ASSESSING THE IMPACT OF EU COHESION POLICY:
WHAT CAN ECONOMIC MODELS TELL US?

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“The consequences for human welfare involved in questions (of growth) are simply staggering: Once one starts to think about them, it is hard to think about anything else.”

Robert Lucas, 1988
1 INTRODUCTORY REMARKS

The challenge of evaluating the impacts of cohesion policy lies in the complexity of the public policy instruments being used in terms of individual projects, wider measures, operational programmes and the entire investment package taken as a whole. The goal of cohesion policy – to promote accelerated growth and development in lagging EU member states and regions, i.e. development at the aggregate macroeconomic level – is ambitious and the evaluation of its likely impacts draws on economic and other research that is still at an early stage of evolution. The context within which cohesion policy is designed, implemented and evaluated is also complex and this should serve as a warning against simplistic evaluations and premature judgements.

In the course of cohesion policy impact evaluation there are really only two crucial decisions to be taken. First, do you need to construct an explicit policy counterfactual? Second, if the answer is “yes”, how does one define the counterfactual? If one wishes to identify the specific contribution of a policy action, it would be difficult to answer other than “yes” to the first question. But there are a range of possible answers to the second question. On the one hand there is what we shall term a “soft” counterfactual, defined in the Barca report as follows:

Counterfactual impact evaluation (here termed simply impact evaluation) allows the assessment of policy effects without the use of complex econometric models, in which strong hypotheses need to be made which are often hard to appreciate by the layman, and to act as a leverage for policy improvement. It focuses on using data of good quality and on the robustness of the method through which a population “similar” to the target population is identified. (Barca, 2009, p.47).

On the other hand there is what we shall term a “hard” counterfactual which can only be constructed using an explicit model that attempts to articulate how policy affects the economy, thus permitting direct analysis of “with policy” compared to “without policy” scenarios.¹

¹ One could argue about the allocation of the terms “hard” and “soft”. In our use of the terms, “hard” signals that the counterfactual scenario can be defined fairly precisely, but depends on the acceptability of the model as a true and accurate portrait of how economies function and how policy instruments affect economic processes. “Soft”, on the other hand, signals that it is very difficult to identify with any degree of precision “a population “similar” to the target population.”
Our background to the preparation of this paper was a period of more than twenty years developing and using a specific model framework to identify the cohesion policy counterfactual. This framework is the HERMIN model which had its origins in the EU HERMES model and is now the model used within DG-REGIO’s Cohesion System of HERMIN Models (or CSHM). However, we do not feel that it is useful simply to present in isolation the results of policy impact analysis based on the HERMIN model since this would represent just the application of one model (HERMIN) and could not claim to be unambiguously preferable to results based on any alternative model. Furthermore, presentation of the technical details of the HERMIN model structure and its operational use would risk confusing the layman (to use Barca’s language), and would simply uncover areas of macroeconomic theory and knowledge where researchers and policy makers can and do legitimately hold different and often opposing views. The ambiguity of the Barca quest for “a population ‘similar’ to the target population” finds a parallel in the quest for an “appropriate model” for use in in model-based cohesion policy analysis. Neither approach to defining a policy counterfactual – hard versus soft - can claim unambiguous superiority. Open discourse on these issues is vital if we are to move towards a better understanding of policy impact analysis.

We set ourselves the following objectives in this paper. First, we stand back from the technical aspects of the analysis of cohesion policy impacts in order to identify and describe what we see as the essential stages of model-based evaluation with specific attention to areas where evaluators may legitimately differ from each other. Second, we briefly examine two model-based evaluations of cohesion policy impacts that were produced using different models: the CSHM of DG-REGIO and the QUEST model of DG-ECFIN. Third, in light of the different policy impact results obtained from these two models, we initiate a discussion of possible explanations for these differences.

