	-1.93
CONS.PRICE.LEVEL_PCER	-0.06	-0.06	-0.11	-0.22	-0.33	-0.46	-0.57	-0.62	-0.61	-0.73
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	-5.1e-10	-1.7e-10	6.7e-12	1.7e-11	4.7e-10	9.8e-12	2.3e-09	4.5e-11	0.00	-4.4e-14
REER_PCER	-0.27	-0.41	-0.36	-0.14	0.14	0.45	0.73	0.98	1.30	2.15

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	0.09	0.08	-0.08	-0.24	-0.28	-0.31	-0.27	-0.18	-0.18	0.08
INFLATION.PC_ER	-0.06	-0.00	-0.05	-0.11	-0.11	-0.13	-0.11	-0.04	0.01	0.05
UNEMPL.RATE_ER	-0.05	-0.02	0.00	0.02	0.03	0.04	0.05	0.03	0.02	0.02
COH.GDP_ER	0.55	1.32	1.65	1.63	1.63	1.46	1.34	1.71	1.61	0.00
TRADE.BAL.TO.GDP_ER	-0.41	-0.67	-0.79	-0.79	-0.80	-0.75	-0.74	-0.98	-1.05	-0.38

Czech Republic

CZ	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.61	0.76	1.25	1.59	1.99	2.32	2.78	3.80	4.58	3.77
PRIV.CONSUM_PCER	5.27	5.19	5.19	5.16	5.15	5.12	5.15	5.38	5.55	4.01
PRIV.INV.I_PCER	-1.64	-1.99	-1.83	-1.39	-0.85	-0.17	0.79	2.03	3.21	3.83
EXPORTS_PCER	-0.58	-0.69	-0.21	0.23	0.70	1.12	1.64	2.51	3.40	3.56
IMPORTS_PCER	0.90	1.40	1.91	2.28	2.75	3.16	3.76	4.96	5.96	4.95
EMPLOYMENT_PCER	0.20	0.06	0.04	0.02	0.03	0.03	0.02	0.08	0.13	0.10
REAL.WAGE.COSTS_PCER	0.50	0.94	1.34	1.69	2.06	2.40	2.90	3.87	4.42	3.84
PRICE.LEVEL_PCER	0.32	0.58	1.01	1.46	1.94	2.41	2.98	3.72	4.71	5.42
CONS.PRICE.LEVEL_PCER	-0.41	-0.06	0.53	1.15	1.83	2.50	3.30	4.34	5.71	6.72
DOLLAR.EXCH.RATE_PCER	-1.30	-0.85	-0.08	0.73	1.61	2.47	3.50	4.88	6.72	8.23
EURO.EXCH.RATE_PCER	-1.00	-0.47	0.35	1.17	2.05	2.91	3.93	5.22	6.85	7.93
REER_PCER	-1.39	-1.19	-0.86	-0.51	-0.13	0.23	0.66	1.20	1.90	2.47

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	0.09	0.62	0.78	0.85	0.84	0.91	1.20	1.65	1.00	0.21
INFLATION.PGDP_ER	0.32	0.26	0.43	0.44	0.48	0.46	0.55	0.73	0.95	0.11
INFLATION.PC_ER	-0.41	0.36	0.59	0.62	0.67	0.66	0.78	1.01	1.32	0.15
UNEMPL.RATE_ER	-0.19	-0.05	-0.04	-0.02	-0.03	-0.02	-0.02	-0.07	-0.12	-0.09
COH.GDP_ER	0.71	1.67	2.08	2.05	2.04	1.80	1.65	2.06	1.91	0.00
TRADE.BAL.TO.GDP_ER	-1.41	-2.06	-2.17	-2.18	-2.22	-2.18	-2.23	-2.55	-2.62	-1.36

Hungary

HU	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.37	1.03	1.76	2.30	2.90	3.37	3.97	5.14	5.99	4.52
PRIV.CONSUM_PCER	0.95	1.12	1.24	1.26	1.25	1.25	1.29	1.49	1.62	0.71
PRIV.INV.I_PCER	-1.43	-2.01	-2.01	-1.76	-1.37	-0.85	-0.03	1.09	2.17	2.35
EXPORTS_PCER	0.01	0.22	0.75	1.28	1.83	2.35	2.92	3.73	4.55	4.18
IMPORTS_PCER	0.33	1.08	1.85	2.44	3.14	3.70	4.46	5.81	6.88	5.06
EMPLOYMENT_PCER	0.08	0.04	0.01	-0.03	-0.05	-0.08	-0.09	-0.05	-0.01	-0.00
REAL.WAGE.COSTS_PCER	0.43	1.18	1.91	2.53	3.12	3.61	4.28	5.45	6.08	4.76
PRICE.LEVEL_PCER	0.15	0.54	1.11	1.69	2.32	2.90	3.56	4.33	5.25	5.03
CONS.PRICE.LEVEL_PCER	0.02	0.59	1.45	2.37	3.37	4.27	5.28	6.45	7.83	7.39
DOLLAR.EXCH.RATE_PCER	-0.33	0.36	1.39	2.47	3.63	4.70	5.94	7.39	9.13	8.89
EURO.EXCH.RATE_PCER	-0.03	0.74	1.82	2.91	4.08	5.16	6.38	7.74	9.27	8.58
REER_PCER	-0.28	0.03	0.49	0.97	1.47	1.94	2.46	3.04	3.70	3.50

