Cohesion Policy and Sectoral Growth in the Italian Regions (1994-2013)

Gianluigi COPPOLA[1], Sergio DESTEFANIS[1],
Giorgia MARINUZZI[2], Walter TORTORELLA[2]

[1]CELPE Centro di Economia del Lavoro e di Politica Economica, DISES Dipartimento di Scienze Economiche e Statistiche. Università degli Studi di Salerno, Via Ponte Don Melillo, 84084 Fisciano.
E-mails: glcoppola@unisa.it, destefanis@unisa.it
[2] IFEL, Istituto per la Finanza e l'Economia Locale, Dipartimento Studi Economia Territoriale, piazza S. Lorenzo in Lucina 26, 00186, Roma.
E-mails: giorgia.marinuzzi@fondazioneifel.it, walter.tortorella@fondazioneifel.it

Abstract: In this paper we put to test the impact of the European Structural Funds on the economies of the 20 Italian administrative regions for the 1994-2013 period. The main elements of novelty are that we assess the impact of the Funds on various sectoral aggregates (the four sectors agriculture, energy and manufacturing, construction, services, plus some smaller aggregates), and that we carefully consider nationally-financed development funds. Our evidence implies that the Funds had a significant impact on regional GDP per capita. We also find very small effects for (nationally-financed) subsidies to firms. Different types of Structural Funds are found to have widely different influences, with the European Regional Development Fund having the strongest impact. Our sectorally-disaggregated evidence implies that EU funds matter for a wide array of sectors in the economy, both directly and indirectly. National funds, on the other hand, mostly matter through interaction effects (***JEL*: C43, D24**).

Keywords: European Structural Funds, nationally-financed development funds, sectoral development, multi-output multi-input transformation functions.

1. Introduction

Today more than ever, it does not seem feasible to advance towards a closer integration of the European Union, without favouring a greater economic and social cohesion between its countries. Yet, there are still very deep economic and social disparities both between countries and between regions that compose the Union, undermining its unity and cohesion. The importance of economic and social cohesion is enhanced by the EU enlargement to Southern and Eastern Europe, and the establishment of economic and monetary union, which leaves very little room for manoeuvre at national level not only for monetary but also for fiscal policy. Hence the need to evaluate the appropriateness and effectiveness of development policies implemented through the European Structural Funds. The Funds are, especially since the introduction of *Agenda 2000*, the European Community's primary tool to sustain development in areas facing economic problems. Although marked differences in levels of regional development characterise many European countries, Italy is a particularly interesting (and worrying) case study for cohesion policies, because of the existence of an area of the country, the South, whose delays in development are relevant and are perpetuated over time (Allen and Stevenson, 1974; Putnam, 1993; Paci and Saba, 1998; Iuzzolino, 2009).

The persistence of such disparities, in the presence of significant financial resources dedicated to cohesion policy, raises issues about the effectiveness of these interventions, and, in particular, on the impact of European Structural Funds. This paper aims to assess whether the financial resources redistributed by the EU actually contributed to reduce interregional disparities in Italy. We also aim to identify effective practices and sectors of intervention. Indeed, the main element of novelty in the present work vis-à-vis the existing literature resides in the fact that the empirical analysis is carried out by considering separately various sectoral aggregates (the four sectors agriculture, energy and manufacturing, construction, services, plus some smaller aggregates: market services, non-market services, manufacturing, energy plus market services). Besides, our empirical framework, unlike most of the earlier work, also considers along with the European Structural Funds different types of nationally-financed funds.

This exercise takes places in a period characterised by fears of hitting the automatic release of

resources for 2007-2013 (in 7 months, from May to December 2015 still about 12 billion euro, 26.4% of the overall total, must be reported back), an excessive fragmentation of resources between projects and beneficiaries[1] (which undermines the structural impact of specific interventions), and the need to limit the delays, unfortunately already evident at the outset of the new programming cycle (2014-2020) (as of May 2015, 12 Regional Operational Programmes - over the 39 planned - are not yet approved). We thus intend to evaluate the Funds' effectiveness with a view to their scheduled lapse at the end of this programming cycle.

The remainder of the paper is organised as follows. Section 2 presents the institutional set-up of the Funds, describing the EU Objectives, the different types of Funds and their evolution across the years 1994-2013, with special emphasis on Italy. Section 3 provides a survey of the empirical literature existing on the argument. Section 4 illustrates the empirical procedures and the data, while the results of the empirical analysis are shown and commented in Section 5. Section 6 concludes and sets out some implications for future research.