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2 HERMES (d’Alcantara and Italianer, 1982) was an ambitious effort to model EU supply-side responses to the second oil price shock. Early documentation of HERMIN includes Bradley et al, 1985 and Bradley et al, 1995. For recent HERMIN documentation, see Bradley and Untiedt, 2010.

3 Our inclusion of QUEST-based simulation results from the Fifth Cohesion Report is merely for the purposes of identifying differences in policy impacts that arise from differences in model properties. We make no assertion that any one analysis is better than any other.
2 THE LOGIC OF “HARD” COHESION POLICY IMPACT ANALYSIS

We can identify ten separate logical steps in any model-based analysis of cohesion policy impacts. These can be collected into the two main stages: methodology (stage 1) and presentation and interpretation of results (stage 2).

Stage 1: Evaluating cohesion policy interventions: methodology

Step 1: Economic theory and public investment: Recent theoretical advances in trade theory, growth theory and economic geography provide insights that can be drawn on for the planning and analysis of cohesion policy. These theoretical advances tell us something about the role of investment in physical infrastructure, human capital, R&D and innovation. In particular, they suggest ways in which these policies could promote growth and wealth.

Step 2: Empirics of investment impacts: Given the theoretical insights that are provided in the trade, growth and spatial literatures, we can then seek to establish what the international empirical literature tells us about the strength of these drivers of growth and development in different circumstances. This literature is still at an early stage and it is easy to become agnostic! What is important is to draw lessons from empirical studies that provide guidance as to how these driving forces can be related to model mechanisms and equations that trace through the consequences for changes in sectoral output and productivity.

Step 3: Why models are needed: The complexity of an economy, with all its internal and external interactions, and the complexity of cohesion policies means that explicit and often complex models must be used to evaluate their structural impacts. Without models it is very difficult to isolate the influences of cohesion policy from all the other factors that drive growth in a small open economy. In addition, the cohesion policy financial injections are usually so large that there will be macroeconomic consequences that will

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6 Monitoring should be clearly distinguished from impact evaluation. Monitoring indicators can be used to show (for example) how much motorway has been constructed, but cannot identify the role of roadway improvements in boosting output and/or productivity.
affect all structural aspects of the economy, and not just the areas that are directly
influenced by the investments (e.g., output and productivity).

**Step 4: What kind of macro model:** One has to ask the important question of what kind of
model is appropriate for the evaluation of cohesion policy impacts. This will be influenced
by insights into what are the key characteristics of the recipient countries. What kind of
paradigm best captures these characteristics and gives an appropriate description of the
supported country? What level of sectoral disaggregation is required? But it is important
to stress a methodological point here. Economic models are imperfect representations of
the real world. Modern modelling practice has tended to assign high status to frameworks
that incorporate complete rational optimising behaviour and perfect foresight. Such
models are elegant but may trap policy analysts into interpreting policy impacts on the
basis of models that may not represent the realistic behaviour of agents in the real world
(Akerlof, 2005 and 2007). The price of realism may be a lack of complete optimising
elegance!

**Step 5: Demand versus supply impacts:** Cohesion policy investments have
implementation impacts during programme execution and supply-side impacts both during
but mainly long after the programmes have terminated. One must be careful with how this
distinction is captured in the models. A wide range of other questions also becomes
important. In particular, how are we to handle demand and supply impacts that arise
during implementation and after termination? The recipient states sometimes have rather
specific structural characteristics. Given the known characteristics of the recipient states,
what could be expected in terms of impacts? Total crowding out of private sector activity
as a consequence of the rise in public sector activity? Partial crowding out? Crowding
in? Ricardian equivalence? The answers to these questions are heavily influenced by
the known facts about the economies being aided.

**Step 6: Sectoral issues in modelling:** A specific and very important issue arises with all
macromodels concerning the level of disaggregation of sectoral production. Cohesion
policy is likely to impact on the various sectors of the economy in very different ways, so
one needs to be aware of how each different model addresses questions of sectoral
disaggregation on the production side of the economy. Can these differences be
subjected to empirical testing? Which approach is more plausible?