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	0.43	0.88	1.03	1.12	1.06	1.08	1.30	1.60	0.74	-0.12
INFLATION.PGDP_ER	0.15	0.39	0.57	0.58	0.62	0.56	0.64	0.74	0.88	-0.07
INFLATION.PC_ER	0.02	0.59	0.87	0.92	0.98	0.87	0.98	1.11	1.29	-0.13
UNEMPL.RATE_ER	-0.08	-0.04	-0.01	0.03	0.05	0.07	0.08	0.05	0.01	0.00
COH.GDP_ER	0.87	2.03	2.50	2.44	2.41	2.13	1.93	2.42	2.24	0.00
TRADE.BAL.TO.GDP_ER	-0.35	-0.97	-1.31	-1.46	-1.68	-1.72	-1.92	-2.55	-2.80	-1.02

Poland

PL	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.39	0.96	1.64	2.02	2.44	2.71	3.19	4.55	5.65	4.71
PRIV.CONSUM_PCER	1.81	2.05	2.37	2.62	2.84	3.02	3.30	3.91	4.60	4.45
PRIV.INV.I_PCER	-3.51	-3.78	-3.61	-3.21	-2.83	-2.29	-1.27	0.41	2.24	4.75
EXPORTS_PCER	-0.70	-0.83	-0.28	0.26	0.80	1.25	1.72	2.53	3.58	3.70
IMPORTS_PCER	0.11	1.08	1.70	2.05	2.48	2.79	3.37	4.91	6.28	5.45
EMPLOYMENT_PCER	0.13	0.08	0.10	0.09	0.11	0.10	0.10	0.18	0.28	0.22
REAL.WAGE.COSTS_PCER	0.39	1.01	1.62	2.06	2.43	2.73	3.26	4.48	5.26	4.69
PRICE.LEVEL_PCER	0.17	0.53	1.11	1.70	2.29	2.77	3.32	4.22	5.49	5.81
CONS.PRICE.LEVEL_PCER	-0.14	0.28	0.97	1.68	2.39	2.98	3.64	4.72	6.24	6.61
DOLLAR.EXCH.RATE_PCER	-1.40	-0.77	0.28	1.35	2.43	3.32	4.33	5.99	8.36	9.16
EURO.EXCH.RATE_PCER	-1.10	-0.39	0.71	1.79	2.88	3.77	4.77	6.34	8.49	8.85
REER_PCER	-1.35	-1.07	-0.61	-0.14	0.33	0.71	1.13	1.79	2.72	2.99

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	0.28	0.85	1.02	1.09	0.90	0.87	1.33	2.06	1.02	0.14
INFLATION.PGDP_ER	0.17	0.36	0.58	0.58	0.58	0.47	0.53	0.87	1.21	0.06
INFLATION.PC_ER	-0.14	0.42	0.69	0.69	0.70	0.57	0.64	1.04	1.45	0.07
UNEMPL.RATE_ER	-0.11	-0.07	-0.09	-0.08	-0.10	-0.09	-0.09	-0.16	-0.25	-0.19
COH.GDP_ER	0.77	1.80	2.24	2.23	2.23	1.97	1.79	2.23	2.06	0.00
TRADE.BAL.TO.GDP_ER	-0.31	-0.75	-0.79	-0.72	-0.69	-0.63	-0.68	-0.97	-1.10	-0.72

