

# GEFRA

## **EU cohesion policy and “conditional” effectiveness: What do cross-section regressions tell us?**

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## ABSTRACT

About one third of total EU budgetary resources are spent on implementing cohesion policy. Therefore, it is understandable that the European Commission and especially donor states (acting for the taxpayers) need to be reassured that their contributions are spent wisely and are being used effectively in achieving their stated goal of promoting growth and thereby reducing welfare differences throughout the Union.

Different evaluation methods have been proposed to look at the likely impact of Structural Funds interventions ranging from macroeconometric models to case studies. Recently, evaluation results based on enhanced growth rate regressions with panel data have received wide interest. Ederveen *et al.* (2006, 2002) are two widely cited works that address the evaluation of the effectiveness of cohesion policy using the single equation, panel dataset approach. The results support a serious critique of cohesion policy, asserting that its effectiveness is conditional on country characteristics that may be in short supply in many poorer member states (e.g., the quality of public institutions), and that cohesion policies should not be implemented in the new member states unless the institutional capacities are installed.

This paper takes a closer look at the Ederveen *et al.* results, mainly from three directions. Firstly, we discuss some issues concerning the general set-up of the database and the time period that was used, secondly show that their preferred regression seems mis-specified and instable concerning the countries included and the time period used and thirdly discuss in more general terms that the use of this methodology in the whole area of policy evaluation has been shown to be deeply flawed and to tell us nothing about the effectiveness of public policy.

Our analysis of the methodology and results of Ederveen *et al.* drive us to the conclusions that the policy recommendations derived from this work are unsound, unwise and without merit. In particular, the recommendations concerning the new EU member states should not be based on an appeal to the cross-section regressions that are presented in their 2006 paper.

In contrast, we propose two other approaches – the macroeconometric modelling approach and the microeconomic approach - which, if developed together, hold out the possibility of more robust and insightful analysis and conclusions.

Only by looking deeper into the manner in which EU Cohesion Policy is actually designed and implemented, the manner in which national governments operate parallel regional policies with no reference to Brussels, and by making use of more searching and holistic models is it likely to be possible to deliver verdicts on whether or not the EU has a role in this important area of integration, and if the answer is “yes”, how that policy can be modified in light of the recent enlargements. Dogmatic conclusions reached in the literature, mainly negative, but the point also applies to supportive conclusions, are premature and almost certainly wrong.



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## INTRODUCTORY REMARKS

When about one third of total EU budgetary resources are spent on implementing cohesion policy, it is understandable that the European Commission and especially donor states (acting for the taxpayers) need to be reassured that their contributions are spent wisely and are being used effectively in achieving their stated goal of promoting growth and thereby reducing welfare differences throughout the Union.<sup>1</sup> Beneficiary states and regions, on the other hand, also have some incentives to design investment programmes that have optimal effectiveness. In order to reinforce incentives for beneficiaries, their administrations are required, as an essential element of access to funding, to evaluate the likely impacts of these programmes on their economic performance.

However, the challenges to be faced in addressing these different demands are daunting. EU cohesion policy is designed in a partnership between the recipient states and the European Commission (EC), is applied in a heterogeneous group of the “poorer” member states and in some regions of the “richer” member states, consists of a very complex range of public investment programmes, and is implemented over periods that can last up to nine years. The instruments of cohesion policy are also complex, and include investment in a wide range of types of physical infrastructure, provide funding for programmes of vocational education, training and re-training, and make available direct aid to commercial businesses for the purposes of promoting activities such as R&D, marketing, management education, entrepreneurship etc. Some aspects of cohesion policy have international as well as national and regional implications, and are directed to improve transport and communication links between member states as well as within member states.

In view of this complexity, and the wide geographical coverage of assisted countries and regions, the task of ex-ante and ex-post evaluation of policy impacts and effectiveness is not simple. One approach has been to make use of large-scale, complex macroeconomic models that attempt to isolate the role of cohesion policy at the margin, i.e., separate from all other external and domestic policy influences on the economy.<sup>2</sup> However, using the model-based approach is not without problems since it means that one must engage in major debates about macroeconomic theory, concerning appropriate types of models, issues relating to micro foundations, and the almost intractable challenges to be faced when one attempts to build a first generation of such models for the “transition” economies of the new EU member states. Participants in this

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1 One third of the EU budget sound impressively big. But recall that the EU budget amounts to only slightly more than 1 per cent of total EU GDP. But focusing Structural Funds on a limited number of recipient countries means that the average rate of assistance expressed as a percentage of recipient GDP can be higher, but is usually capped at below 4 per cent.

2 Two such models are used regularly by the EC: see Roger and int'Veld, 1997 for QUEST (the internal DG-ECFIN model); Bradley et al., 2004 for HERMIN (used within DG-REGIO and by some member states). A more recent IMF study of cohesion policy uses the GIMF model of Kumhof and Laxton, 2008.

area of research have tended to debate between themselves on matters concerning macroeconomic theory and practice, and the lack of agreement between the modelling groups can be confusing and off-putting to hard pressed policy makers and policy analysts who need to arrive at robust conclusions concerning the effectiveness of cohesion policy. Bradley and Untiedt, 2008 provide a survey of the range of complex issues that arise in the “modelling” debate when comparing and contrasting the QUEST and HERMIN models.