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7 Bayoumi (2004) describes the IMF DSGE model, GEM; Ratto et al. (2005) describe DG-
ECFIN’s new DSGE implementation of QUEST III.
**Stage 2: Evaluating cohesion policy interventions: results**

**Step 7:** The “no cohesion policy” counterfactual: The creation of a “no-cohesion policy” baseline is not trivial. In using a macro model to quantify the impacts of cohesion policy shocks, all models must go through the following stages:8

a) Project all non-cohesion policy (CP) exogenous variables out to the terminal year of the simulation (i.e., world, domestic policy instruments, etc.). For example, in the case of the analysis of the 2007-2013 cohesion programme, this year might be taken to be 2020.

b) Set all CP instruments to the appropriate counterfactual values (see below)

c) Simulate the model out to 2020

d) Re-set the cohesion policy instruments to the appropriate actual values

e) Re-simulate the model to 2020

f) Compare results obtained from stage (e) to results from stage (c), to evaluate CP impacts

However, a range of different “no-cohesion policy” counterfactuals are possible. We can distinguish three main cases: the “zero” substitution case; the “full” substitution case; and the “partial” substitution case.

(a) The “zero substitution” case:

Here, domestic authorities do not substitute with domestic finance and cancel the entire investment programme (usually selected as the default case). In some cases the fiscal imbalances in a recipient economy would preclude any expansions of public investment. However, in other cases the national authorities could step in and fund the cohesion policy investment programme purely out of local resources.9 Of course, in the latter situation, there would be more severe fiscal consequences for the public sector budget balance compared to the case of EU-funded cohesion policy.

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8 Hanging over step 7 is the spectre of the so-called “Lucas critique” (Lucas, 1976). The Lucas critique argues that it is naïve to try to predict the effects of a change in economic policy entirely on the basis of relationships observed in historical data, especially highly aggregated historical data. However, models such as HERMIN and QUEST are based carefully on micro-foundations, albeit in different ways and to different degrees. Model research has come a long way from the reduced form, time-series models, the use of which Lucas convincingly destroyed in the 1970s!

9 Countries are expected eventually to grow out of the need for EU development aid. For example, the Irish cohesion policy funding effectively ended in 2006, having run from 1989 to 2006.
(b) The “full substitution” case:

Here, domestic authorities fully implement original CP investments, but finance them entirely out of their own resources (see discussion above). This could be a mixture of public expenditure re-allocation to the kinds of investments involved in cohesion policy, borrowing and tax increases.

(c) The “partial substitution” case:

Here, domestic authorities implement only part of the original CP investments, but financed out of their own resources.

Very different implications arise from these counterfactuals. For example, in the “zero” substitution case, impact analysis would attribute to cohesion policy the entire economic benefits of the CP investments, treating the funding as a grant. In the “full” substitution case, impact analysis would be identical to the “zero substitution” case, except for the negative impacts (such as higher tax rates, offsetting cuts in expenditure, higher interest rates, exchange rate effects, etc.) of the need to finance domestically. Finally, the “partial” substitution case is difficult to evaluate. If the cancelled cohesion policy investments were genuine barriers to growth, the outcome might fall well below “full” substitution. If the cancelled investments were poorly designed (high deadweight/crowding out), then this case might be actually better than the case of “full” substitution.