2. European Structural Funds: the Institutional Set-up

As is well known, a variety of different programmes are gathered under the label of Structural Funds:

1) the European Regional Development Fund (ERDF) was created in 1975 with the aim of reducing regional imbalances in the EU. It targets less-developed regions and primarily finances projects involving investments in physical capital (private and public), support for small and medium firms, and R&D;

2) the European Social Fund (ESF) was created in 1957 with the aim of promoting training and the educational attainment among the labour force, as well as other forms of active labour market policies;

3) the European Agricultural Guidance and Guarantee Fund (EAGGF) dated back to 1962 and was a component of the Common Agricultural Policy. It aimed to accelerate the adjustment of

[1] Tortorella (ed.) (2011, 2012, 2013, 2014, 2015), Marinuzzi and Tortorella (2015), Tortorella (2015).

agricultural structures and contribute to the development of rural areas. In 2007, the EAGGF gave way to the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD);[2]

4) the Financial Instrument for Fisheries Guidance (FIFG), which supported fisheries, was created in 1994, and substituted by the European Fisheries Fund (EFF) in 2007.

In this paper we will not consider an important instrument of the EU's development policy: the Cohesion Fund. This fund, created in 1993 after the Maastricht Treaty, supports particular projects of member states (not regions) with GDP per capita levels below 90% of the EU mean. As Italy does not satisfy this criterion, it is not a beneficiary of the Cohesion Fund.

The Funds have been managed within given programming periods. The first programming period we consider (1994-99) was articulated around the following objectives:

Objective 1: Economic and structural adaptation of less-developed regions; this includes all regions with GDP per capita levels below 75% of the EU average over the last three years;[3]

Objective 2: Economic recovery of regions affected by industrial crisis (as defined by three eligibility criteria);

Objective 3: Combating long-term unemployment through reforms of education, training and employment services;

Objective 4: Facilitating the adaptation of workers to changes in production systems;

Objective 5a: Facilitating rural development within the Common Agricultural Policy (CAP);

Objective 5b: Facilitating rural development through the adjustment of industrial structures in areas with high levels of agricultural employment, low levels of agricultural income, low population density and/or a significant depopulation trend.

The reform implemented for 2000-06 attempted to improve the effectiveness of the Funds through a clearer allocation of responsibilities among the Commission and member states and a greater concentration of aid: there were three Objectives instead of six. *Objective 1* always related to the economic and structural adaptation of less-developed regions; *Objective 2* supported the

[2] In what follows we will consider EAGGF (from 2007 the EAGF and the EAFRD) and FIFG (or EFF) jointly, given their highly similar object.

[3] In Italy these regions include Abruzzo (until 1996), Sardegna and Molise (until 2006), Campania, Puglia, Basilicata, Calabria, Sicilia.

social and economic restructuring of areas (be they industrial, rural, urban or centred on fishery) with structural problems; *Objective 3* aimed at creating new jobs through reforms of education, training and employment services.

In 2007-2013 *Objectives 1*, *2* and *3* were reorganised around the *Convergence Objective*, aiming to accelerate the convergence of less-developed regions and member states; the *Regional Competitiveness and Employment Objective,* aiming to strengthen employment and competitiveness in other areas; and the less quantitatively important *European Territorial Cooperation Objective*. Beside these three objectives, co-financed by ERDF and ESF, there are the Rural Development Programmes, supported by the EARDF, and a national fishery programme supported by the EFF.

Structural Funds per inhabitant are much higher in the Italian Southern regions, especially with respect to the ERDF. However, note that there is considerable variation even among the Mezzogiorno regions. Particularly high values are obtained for Molise and Basilicata. Note also that a substantial share of Structural Funds is not allocated to any single region, but to multi-regional aggregates. In the following analysis we shall assume that this funding affects regions proportionally to the shares of regionally-allocated Funds.

In Tables 1 and 2 we give the total financial endowment available for the three programming periods under scrutiny, by Fund and Objective[4] : they are respectively 52,452 million euros for 1994-1999,[5] 64,294 million euros for 2000-2006,[6] and 65,914 million euros for 2007-2013.[7]

The ERDF prevails in all three programming periods: it absorbs over 60% of the available resources in 1994-1999 and 2000-2006 and just about half of them in 2007-2013. Another persistent feature, derived from the raison d'être of the Funds, relates to the larger shares of funding allocated to the relatively backward areas: 60.7% and 71.4% of endowments in 1994-

[4] A substantial share of Structural Funds is not allocated to any single region, but to multi-regional aggregates. In the following analysis we shall assume that these finds are equally spread among all regions. We also adopted different hypotheses, such as spreading these funds proportionally to the shares of regionally-allocated Funds; or, multi-regional funding being allocated by area (North-Centre or South), spreading these funds proportionally to the shares of regionally-allocated Funds only within the relevant area. Estimates based on these hypotheses have a slightly lower fit and do not show substantial differences vis-à-vis the results we report in this paper.