Consequently, it probably comes as a considerable relief to policy makers and analysts when a technique is proposed that serves to reduce the task of evaluation of the entire field of EU cohesion policy actions to the specification of a “simple” single regression equation, the calibration of this equation with an aggregate panel dataset, and the interpretation of the empirical implications that flow from the regression. When the results of such an approach are then used to support a serious critique of cohesion policy, asserting that its effectiveness is conditional on country characteristics that may be in short supply in many poorer member states (e.g., the quality of public institutions), and that cohesion policies should not be implemented in the new member states, not only is the simple, single equation approach likely to be popular, but the conclusions and policy recommendations are certain to command widespread attention and will be highly influential in any debates concerning the future of cohesion policy.

Ederveen *et al.*, 2006 (“Fertile Soil for Structural Funds?”), and its earlier version Ederveen *et al.*, 2002 (“Funds and Games: The Economics of European Cohesion Policy”) are the two most commonly cited works that address the evaluation of the effectiveness of cohesion policy using the single equation, panel dataset approach. A search on Google Scholar (May 9<sup>th</sup>, 2008) produced an enviable 51 citations of Ederveen *et al.*, 2006 and the same number of citations of Ederveen *et al.*, 2002, and the citations are growing rapidly in yet-to-be-published works (including Bachtler and Gorzelak, 2008)<sup>3</sup>.

The popularity of the above two studies is understandable, since they are well written analyses, use a methodology that is simple and easy to grasp, and reach very strong conclusions that have implications that are difficult to ignore or misinterpret. But what is not so easy to understand is the way in which the Ederveen *et al.* methodology, analysis and policy conclusions have been treated by most participants in the debate about the effectiveness of past cohesion policy actions and the reform of future cohesion policy. Little or no discussion about the methodology, the database, its implications and the validity of the results can be found and the results are often uncritically used and interpreted.

In our paper we subject the two Ederveen *et al.* papers to a critical examination and we reach some unsettling conclusions. First, even assuming that the cross-section regression methodology is valid, the empirical results presented by Ederveen *et al.* appear to be so unstable as to provide no robust basis for the credibility of their analysis and policy conclusions. Second, the use of regressions performed using data from “old member states” for the period 1960-1995, i.e., mainly before the reform and expansion of cohesion policy after 1989, is unlikely to be very informative when used to derive conclusions concerning subsequent post-reform cohesion policy (i.e., for the programming periods 1989-1993, 1994-1999, 2000-2006 and 2007-2013).<sup>4</sup>

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<sup>3</sup> The most commonly cited paper is Boldrin and Canova, 2001, which scores 272 citations in Google Scholar. We return to this paper in our concluding section.

<sup>4</sup> We shall see below that the 1989-1993 period was included in the Ederveen *et al.* data set. But only the so called “implementation (or Keynesian) impacts fall fully within the period of the data set. No longer-tailed supply side impacts from the 1989-93 programming period would have had time to manifest themselves.

Third, the use of these regressions to infer dramatic and extremely negative policy conclusions for the new EU member states of the former Communist bloc is almost certainly misleading and without any substantial merit. Finally, the basic empirical cross-section regression approach used by Ederveen *et al.* to investigate cohesion policy effectiveness draws its inspiration from an earlier debate on the effectiveness of aid given to very poor, underdeveloped countries (Burnside and Dolar, 2000; Riddell, 2007; Easterly, 2003). Not only is this debate even more fractious than the debates that take place between macro modellers, but unfortunately for its practitioners, the use of this methodology in the whole area of policy evaluation has been shown to be deeply flawed and to tell us nothing about the effectiveness of public policy (Rodrik, 2004).

We proceed as follows. The next section introduces the basic Ederveen *et al.*, 2006 regression methodology and introduces the general set-up of their database. Section 3 reviews their basic results and summarizes the principal policy conclusions. Section 4, the main part of our examination, looks in detail at the Ederveen *et al.* results and shows that there are several major *caveats* that need to be entered when the results are interpreted. The final section summarises the obtained results and gives some suggestions on alternative approaches to the evaluation of the impact of Structural Fund intervention, since the simple single equation approach that treats all countries identically is a methodological *cul de sac*.

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## EDERVEEN ET AL.: THE BASIC REGRESSION METHODOLOGY

The basic tool used by Ederveen *et al.*, 2002 and 2006 is a pooled cross-section regression equation, motivated by the standard neoclassical framework of Mankiw, Romer and Weil (1992), of the form:

$$g_{it} = \beta_0 + \beta_1 \ln(y_{it}) + \beta_2 \ln(s_{k,it}) + \beta_3 \ln(s_{h,it}) + \beta_4 \ln(n_{it} + g_A + \delta) + \beta_5 SF_{it} + \beta_6 COND_{it} SF_{it} + \varepsilon_{it}$$

where the dependent variable and the “standard” (i.e., non cohesion policy) explanatory variables are as follows:

- a)  $g_{it}$  is the average annual growth rate of real GDP per capita over the period under consideration, for country  $i$  and time period  $t$ .
- b)  $y_{it}$  is initial GDP per capita in constant 1995 dollars;
- c)  $s_{k,it}$  is the average gross domestic savings rate;
- d)  $s_{h,it}$  is the rate of human capital accumulation; and
- e)  $n_{it}$  is the population growth rate, and is adjusted by the exogenous rate of technological progress ( $g_A$ ), and the rate of depreciation ( $\delta$ ).