Step 8: Policy Impacts for a single country: It is useful to present the empirical results, initially for a single country so that the presentation can refer to country specifics. The analysis should then provide a wide range of information aimed at interpreting the analysis, such as;

a) Present stylised facts about the country model.

b) Present the no-cohesion policy baseline under different assumptions, e.g., zero substitution and full substitution.

c) Present sensitivity analysis with respect to important model parameters, e.g., the so-called externality parameters that link changes in stocks of infrastructure, human capital and R&D to changes in sectoral output and productivity. Discuss the consequences in terms of what micro-scoring might indicate about the “quality” of the cohesion policy planning and implementation.10

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10 Bradley, et al, 2006 examines the close, but as yet under-researched, relationship between macro and micro economic techniques used in policy impact analysis.
d) Design the presentation of the results for a given country in a way that facilitates comparisons with other countries. The concept of a cumulative cohesion policy multiplier is particularly useful here, defined as:

\[
\text{Normal policy multiplier} = \frac{\text{Change in GDP}}{\text{Change in public investment}}
\]

The cumulative policy multiplier (between time \( t \) and time \( t+n \)) is defined as:

\[
\text{Cumulative CP multiplier} = \frac{\text{Cumulative percentage change in GDP}}{\text{Cumulative percentage share of CP in GDP}}
\]

**Step 9: Policy Impacts for many countries**: In a multi-country evaluation, we need to present summary results for all the countries, and explore international comparisons, spillovers and differences.

**Step 10: Drawing conclusions.** We need to discuss what the evaluations tell us about how policy can alter the initial structure and characteristics of the economies. Why do different models produce different results? What can be done about it? This is, of course, an important question, but it comes at the end of a long list of other issues that also influence the answers. Only when the question of model-based impact comparisons is placed in the above wider context can we isolate and rationally explore these differences.

It is useful to enquire into whether there are likely to be strong differences of approach to these steps as between different modelling groups. To that end, we suggest that the ten points can be subdivided into two distinct groups. In the first, we suggest that there ought to be no significant differences of approach between different modelling frameworks. In the second, unfortunately, strong differences of approach can and do legitimately arise.
3 AREAS OF POSSIBLE BROAD AGREEMENT

Within the range of different impact evaluation studies, there are likely to be areas within the above 10 steps where there is broad agreement. The most obvious cases for agreement might include the following:

Step 1: Economic theory and public investment: Faced with the challenge of analysing cohesion policy impacts, all modelling groups dip into new growth theory and economic geography in order to articulate the theoretical roles of physical infrastructure, human capital and R&D in promoting faster growth and catch-up. There is likely to be a lot of common ground here.

Step 3: Why are models needed: All modelling groups tend to accept that the role of models is to generate policy counterfactual scenarios and place the cohesion policy interventions in a wider macro context, where macro and other spillover impacts can be examined.

Step 7: The “no cohesion policy” counterfactual: There should be little or no differences between modelling groups on the definition of the counterfactuals. However, the counterfactuals are seldom discussed explicitly and there may be differences of opinion as to the most appropriate counterfactual to adopt as a standard.
4 AREAS OF POSSIBLE DISAGREEMENT

Step 2: Empirics of investment impacts: It is possible that all modelling groups have a common interpretation of the role of theory in exploring the drivers of growth and catch-up. However, there may be differences between the groups as to the strength of these relationships. Here we are focusing on the immediate relationship between (say) improved physical infrastructure and (say) manufacturing output or manufacturing productivity. We are not referring to the wider macro-economic outcome that is obtained when the immediate relationships are embedded in large-scale models. The literature presents a wide range of options from empirical studies, and is fraught with methodological and conceptual difficulties. However, even if there were agreement on what to take from the rather confused empirical literature, there could still be problems. The structures of the different models often impose differences in the underlying cohesion mechanisms.

Step 4: What kind of macro model: The most important difference between modelling groups probably lies in their choice of the modelling framework. This is not to say that there are any deep, fundamental paradigmatic differences between the models, such as exist between, say, central planning and market-based economics. All models draw in varying degrees from recent advances in modelling within the neo-Keynesian and CGE traditions. All tend to have a significant degree of micro underpinnings and are probably reasonably robust to the so-called Lucas critique.