Slovenia

SI	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.43	0.46	0.49	0.56	0.75	0.91	1.14	1.67	2.02	1.96
PRIV.CONSUM_PCER	1.50	1.47	1.45	1.48	1.55	1.62	1.72	1.93	2.15	2.04
PRIV.INV.I_PCER	-0.77	-1.47	-1.86	-1.99	-1.95	-1.80	-1.51	-1.01	-0.46	0.74
EXPORTS_PCER	-0.02	-0.18	-0.12	0.08	0.36	0.65	0.96	1.42	1.84	2.26
IMPORTS_PCER	0.51	0.43	0.45	0.57	0.78	1.01	1.28	1.87	2.32	2.49
EMPLOYMENT_PCER	0.10	0.07	0.05	0.04	0.05	0.05	0.06	0.11	0.14	0.13
REAL.WAGE.COSTS_PCER	0.30	0.52	0.52	0.59	0.75	0.91	1.15	1.62	1.86	1.94
PRICE.LEVEL_PCER	0.25	0.38	0.32	0.12	-0.11	-0.37	-0.60	-0.80	-0.95	-1.42
CONS.PRICE.LEVEL_PCER	0.13	0.16	0.11	-0.01	-0.14	-0.28	-0.40	-0.50	-0.53	-0.70
DOLLAR.EXCH.RATE_PCER	-0.30	-0.38	-0.42	-0.44	-0.43	-0.43	-0.42	-0.33	-0.12	0.28
EURO.EXCH.RATE_PCER	-1.2e-10	-2.7e-10	0.00	-1.6e-11	4.8e-10	9.3e-12	-6.0e-10	0.00	6.4e-13	1.6e-13
REER_PCER	-0.34	-0.53	-0.51	-0.34	-0.12	0.13	0.34	0.58	0.84	1.55

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	-0.08	-0.05	-0.01	0.01	0.01	0.01	0.06	0.18	0.17	0.04
INFLATION.PGDP_ER	0.26	0.13	-0.06	-0.20	-0.23	-0.27	-0.22	-0.20	-0.15	0.04
INFLATION.PC_ER	0.13	0.03	-0.06	-0.12	-0.13	-0.14	-0.12	-0.09	-0.04	0.03
UNEMPL.RATE_ER	-0.10	-0.07	-0.05	-0.04	-0.05	-0.05	-0.06	-0.10	-0.14	-0.13
COH.GDP_ER	0.43	1.01	1.26	1.25	1.26	1.12	1.03	1.31	1.23	0.00
TRADE.BAL.TO.GDP_ER	-0.39	-0.45	-0.44	-0.38	-0.33	-0.28	-0.25	-0.35	-0.38	-0.18

Slovakia

SK	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
GDP_PCER	0.81	1.18	2.02	2.72	3.54	4.28	5.17	6.71	7.92	7.27
PRIV.CONSUM_PCER	5.50	5.47	5.44	5.30	5.11	4.93	4.79	4.82	4.75	2.48
PRIV.INV.I_PCER	-1.99	-2.46	-2.03	-1.11	0.04	1.42	3.16	5.20	7.13	8.72
EXPORTS_PCER	-0.29	-0.14	0.67	1.48	2.36	3.22	4.18	5.54	6.87	7.34
IMPORTS_PCER	1.31	2.01	2.96	3.86	4.95	5.96	7.18	9.08	10.65	9.75
EMPLOYMENT_PCER	0.26	0.02	-0.04	-0.13	-0.17	-0.22	-0.25	-0.23	-0.20	-0.16
REAL.WAGE.COSTS_PCER	0.75	1.47	2.23	3.00	3.81	4.56	5.54	7.11	8.03	7.52
PRICE.LEVEL_PCER	0.41	0.97	1.82	2.75	3.77	4.77	5.89	7.19	8.66	9.80
CONS.PRICE.LEVEL_PCER	-0.18	0.58	1.82	3.25	4.85	6.42	8.15	10.15	12.38	14.13
DOLLAR.EXCH.RATE_PCER	-1.08	-0.09	1.45	3.16	5.05	6.93	9.03	11.51	14.35	16.78
EURO.EXCH.RATE_PCER	-0.78	0.29	1.88	3.61	5.51	7.39	9.49	11.87	14.49	16.45
REER_PCER	-1.26	-0.82	-0.14	0.61	1.43	2.23	3.11	4.11	5.20	6.13

	2007A	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2020A
SHORT.RATE_ER	0.48	1.32	1.61	1.79	1.78	1.84	2.15	2.54	1.48	0.23
INFLATION.PGDP_ER	0.42	0.56	0.85	0.92	1.00	0.97	1.07	1.23	1.38	0.13
INFLATION.PC_ER	-0.18	0.76	1.25	1.41	1.56	1.49	1.62	1.84	2.03	0.18
UNEMPL.RATE_ER	-0.22	-0.02	0.04	0.11	0.15	0.19	0.22	0.20	0.18	0.14
COH.GDP_ER	0.78	1.78	2.18	2.12	2.08	1.82	1.65	2.04	1.88	0.00
TRADE.BAL.TO.GDP_ER	-1.64	-2.38	-2.66	-2.90	-3.20	-3.33	-3.57	-4.13	-4.32	-2.61

Note: PCER percentage difference from base, ER absolute difference from base (-.GDP_ER as % of GDP)