Two explanatory variables related to cohesion policy are used by Ederveen *et al.* The natural logarithm of 1 plus the amount of Structural Funds as a fraction of GDP is used in the equation, indicated by the variable  $SF_{it}$ . Finally,  $COND_{it}$  denotes a conditioning variable, designed to capture aspects of the institutional quality of the country, and can take a variety of realisations, such as quality of institutions, openness to trade, inflation, government deficits, etc.

The cohesion policy data used are at the national level, and concern the main element of EU cohesion funding, i.e. the European Regional Development Fund (ERDF) which is designed primarily to finance infrastructure projects.<sup>5</sup> All variables in the data set run from 1960/65 to

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<sup>5</sup> The ERDF is the main source of cohesion funding. Other smaller, but not insignificant, sources are the European Social Fund (ESF), directed at training, the EAGGF, directed at rural development, and the FISM, directed at fisheries.

1990/95 in seven five-year intervals, and a group of 13 recipient countries that range from rich to relatively poor.<sup>6</sup>

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<sup>6</sup> The data set includes thirteen EU countries: Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom). The panel data set covers seven five-year periods from 1960-1965 through 1990-1995. An observation in the data set thus captures a country's performance averaged over a five-year period. The data set of Ed-erveen et al., 2006 is available in [www.henridegroot.net/downloads.asp](http://www.henridegroot.net/downloads.asp)

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## EDERVEEN ET AL.: THE BASIC RESULTS

Although Ederveen *et al.* present a wide range of variations of their one equation model above, this is done more in a spirit of building confidence around a preferred “standard” version (i.e., the variations are carried out for sensitivity analysis) than in any spirit of a deep or searching exploration of structural alternatives. The basic criticism of Structural Funds that emerges from the paper is expressed in terms of the above “standard” version. The sequence of analysis followed by the paper can be summarised as follows:

- Step 1:* It demonstrates the basic validity of the standard “neoclassical” model, showing that key determinants of growth are the initial starting point, the level of investment, the standard of human capital, and population growth. This is presented in column 1 of Table 1 below and provides the stepping off point for further extension to examine Structural Fund impacts.
- Step 2:* It augments the standard “neoclassical” model by adding a separate term that expresses Structural Fund aid as a share of GDP. This is presented in column 2 of Table 1.
- Step 3:* It adds a further Structural Fund term to Step 2, modified with a measure of “conditionality”. In column 3 of Table 1, the choice of conditionality measure is the preferred one of “quality of institutions” (see further treatment below).

The basic policy conclusions drawn by Ederveen *et al.* from this sequence of regressions can be expressed in terms of the results presented in Table 1 above, and are fairly damning in terms of the asserted ineffectiveness of EU cohesion policy. The following is a summary statement of their findings. In the next section we will examine these in greater detail.

- i. The standard neoclassical story of growth and convergence is valid. Poor countries tend to grow faster. Investment and human capital boosts convergence. Population growth lowers per capita GDP growth (column 1).
- ii. EU provision of Structural Funds in support of cohesion policy, in isolation from all other issues, does not improve the growth performance of recipient countries. In other words, Structural Funds, by themselves, do not explain growth differentials among the member states (column 2)

- iii. However, for countries with the “good” institutions, and only for such countries, EU cohesion policy does enhance growth performance. So, conditioning for direct measures of institutional quality (and other such proxies like “openness”), cohesion policy can have robust and significant positive effectiveness, provided “institutions” are good enough (column 3)
- iv. Since institutional quality in three of the original four “poor” member states (Greece, Ireland, Portugal and Spain) was low prior to 1995, these three states did not benefit in terms of augmented growth induced by pre-1995 Structural Funds.<sup>7</sup>
- v. Applying the “old” EU equation coefficients derived in column 3 of Table 1 above to a range of “new” and “applicant” EU states, where the institutional quality is even lower than was the case in the original four “old” member states, implies that Structural Funds may actually reduce growth rates. Hence, such funds ought to be re-directed towards institution building, and only after success in that task are the funds likely to prove effective in promoting faster growth.

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<sup>7</sup> Ireland is the “poor” country outlier in terms of its relatively high score on institutional quality, lack of corruption, and openness.