Step 5: Demand versus supply impacts: Although the need to distinguish demand (implementation) effects from long-lasting supply (post-implementation) effects is accepted by all groups, the empirical analysis can lead to dramatically different outcomes, mainly due to the issues mentioned in Step 4 (choice of model structure).

Step 6: Sectoral issues in modelling: Under this heading we emphasise the fact that any detailed examination of cohesion policy impacts needs to be performed at a level of sectoral disaggregation that permits – at the very least – the separate analysis of key production sectors such as manufacturing, market services, agriculture and government. With few exceptions, the main sectoral driver of growth has been manufacturing, or sub-sectors of manufacturing. The rise of market services from a very low base has also been a common characteristic of the post-Communist transition of the new EU member states of the CEE area. Also, the agricultural sector has very specific characteristics that may serve to distort cohesion policy analysis unless the sector is isolated. Differences of the degree of sectoral disaggregation may also distort the comparisons of their results.
Steps 8-10: Policy impacts: Any different analyses of cohesion policy impacts derived from models such as QUEST or HERMIN are simply the results of all the divergences in modelling that are outlined above.
Two model-based ex-ante evaluations of EU cohesion policy were commissioned by DG Regional Policy in 2009 and formed an input to the *Fifth Cohesion Report* published in 2010. These evaluations explored the likely impact of the investments funded during the 2000-2006 and 2007-2013 budgetary programmes. A common set of cohesion policy financial data was used by both modelling groups: the *QUEST* model of DG ECFIN and the HERMIN models of the CSHM developed for DG-REGIO.

Although all models have the potential to examine the impacts of cohesion policy on many different aspects of economic performance, the impacts on aggregate GDP tends to be emphasised. Such analysis is usually presented in terms of the comparison of a “with cohesion policy” scenario relative to a “without cohesion policy” scenario. This distinction is not without its complications, as we discussed above, and there are a range of alternative counterfactuals. Using the terminology set out above, both models implemented the “zero” substitution counterfactual (i.e., domestic authorities do not substitute with domestic finance, and cancel the entire investment programme).

We reproduce a series of six figures that were published in the Fifth Cohesion Report, which contain summary comparisons of HERMIN and QUEST-based cohesion policy impact analysis. These are not ideal as examples of the kind of detailed, country-specific output that can be derived from such models, but they have the virtue of being in the public domain.

Figure 1 shows the average annual contribution of the EU element of cohesion funding, expressed as a percentage of national GDP. The “old” member states were still the main beneficiaries during the budgetary period 2000-2006, but this situation changed dramatically for the 2007-2013 budgetary period after the 2004 enlargement (Figure 2).

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11 See European Commission (2010), Chapter 4, Section 6 (pages 201-257) for the model results. See European Commission (2007) for earlier results based on HERMIN and QUEST II.
Figure 3 summarises the impacts on the level of total GDP during what we may term the policy “implementation” years of programme 2000-2006. It is seen that the impacts derived from HERMIN are larger in all cases, and significantly larger in the cases of the Italian Mezzogiorno, East Germany and Ireland. In the cases of the two regional economies, the differences are probably accounted for by the fact that the HERMIN models were specifically regional models of the respective national economies (Italy and Germany). In the case of Ireland, a national economy, the differences remain puzzling. In the cases of the new member states the comparison is mixed, with QUEST suggesting a much larger impact on Latvia than HERMIN does, but a much smaller impact for Hungary, Estonia, Malta and the Czech Republic.

12 Recall that under the so-called “n+2” rule recipients were permitted two extra years, 2007-2008, to draw down all funding.
Figure 4 shows the impacts on GDP for the year 2014, i.e., six years after expenditure from the 2000-2006 budgetary period ceased. Here there is a dramatic difference between the HERMIN and QUEST results, with QUEST suggesting much bigger post-implementation impacts.