[5] Data to 31/12/2003.

[6] Data to 31/12/2010.

[7] Data to 30/04/2015, excepting the data for rural development and fishery, financed respectively by EARDF and EFF, and updated to 31/12/2012.

1999 and 2000-2006 were destined to Objective 1 and 47.8% of funding in 2007-2013 went to the Convergence Objective.

Table 1 - Financial endowment of structural interventions in Italy for the 1994-1999, 2000-2006 and 2007-2013 programming periods, by Fund (million euros)

Structural Fund	1994-1999 (data to 31/12/2003)		2000-2006 (data to 31/12/2010)		2007-2013 (data to 30/04/2015)	
	a.v.	%	a.v.	%	a.v.	%
ERDF	32,641	62.2%	40,512	63.0%	33,352	50.6%
ESF	9,931	18.9%	16,613	25.8%	14,018	21.3%
EAGGF	9,090	17.3%	6,088	9.5%		
FIFG	790	1.5%	1,080	1.7%		
EAFRD*					17,695	26.8%
EFF*					849	1.3%
Total	**52,452**	**100.0%**	**64,294**	**100.0%**	**65,914**	**100.0%**

* MEF data to 31/12/2012.

Source: elaboration by IFEL-Dipartimento Studi Economia Territoriale on MEF data, various years.

Table 2 - Financial endowment of structural interventions in Italy for the 1994-1999, 2000-2006 and 2007-2013 programming periods, by Objective (million euros)

Objective	1994-1999 (data to 31/12/2003)		2000-2006 (data to 31/12/2010)		2007-2013 (data to 30/04/2015)	
	a.v.	%	a.v.	%	a.v.	%
Objective 1	31,850	60.7%	45,896	71.4%		
Objective 2	4,352	8.3%	7,183	11.2%		
Objective 3	3,047	5.8%	9,098	14.2%		
Objective 4	921	1.8%				
Objective 5a	2,704	5.2%				
Objective 5b	5,174	9.9%				
No Objective	4,406	8.4%	2,118	3.3%		
Convergence					31,494	47.8%
Competitiveness					15,179	23.0%
European Territorial Cooperation					697	1.1%
Rural Development*					17,695	26.8%
Fishery*					849	1.3%
Total	**52,452**	**100.0%**	**64,294**	**100.0%**	**65,914**	**100.0%**

* MEF data to 31/12/2012.

Source: elaboration by IFEL-Dipartimento Studi Economia Territoriale on MEF data, various years.

3. A Short Overview of the Empirical Literature

The empirical literature on the impact and effectiveness of European regional policy is substantial. The, papers can be classified on the basis of 1) the period considered in the analysis, 2) the level of territorial disaggregation of the analysis, 3) the estimation method applied, and 4)

the variables included in the model (dependent variables, covariates and their frequency).

Period and level of territorial disaggregation widely differ across the papers. For instance, Rodriguez Pose and Fratesi (2004) or Esposti and Bussoletti (2008) take into account only ten (1989-1999) or eleven (1989 -2000) years, against the 35 years (1960 -1995) of Ederveen et al. (2002). Ederveen et al. (2002) and Beugelsdijk and Eijffinger (2005) consider respectively thirteen and fifteen countries, while the analysis of Rodriguez Pose and Fratesi (2004) is based on 162 EU15 regions and that of Esposti and Bussoletti (2008) on 206 EU15 regions.

Concerning the econometric method applied, many papers estimate a regression à la Barro, augmented by the Structural Funds, in order to test various hypotheses about growth and convergence among regions (Garcìa–Solanes and Maria-Dolores, 2002a, 2002b; Cappelen et al. 2003; Rodriguez Pose and Fratesi, 2004; Beugelsdijk and Eijffinger, 2005; Aiello and Pupo, 2007; Puigcerver-Peñalver, 2007; Esposti and Bussoletti, 2008). There are also some estimates of other type (Boldrin and Canova, 2001; Coppola and Destefanis, 2007, 2015) and macroeconomic simulation models (Hermin and Quest, see the surveys by Tondl, 2004; Marzinotto, 2012; and Prota and Viesti, 2013).