Table 1:  
The basic results<sup>8</sup>

	[1] Ederveen et al., 2006 Standard neoclassical case Table 1, column 1	[2] Ederveen et al., 2006 "Pure" SF equation Table 1, column 5	[3] Ederveen et al., 2006 "conditional" SF equation Table 1, column 5
Log of initial GDP per capita	-0.028*** (0.005)	-0.028*** (0.005)	-0.028*** (0,005)
Log of investment rate	0.020** (0.009)	0.018* (0.009)	0.020** (0,009)
Log of human capital	0.023* (0.012)	0.023* (0.012)	0.022* (0,012)
Log of (population growth + 0.05)	-0.023 (0.019)	-0.030 (0.021)	-0.024 (0,020)
Structural Funds	-	-0.015 (0.012))	-0.141*** (0,043)
Structural Funds with Institutional Quality	-	-	0.0018** (0,007)
Constant	0.202*** (0.055)	0.190*** (0.057)	0.208*** (0,058)

<sup>8</sup> For ease of exposition, we suppress the wide range of additional diagnostic statistics that accompany the regression results. These are available in the original paper (Ederveen et al., 2006).



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## HOW CREDIBLE IS EDERVEEN ET AL.?

We structure our examination of Ederveen *et al.* under four headings. First, we comment on the nature of the data sample used to calibrate the basic model from which the policy conclusions flow. Second, we discuss the manner in which the tests of Structural Fund impacts and effectiveness were executed. Third, we examine the wider lack of robustness of the conclusions, and position this in the generally unsatisfactory use of the technique in the debate of aid effectiveness globally. Finally, we discuss how Rodrik, 2004 has shown that cross-section regression models are likely to be useless as tools for examining policy effectiveness.

### 4.1 THE DATA SAMPLE

There has been very little criticism of the fact that Ederveen *et al.* make use of a data sample that runs from 1960 to 1995. This would not be an issue if it were demonstrably the case that the early rounds of Structural Fund aid displayed similar characteristics to the post-reform (i.e., post-1989) rounds, i.e. there was policy stability. What was special about the reformed Structural Fund aid policies was their goals, i.e., the provision of financial aid to assist the design and implementation of policies whose key explicit aim was to transform the underlying structure mainly in a select group of beneficiary economies (the so-called, Cohesion or Objective 1 states) in order to prepare them for exposure to the competitive forces about to be unleashed by the Single Market and EMU.

Thus, cohesion policy moved far beyond the conventional Keynesian demand-side stabilisation role of public expenditure policies, and was directed at the promotion of structural change, faster long-term growth and real convergence through improvement of mainly supply-side processes. Post-1989, not only was the magnitude of Structural Funds increased massively, relative to the level of aid pre-1989, but the administrative, oversight, monitoring and evaluation procedures were also dramatically overhauled, and continue to be overhauled. One might even conclude that an additional driving force behind many of these reforms was the perceived inadequacy of the pre-1989 cohesion policy framework that Ederveen's data sample largely covered!

Only when the Structural Funds were reformed after 1989 did the amount of EU aid become significant, expressed as a percentage of recipient country GDP. For all countries except the four so-called Cohesion states (Greece, Ireland, Portugal and Spain), the highest share of Structural Funds was only 0.15 per cent of GDP (in the case of Italy). Even in the case of the four Cohesion states, the shares prior to the 1989 reform and expansion of cohesion policy were below 0.6 per cent of GDP. For the final five-year period analysed in the panel dataset, the highest share was for Portugal (1.5 per cent), the share was about 1 per cent for Greece and Ireland, and was 0.4 per cent for Spain. Compared to the role of two "standard"

neoclassical regression variables (public investment ( $s_{k,it}$ ) and human capital investment ( $s_{h,it}$ ) in the regression equation above), these are relatively small policy shocks, trivially small for all but the four Cohesion states, and even for these states, trivially small for all but the final panel dataset observation 1990/95.

Of course, it would be unwise to pre-judge policy outcomes on the basis of such casual observations concerning data. It is always possible that the pre-reform Structural Funds might have had a statistically significant impact on growth and convergence outcomes. However, the small size of the aid injections up to 1988, and the higher injections over the extremely short period between 1989 and 1995 that is captured in the Ederveen *et al.* data sample, might reasonably give one pause in expecting too much from so little! The funding situation changed dramatically after 1989, and Structural Funds are now highly significant when measured as shares of recipient country GDP. However, this period is excluded from the analysis of Ederveen *et al.*

## 4.2 TESTING FOR STRUCTURAL FUND IMPACTS

We now comment on the manner in which the role of Structural Funds was tested. Ederveen *et al.* presented an initial “standard” neoclassical regression that explains growth in terms of four explanatory variables: the initial level of GDP per capita, the public investment rate, the level of human capital, and population growth, adjusted for technical progress and depreciation (column 1, Table 1). To this “standard” regression were then added the two Structural Fund variables: i.e., the level of EU aid as a share of GDP ( $SF$ ) and then – additionally – this variable conditional on an indicator of institutional quality ( $COND*SF$ ).

The first variable, in isolation, attracts a negative coefficient, which is statistically insignificant (column 2, Table 1). But when the “conditional” term is added, both  $SF$  variables now become statistically significant, the first being negative and the second being positive (column 3, Table 1). This is the key finding of the paper and is interpreted as proving that Structural Funds only have positive growth impacts if institutional quality is high.