13 Of course by the year 2014 the cohesion expenditures from the 2007-2013 budgetary programme will be flowing. The analysis being described in Figure 4 is focused purely on the 2000-2006 budgetary programme. The models permit us to carry out this kind of counterfactual analysis. The Commission accounting regulations require separate impact analysis of each budgetary programme. From an economic point of view this is meaningless!
In the 5th Cohesion Report, employment impacts were only presented in the case of HERMIN. This was not because there were no QUEST-based results. Rather it was because the QUEST analysis suggested that there were only very small employment impacts during the 2000-2006 budgetary programme implementation years. An interpretation of this result is that QUEST suggests that during the implementation years increased public investment expenditures funded by cohesion policy effectively crowds out private sector employment by a broadly similar amount to the employment creation generated by cohesion policy actions.\textsuperscript{14}

\textsuperscript{14} It was unfortunate that the employment impacts were not presented for QUEST in the 5th Cohesion Report since there are real issues to be addressed concerning the radically different policy impacts on employment produced by QUEST and HERMIN.
Finally, Figure 6 shows the impacts on GDP of the implementation years of the 2007-2013 budgetary programme. It is seen that the HERMIN-based impacts are bigger for the new member states, but equal or smaller for the “old” member states. Although the post-implementation impacts (i.e., after 2015) were not presented in the report, the pattern of behaviour is broadly similar to that shown in Figure 4 (i.e., the post implementation QUEST-based impacts on GDP are larger than the HERMIN-based results).

Figure 6: Estimated impact of cohesion policy expenditure on GDP, 2007-2016

Legend:
- HERMIN, EU-15
- HERMIN, MS since 2004/2007
- QUEST, EU-15
- QUEST, MS since 2004/2007

Note: DE-O=Estonia, Germany; MZ=Mezzogiorno; HERMIN models the impact for DE-O and MZ while QUEST shows the impact for the whole of DE and IT.

Source: HERMIN, QUEST
6.1 MODELLING COHESION POLICY SUPPLY-SIDE SPILLOVER EFFECTS

In the analysis reported in the 5th Cohesion Report, QUEST and HERMIN used similar financial data for the cohesion policy shock. The demand-side impact mechanisms are handled in a similar way, with elements of public expenditure being boosted during the programmes implementation phase (i.e., 2000-2006(+2) and 2007-2013(+2)). Of course, both models differ in the modelling of expenditure (private consumption and investment, in particular), but we will return to this point. There are some differences in the manner in which the financial data were transformed into changed stocks of physical infrastructure, human capital and R&D, but these are likely to be minor. The biggest difference is in the manner in which the improved stocks influence sectoral output and productivity in the models.

QUEST is essentially a one-production-sector model, with modelling at the level of aggregate private sector output. Improved stocks of infrastructure and human capital feed into capacity output in QUEST, through a Cobb-Douglas (CD) production function that has constant returns to private factor inputs (labour and private capital) and increasing returns to public capital. Consequently, it is mainly through the consequences of capacity utilization that QUEST reacts on the supply-side. During the implementation phase, capacity utilization is driven up, as demand impacts outstrip the more gradual build-up of new capacity. This seems to generate large crowding-out mechanisms, which may be further increased by assumptions made on the expenditure side of QUEST.

Production modelling in the HERMIN models of the CSHM is on the basis of five sectors: manufacturing, market services, building and construction, agriculture and non-market services (Bradley and Untiedt, 2010). Factor demands in the first three are determined on
the basis of cost minimization (using a CES production function constraint). A simpler approach is used in agriculture, and output in non-market services is policy driven through employment and wages.

For the important manufacturing sector (and also for the market service and building & construction sector), HERMIN draws on small open economy modelling research, where country (capacity) output is not determined directly by a national production function constraint (as in QUEST). Rather, the national production function appears in the determination of the national technology (via national factor demand equations), and the national output equation originated from a higher level "global" production function (Bradley and FitzGerald (1988)). This approach attempts to capture the essential notion that integrating within the EU Single Market, and particularly the integration of its peripheral and weaker economies, is best modelled directly through the internationalisation of production than indirectly, through trade flows.

Consequently, output determination in manufacturing in HERMIN can be directly influenced by improved infrastructure, human capital and R&D, through making the recipient economies more attractive as hosts to inward investment and by strengthening the internal attractiveness of the competitive environment for locally owned firms. The international empirical literature is used to provide plausible values for the externality parameters.

National productivity can also be influenced directly by improved stocks of infrastructure, human capital and R&D, and these effects are incorporated into the national CES production functions. In other words, while the output effects are mainly international in their consequences (affecting the international allocation of production), the productivity effects are local and serve to modify the local production technology.15

### 6.2 OTHER DIFFERENCES BETWEEN QUEST AND HERMIN

Another important difference between QUEST and HERMIN-based analysis lies in the different nature and strength of crowding out mechanisms, through the labour market (Philips curve), through fiscal tightening and through monetary tightening. The material placed in the public domain does not permit a thorough analysis of these issues, so they need to be explored further. For example, the assumption is made in QUEST that all increases in productivity are passed on to labour. Consequently, none of the productivity increases caused by cohesion policy will have any effect in increasing cost competitiveness in the recipient countries. In HERMIN, on the other hand, empirical analysis suggests that there can sometimes be a less than full pass-through of

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15 See Bradley, Petrakos and Traistaru (2004) for further details.
productivity changes to wages. This is quite striking in some countries, such as Poland during the years immediately prior to and after EU accession. Where there is significant foreign ownership of firms, this also affects the role of productivity pass-through. Our judgement is that the strong employment crowding-out features that are hard-wired into the QUEST DSGE model may not be appropriate to the lagging economies of many of the new member states. In particular, the “grant” nature of cohesion policy funding, with a “weakened” concept of additionality, may not be reflected in the QUEST analysis.

Another difference between QUEST and HERMIN is that the former imposes model-consistent expectations, while the latter uses static (or auto-regressive) expectations. What this means is that in QUEST agents have perfect (model consistent) information about the exact future consequences of cohesion policy impacts and consequences, and can react today in light of tomorrow’s impacts. HERMIN makes no such assertion. Rather, it takes a pragmatic view that for the analysis of extremely long-tailed structural investment policies in rapidly transforming economies, the incorporation of model consistent expectations (MCEs) is probably not justifiable in terms of the context of these economies. Furthermore, if the basic model set-up is inappropriate, the incorporation of MCEs simply compounds the initial error and increases the possibility of misinterpretation of the policy analysis. MCEs are perhaps more appropriate for the analysis of short-term demand and monetary shocks, where the underlying economic structure is fairly stable and well understood. There is less justification for their use for long-term supply-side shocks administered mainly through public investment in productive infrastructure, human capital and R&D, in a situation where the underlying structure is not well understood and may be rapidly changing.

On a more technical issue, in QUEST the degree of liquidity constrained consumption behaviour assumed for the new member state models is 40% compared with 30% in the “old” member states. Is there strong empirical evidence that the liquidity constraint in the new member states of the CEE area is so low? With such a low degree of liquidity constraint, and the assumption of MCEs, it is not surprising that there is so much crowding out of employment in the QUEST-based analysis.

Another technical issue concerns the nature of the production technology used in QUEST. It should also be noted that a property of the Cobb-Douglas (CD) production function is that all factor inputs are substitutes. In a more generalised production function (e.g., nested CES, Generalised Leontief, etc.), the possibility arises that public and private capital might actually be complements. This CD-based restriction may be a factor in the high crowding out mechanisms that appear to operate within QUEST.

\[\text{16} \quad \text{In other words, 40 per cent of households are assumed to be liquidity constrained, and the remaining 60\% can be modelled in terms of (forward-looking) permanent income.}\]

\[\text{17} \quad \text{The assumption is also made in QUEST that the marginal product of public capital stock } (K_{\text{pub}}) \text{ is the same as the marginal product of private capital stock } (K_{\text{priv}}).\]
CONCLUDING REMARKS