However, even accepting the methodological validity of the regression<sup>9</sup>, the correct interpretation of the result of the combined  $SF$  and conditional  $SF$  terms is to express it as follows:

$$\text{Effect of Structural Funds} = [-0.141 + 0.018 \text{ COND}_{it}] SF_{it}$$

The term within brackets is positive for all countries in the data set, and for all years, except Greece (-0.042), Portugal (-0.002) and Spain (-0.004).<sup>10</sup> Accepting the validity of the Ed-

<sup>9</sup> Initially we ignore the deeper criticisms of the cross-sectional regression approach advanced by Rodrik, 2004. But we return to them later.

<sup>10</sup> In fact, one can use the bracketed expression to calculate the value required for  $COND_{it}$ , above which the aggregate  $SF$  impact ceases to be negative and becomes positive. This value is 7.83, and only in the case of Greece is the measured value of  $COND_{it}$  seriously below this value (at 5.50). Hence, a more accurate interpretation of the Ederveen *et al* results is that for EU cohesion aid to be effective, *ceteris paribus*, in the sense of enhancing growth, the level of institutional quality needs to be above a certain “threshold” value.

erveen *et al.* regression results, for the sake of argument, the direct implication is that the addition of Structural Fund assistance to Greece, Portugal and Spain may actually have lowered the growth rate below the no-Structural Fund case. The reduction would be serious in the case of Greece, and modest in the cases of Portugal and Spain. In the context of a static cross-section equation, for this to happen would require the Keynesian multipliers to be negative. In other words, there would have to be a “contractionary fiscal expansion”! A deeper examination of the likelihood of this occurring in Greece, Portugal and Spain would require a more sophisticated model that might explain how the addition of Structural Fund aid could crowd out private sector activity more than one-to-one.<sup>11</sup>

The extension of the results to the new EU member states is even more questionable. For all these states, where data are available, the institutional quality measures are much lower than even in the case of the four “old” Cohesion states back in the 1980s and early 1990s.<sup>12</sup> For the new member states, the extensive period of pre-accession programmes prior to their joining in 2004 and 2007 was explicitly designed to ensure that absorptive capacity and institutional quality were raised, so that Structural Funds could be better absorbed and more effectively used. Using the calibrated regression equation, based on “old” EU values drawn mainly from the pre-reform era of cohesion policy, guarantees that the Structural Fund impacts will be negative for the new EU member states, since the levels of institutional quality are all lower than for the “old” EU Objective 1 countries. The arguments against using the calibrated equation in this way for the “new” member states, and for the reformed cohesion policy, are even stronger than the earlier arguments warning of the dangers of using the approach for the “old” EU member states.

### 4.3 WIDER LACK OF ROBUSTNESS

The empirical methodology of Ederveen *et al.* has two even deeper problems. First, the manner in which the role of institutional quality in isolation from Structural Funds was tested is unusual. Second, the empirical results can be shown to be dependent on the observations for Greece, regardless of using the full or reduced sample that excludes the period from 1990 to 1995.

#### *Institutional quality*

Turning first to the separate role of institutional quality, an obvious hypothesis that should have been tested prior to examination of a separate role for Structural Funds is the role of

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<sup>11</sup> Back in the late 1980s a debate took place on the so-called “expansionary fiscal contraction” (EFC), as a way of explaining the strength of the Danish and Irish recoveries purely in terms of fiscal cut-backs (Giavazzi and Pagano, 1990; Barry and Devereaux, 1995; Bradley and Whelan, 1997). Such debates in economics are seldom resolved. But in this case, the theoretical possibility of an EFC was shown empirically to be unlikely in practice.

<sup>12</sup> Unfortunately, Ederveen *et al.*, 2006 do not make clear if the institutional quality data that they used for the new EU member states represents past values characteristic of the immediate post-Communist transition period, or contemporary values that represent the post-EU accession period and the consequences of adopting the *acquis communautaire*.

institutional quality as an addition to the simple “standard” neoclassical form of the equation. Using as the measure of institutional quality the variable COND (ICRGE80 in their dataset), we present the results below in Table 2.<sup>13</sup> Adding this variable to the right hand side of the “neo-classical” growth equation, the estimate is highly significant, indicating that institutional quality, by itself, has an impact on growth performance (Table 2, column (4)). This is in keeping with standard results from economic theory. Indeed, it can be regarded as a partial of test of the implications of the theory of institutions (North, 1990). Clearly, institutions matter. The better your institutions, the higher your growth is likely to be. This is a finding that commands broad acceptance.

The policy implication of this result is quite specific. Countries with “good” institutions, as proxied by the index, will tend to grow faster than countries with “bad” institutions, *ceteris paribus*. Of course, bad institutions will not necessarily prevent countries from growing. But there will be a kind of trade off between institutional quality and policy. Higher values of the investment measure ( $s_k$ ), and/or of the human capital measure ( $s_h$ ) would be needed to offset lower values of the institutional measure.