It is possible to attempt to pinpoint more accurately those aspects of the QUEST and HERMIN model frameworks that may be driving the rather significant differences in their implications for the analysis of the impacts of cohesion policy. We stress that we offer merely initial insights for the purposes of stimulating further discussion. Macro-models are very complex tools and are intrinsically difficult to compare. In addition, their application can go far beyond measuring growth effects of cohesion policy. The most active area of design and analysis of cohesion policy are currently the former centrally planned states of Eastern Europe, where the relevant modelling culture is weak and one has access to time series data only from the mid-1990s.

We conclude with the observation that the impact analysis of cohesion policy interventions is very complex and the final results published are often determined by a series of hidden decisions taken by the modellers which may not be completely transparent. To some extent, the criticism of the Barca report noted in our introduction is correct, but nevertheless the use of a complex tool for policy diagnosis and impact evaluation should not be excluded or replaced by a “softer” method simply because the “layman” does not understand it. But to be able to use models and judge the results, it is absolutely necessary to be fully transparent concerning the exact set-up of the models. Otherwise, cohesion policy impact analysis using macro-economic models will continue to be an impenetrable “black-box” and the theoretical advantage claimed for macro-models, i.e., to be able to look at cohesion policy impacts in a way that takes into account the specific and realistic economic relations within the recipient countries and their linkage to the rest of the world, will not be realised in practice.

However, even the 5th Cohesion Report, which made limited use of HERMIN and QUEST results, tends to sell the benefits of macro model-based analysis short. For example, in the report it was stated that:

*Like any evaluation method, macroeconomic models have their strengths but need to be used with other evaluation methods to complete the picture. This especially so, since Cohesion Policy has goals which go much further than only GDP growth (5th Cohesion Report, page 248)*

The impression is left that models can only quantify impacts on GDP. However, models can be used to examine the deep structural impacts on economies, including GDP, employment, unemployment, productivity, wage rates, labour force participation, sectoral structure of production, household income, competitiveness, etc. The fact that these kinds of insights have not found their way into public policy discourse is as much the fault of the policy makers as it is of the model-using policy analysts and researchers.
So, on the basis of the above limited output from HERMIN and QUEST, what can we conclude about the question posed in the paper’s title? First, both models suggest that the investment programmes financed by cohesion policy do benefit the recipient economies in terms of raising the level of GDP, both during and after programme implementation. However, the boost to GDP growth is rather modest. In the case of HERMIN, the boost to growth is transitory and growth reverts to what one might term a “normal” rate of growth determined by the underlying structure of the recipient economy, its investment and trading relationships with the rest of the EU and world, and other non-cohesion policy issues. In the case of QUEST, the endogenous growth mechanisms manifest themselves more strongly, promising a more enduring boost to growth.

Second, it has been suggested that models like HERMIN and QUEST do not prove that cohesion policy is beneficial, but that the beneficial effects are simply “hard-wired” into the model structures. However, as we discussed earlier, the crucial stage of research in this area takes place off-model, in the growing economic literature that seeks to explain more precisely how improved physical infrastructure, human capital and innovation/R&D can accelerate growth and development in lagging economies. If this literature were to point to cohesion policy ineffectiveness, at the detailed level of individual measures and operational programmes, then that ineffectiveness would also appear at the more aggregate level in the macro-models. However, such research tends to be available in the more advanced EU economies, but is singularly lacking in the new EU member states who are the main targets of cohesion policy. This research gap, rather than differences between model structures, is the current weakness of model-based cohesion policy analysis.

The fact that models are complex and that the answers they generate are also complex is a fact of life that we would be unwise to wish away. As the Irish playwright Oscar Wilde said: “The truth is rarely pure and never simple”.

BIBLIOGRAPHY