### **Structural Fund robustness**

Since institutional quality is seen to be an important variable in explaining growth differences across countries, a proper starting point for an examination of the SF interventions would be the following equation, which contains COND = ICRGE80 as an additional explanatory variable:

$$g_{it} = \beta_0 + \beta_1 \ln(y_{it}) + \beta_2 \ln(s_{k,it}) + \beta_3 \ln(s_{h,it}) + \beta_4 \ln(n_{it} + g_A + \delta) \\ + \beta_5 SF_{it} + \beta_6 COND_{it} SF_{it} + \beta_7 COND_{it} + \varepsilon_{it}$$

This framework has the advantage that we can test the importance of SF interventions in a nested framework, within which the Ederveen *et al.* preferred equation is a special case.<sup>14</sup>

But Ederveen *et al.* did not follow that route, but estimated the above equation without the variable COND, which was shown above to be in itself highly significant within this framework. Their equation was re-estimated by ordinary least squares (OLS) and heteroscedasticity consistent standard errors are used to perform individual t-tests to check the significance of the individual variables.<sup>15</sup> To test for the effectiveness of European cohesion policy we

<sup>13</sup> The institutional quality index, ICRGE80, is taken from Sachs and Warner, 1995.

<sup>14</sup> Table 5, column 2 in Ederveen *et al.* contains results for this specification. But it is only used to show that the variable COND is not significant. They conclude (p.29): “*The results, ..., clearly show that it is not insitutional quality itself that matters.*” But they never tested COND separately as we did in the preceding section.

<sup>15</sup> Across countries within a panel, different distributions, i.e. different (conditional) means and standard deviations, for the variables can be expected. The parameter estimates are unbiased if there is heteroscedasticity, but the estimated standard errors of the regression coefficients are biased. To correct this bias, different solutions have been proposed, such as. Asteriou, Hall (2007, p. 100-26).

investigated the joint significance of the variables SF and COND\*SF, i.e.  $\beta_5=0$  and  $\beta_6=0$  by using a F-Test. Table 2 presents the results.

Table 2:  
The Ederveen et al. results examined

	(1) Ederveen, prefer- ential equation, table 1, column 5	(2) Re-estimation using the published data	(3) As (2), but Greece dropped	(4) Full sample with institu- tional quality
Log of initial GDP per capita	-0.028*** (5.6)	-0.029*** (5.41)	-0.025*** (4.91)	-0.031*** (5.47)
Log of investment rate	0.020** (2.2)	0.020** (2.16)	0.026** (2.36)	0.020** (2.06)
Log of human capital	0.022* (1.8)	0.023* (1.78)	0.016 (1.22)	0.014 (0.99)
Log of (population growth + 0.05)	-0.024 (1.2)	-0.023 (1.08)	-0.022 (1.06)	-0.024 (1.26)
Structural Funds	-0.141*** (3.3)	-0.145*** (3.23)	-0.364 (1.11)	
Structural Funds * Institu- tional Quality	0.018** (2.6)	0.0018** (2.54)	0.046 (1.09)	
Institutional Quality				0.005*** (2.98)
Constant	0.208*** (3.9)	0.130 (1.55)	0.087 (1.03)	0.128 (1.54)
Adjusted R2	0.51	0.51	0.44	0.49
Number of panel observa- tions	91	91	84	91
Joint test of significance (SF variables)				
Wald-Test	11.91***			
F-Test		6.38*** [0.002]	1.12 [0.32]	

Note : The significance of the estimated parameters is indicated by asterisks, and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent level, respectively. T-Statistics are calculated using heteroscedasticity consistent errors, the figure in [] denotes the probability of a rejection of the Null hypothesis that  $\beta_5$  and  $\beta_6$  are jointly zero.

Column (1) shows the original estimates of the preferred equation by Ederveen *et al.*; column (2) introduces our re-estimated results from the database that was published by Ederveen *et al.*; and column (3) reports our results for a reduced sample, i.e. Greece was excluded from the database. Column (4) reports the results of adding COND as a separate variable in the standard neoclassical equation (discussed above).

In the case of column (2), the re-estimation shows that only very small differences for the coefficients of the explanatory variables (as between column (1) and column (2)) are observable, where only the intercept terms are somewhat different. The individual coefficients concerning the SF are in line with Ederveen *et al.*, showing a negative impact of Structural Funds by themselves (SF) and a positive coefficient for the interaction of Structural Funds and institutional quality (SF\*COND). The F-test signals that both variables are jointly highly significant.

In the case of column (3), we show that a robustness check that excludes Greece – one of the main recipients of cohesion policy aid - from the sample produces a totally different result for the Structural Fund impacts from the preferred Ederveen case (column (1)). No individual coefficient of the impact of the SF or the interaction variable SF\*COND is significant, nor are they jointly significant. This shows that the Ederveen *et al.* results are sensitive to a single country and are not robust to changes concerning the countries included, nor the time period investigated as can also be shown. The conclusions drawn by Ederveen *et al.* do not pass a robustness check that goes beyond their own reported robustness investigations and the equation seems mis-specified since the important variable that acts as a proxy for institutional quality is not part of the preferred specification.

Our conclusion from this robustness analysis is disturbing. The specification of Ederveen *et al.* appears to be very sensitive to the exact specification used, and to the time periods analysed. Whereas they analysed a wide range of conditioning variables in their exploration of robustness, they did not explore different specifications, and did not examine sensitivity to the length of the data set or the countries included, except in the case of Ireland.<sup>16</sup>

The research literature on the question of the sensitivity and stability of cross section regressions used to explore the effectiveness of aid to less developed countries is voluminous, and reaches conclusions similar to ours. Roodman, 2004 is a recent exhaustive examination of the area. The implications are that one cannot, and should not, base policy conclusions on these kinds of results.

#### 4.4 A DEEPER METHODOLOGICAL PROBLEM<sup>17</sup>

We have examined issues in the Ederveen *et al.* paper that concern the data set, how Structural Fund impacts are tested, and empirical robustness. For the purposes of this examination, we made the assumption that the basic cross-section growth regression framework was a valid methodology for investigating policy effectiveness. As the empirical growth literature

<sup>16</sup> In the case of applications to the debate on aid effectiveness, Easterly, 2004 emphasises that results are driven by outliers which represent instances of extremely “bad” policies. Greece may be such an outlier in the case of EU cohesion policy, but a more detailed examination would be needed before proposing such an interpretation.

<sup>17</sup> This material draws heavily from Rodrik, 2004.

has grown, so has the critical evaluation of it. There is by now a wide-ranging discussion of the shortcomings of growth regressions, which focuses on problems relating to: parameter heterogeneity, outliers, omitted variables, model uncertainty, measurement error and endogeneity (Roodman, 2004). However, the panel regression technique has also been shown by Dani Rodrik to provide little or nothing by way of understanding of policy impacts (Rodrik, 2004).

In the case of cross-section regressions, policy endogeneity is not just an annoying econometric nuisance, but typically an integral part of the null hypothesis that is being tested. Rodrik concludes that:

*“As long as policy interventions are not random and their presence responds to unobservables, regressing an economic performance variable on policies is uninformative about the degree to which market failures exist, the extent to which policy interventions are targeted on them, the effectiveness with which government policies are deployed, or the extent to which policy interventions are used to create and divert rents for political purposes.”*

The trouble with instrumental variables (IV) is twofold. First, in the area of inquiry concerning the determinants of growth, it is hard to find credible instruments which satisfy both the *exogeneity* and *exclusion* requirements. Growth theory is so broad and encompassing that it is always possible to find a story about why an exogenous variable belongs as a regressor in the second-stage of the estimation (therefore making it invalid as an instrument). Plausible instruments are very few indeed.

But an equally important limitation on IV is that what one is typically interested in knowing is the impact of purposeful policy action. We want the answer to the question: when governments have tried to achieve this or that objective, how successful have they been at it? The exogenous component of policy, even if excludable from the second-stage of IV, can help us answer a different question: what has been the impact of policy interventions that governments did not adopt purposefully, but it does not answer questions concerning “purposeful” actions.

Rodrik suggests that a first step in the right direction is to take the theories that motivate empirical analyses more seriously. Failure to undertake meaningful tests often derives from a failure to fully specify the theoretical model(s) being put to the test. For example, if one is testing the null hypothesis that governments are acting in the public interest, one needs to specify a model in which governments do precisely that, come clean about what one assumes is and is not observable, and inquire whether the empirical implications of such a model are consistent with the data. If one is testing this view against the alternative that they are motivated by private/political interests, one needs to be clear about the distinct predictions the two models make for the data. Furthermore, whether or not the alternative theories generate different predictions, one needs to look for direct evidence about the channels through which policies are hypothesized to operate. However, this advice is seldom followed, and Rodrik concludes:

*“These (suggestions) seem like standard good practice, but it is clear that the bulk of the cross-national growth literature proceeds in a different manner, assuming that it is enough to plug a policy variable in a regression (while perhaps making an honest attempt at instrumenting it) in order to answer a whole series of questions about the effectiveness of policy and the motives of governments.”*

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## SUMMARY AND CONCLUSIONS

Our analysis of the methodology and results of Ederveen *et al.* drive us to the conclusions that the policy recommendations derived from this work are unsound, unwise and without merit. In particular, the recommendations concerning the new EU member states should not be based on an appeal to the cross-section regressions that are presented in the paper.

Let us recall the two most important policy conclusions in Ederveen *et al.*:

- i. *“Building on a standard neoclassical growth framework, we find that European support as such did not improve the countries’ growth performance. However, we find evidence that it enhances growth in countries with the ‘right’ institutions”.*
- ii. *“So, the European policy to promote regional growth is only conditionally effective. This finding bears considerable consequences for the (re-)design of the EU cohesion policy in light of the enlargement of the EU: the funds are to be allocated toward institution building in the first instance. Once the institutions are of a sufficient quality, the funds may be effective in stimulating (catching-up) growth”.*

A revised statement of policy conclusions, based on our critique, might run as follows:

- a) Building on a standard neoclassical growth framework, we find that the quality of institutions, on its own, has a highly significant impact on growth.
- b) In a cross section regression containing all four “standard” neoclassical explanatory variables (initial GDP level, investment, human capital and adjusted population), plus institutional quality, there appears to be no separate robust impact of the pre-reform Structural Funds on growth. But one should not rush to the conclusion that Structural Funds are “ineffective”, since the pre-reform funds were relatively insignificant, compared to the magnitude of the other driving forces of growth.
- c) The implications of the Ederveen *et al* work for the post-reform impacts of Structural Funds cannot be inferred from their data sample. *A fortiori*, nothing can be inferred concerning the role of Structural Funds on the new EU member states.

If the simple cross-section regression approach is to be dismissed, are there better ways to evaluate the effectiveness of Structural Funds? One approach is that taken by Boldrin and Canova, 2001, the most commonly cited paper in the area of evaluation of EU Cohesion Policy (see footnote 3 above). Unlike Ederveen *et al.*, 2006, this paper uses an eclectic methodological approach, based on a blend of theory and data examination, against the



general background of the growth regression/convergence literature. Their critique of EU Cohesion Policy is even more damning than Ederveen *et al*:

*“Regional and policies serve mostly a redistributive purpose, motivated by the nature of the political equilibria upon which the European Union is built” (p. 206)*

If one defines EU Cohesion Policy in terms of seeking equity between regions rather than between countries, observations as well as common sense tell one that this policy will not only fail, but will probably be counter productive. If EU Cohesion Policy had been designed and implemented purely at the regional level within member states, with rapid moves towards regional equity as a goal, then it has not been a success. Rich, poor and middling regions coexist with each other, in the past, today, and probably in the future.

But although the rhetoric of the EU cohesion objective, as expressed in the Treaties, seeks equity at all levels within the Union, in practice EU Cohesion Policy is designed and administered by national governments in association with Brussels oversight, and directs investment to regions in a manner that seeks to balance the twin goals of efficiency and equity. Thus, it would be a waste of resources to build a motorway through a poor region, unless it connected large conurbations in adjoining regions. A more appropriate type of policy for the poor region might be to make use of the Social Fund element to increase human capital in poorer – usually rural – regions. This would facilitate outward migration in early stages of development, with the prospects of return migration as the congestion-driven spillover from richer regions start to open opportunities in less developed regions. This, in essence, is the Irish model, operated at national level initially in a state that is smaller than many of the regions of the rest of the EU (Bradley, 2008)

Operating in parallel with Cohesion Policy, which is funded domestically and by Brussels, domestically funded social and income support transfers tend to be much larger than investment expenditures. If there is a problem with EU Cohesion Policy, perhaps one ought to seek it by examining the uneasy relationship between these two kinds of regional support. Examining EU Cohesion Policy in isolation, at the regional level, as Boldrin and Canova, 2001 do, almost certainly leads one to false conclusions about how states and their sub-regions actually develop and grow, and what policies are required to assist this process.

We believe that there are two approaches which, if developed together, hold out the possibility of more robust and insightful analysis and conclusions.

If one is to avoid the traps of the Ederveen *et al.*, 2006 and Boldrin and Canova, 2001 approaches – namely, a flawed analytic methodology and a misleading assertion of the null hypothesis - one must turn to deeper methodological approaches. The first is the much criticised one based on macroeconomic models, and is entirely in keeping with Rodrik’s suggestion that “one needs to look for direct evidence about the channels through which policies are hypothesized to operate”. Possibly the most promising results in this area were derived recently using the new IMF *GIMF* model, which imposes micro foundations in a way that takes full account of likely deviations from more conventional assumptions of full optimizing behaviour in perfectly flexible markets (Kumhof and Laxton, 2008; Allard and Annett, 2008). Much of the previous use of models to study Structural Funds needs to be re-examined and improved in light of the advances reported in the IMF work.

The second approach is a pure microeconomic one. There is unanimous agreement on the need for policy intervention when the efficiency of markets is limited. The efficiency of market allocation can be restricted for different reasons and those situations are typically labelled “market failures”. One prominent type of market failure is the existence of a public good, since private producers will tend to undersupply such goods or services relative to the social optimum. As a result, it is appropriate for the government to act to ensure that such goods are made available. However, a public good is just one of the many types of externalities which may exist. Policy interventions that try to adjust for these distortions or sources of market failure will inevitably be imperfect. A policy therefore has to be evaluated to see whether it makes the best possible correction towards efficient functioning without inducing undue adverse side-effects. This suggests that a useful way of approaching the evaluation of particular cohesion policy measures is to identify the distortion to which it is principally addressed, and to assess its performance chiefly as a correction for that distortion. Practical approaches to implementing such suggestions in the context of EU Structural Funds are set out in Bradley *et al*, 2006.

Only by looking deeper into the manner in which EU Cohesion Policy is actually designed and implemented, the manner in which national governments operate parallel regional policies with no reference to Brussels, and by making use of more searching and holistic models is it likely to be possible to deliver verdicts on whether or not the EU has a role in this important area of integration, and if the answer is “yes”, how that policy can be modified in light of the recent enlargements. Dogmatic conclusions reached in the literature, mainly negative, but the point also applies to supportive conclusions, are premature and almost certainly wrong.

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