The different methods applied and the dataset and variable used in the literature obviously imply heterogeneous results. Usually the Structural Funds seem to have a positive impact on growth but the empirical works come to different conclusions.

Boldrin and Canova (2001), mainly relying on the assessment of changes in the empirical distributions of labour productivity, find that the Structural Funds do not generate any large effects on the convergence process, and their main conclusion is that regional policies can generally be rationalised in terms of redistributive practices, motivated by the nature of the political equilibria on which the EU is built.

On the other hand, according to Garcìa–Solanes and Maria-Dolores (2002a, 2002b) the inclusion of Funds in the regressions increases the estimated speed of convergence and has a significant impact on the steady-state growth rate, but these effects are stronger in the country (as opposed to the region) regressions.

For Ederveen et al. (2002) the “quality” of institutions matters, because the set of rules of

institutions in a country determines the allocation of the funds to productive activities or to “rent-seeking” activities. On the contrary in Beugelsdijk and Eijffinger (2005) the empirical evidence does not indicate that more corrupt countries use their Funds in a more inefficient way, and also for this reason the hypothesis that Structural Funds reduced interregional disparities within the current 15 European countries cannot be rejected. Cappelen et al. (2003) find that EU regional support has a positive impact on the growth performance of European regions. However, their results also show that this impact is much stronger in more developed environments (not only institutionally, but also technology-wise), emphasising the importance of accompanying policies that improve the competence of the receiving environments. Esposti and Bussoletti (2008) find different results among the regions without a clearly explainable pattern. Their generally positive (albeit small) impact of Funds on the growth of Objective 1 regions turns negative is some cases (i.e. German, Greek and Spanish Objective 1 regions). The largest effect is found for French Objective 1 regions.

Rodriguez-Pose and Fratesi (2004) detect an interesting distinction between development axes. The returns to commitments on infrastructure and business support are not significant (despite the concentration of development funds on these axes). Support to agriculture has only short-term (positive) effects on growth. Only investment in education and human capital has medium-term positive and significant returns. Another interesting result by Cappelen et al. (2003) is that, according to their results, EU regional support has a positive impact only after 1989. On the other hand for Puigcerver-Peñalver (2007) the impact of Structural Funds has been stronger during the 1989-93 programming period than in 1994-99.

The macrosimulation models, such as Hermin or Quest, generally find that regional policy has a positive impact, in both the short and long run, on GDP and employment. The size of the impact observed typically varies across countries.

All the studies examined so far deal with countries or a wide set of European regions. Concerning the impact of the Structural Funds on Italian regions, Aiello and Pupo (2009) focus on the effects of EU spending from 1996 to 2007 as regards the 20 Italian administrative regions. They use data on actually spent, rather than accredited funds. Their empirical analysis is based on

panel estimates of an augmented neoclassical growth model. They find that the Funds, although having a stronger impact in the South than in the Centre-North, have only weakly contributed to regional convergence in Italy. Coppola and Destefanis (2007) adopt a different framework to study the impact of accredited Funds across Italian regions in 1989-2003. The components of total factor productivity change are measured through a non-parametric FDH approach and then regressed on Funds and other variables. They find that the Funds have a weak but significant impact on changes in total factor productivity, as well as on capital accumulation and changes in employment. However, in a recent paper (Coppola and Destefanis, 2015) the same authors find, for the period 1989-2006, virtually no effect of actually spent Funds on capital accumulation and employment.

Clearly, macroeconomic simulations have a richer structure than the other econometric analyses. Yet they also rely on many more (often untested) hypotheses about model specification (variables included, some key parameters, dynamic structure, functional form, etc.). In our paper, we do not want to take sides on a simulation vs. estimation debate. Rather, we aim to identify effective practices and sectors of intervention. We use sectoral data, in order to better understand the way in which the Funds impact on different industries. Second, we carefully consider nationally-financed development funds. Arguably this should also allow a better treatment of the selection bias (linked to the fact that Funds are distributed not randomly but on the basis of observable criteria), as the allocation rules of the various funds are interrelated (see Bouvet and Dall'erba, 2010).

4. The Empirical Framework

In principle, Structural Funds should increase the productive capacity of the benefited regions, and reduce their economic performance gap vis-à-vis the other areas (European Commission, 2000; p. 155). This impact can be gauged by assessing the relationship between the Funds, productivity and factor accumulation. We are interested in a macroeconomic impact assessment, concerning aggregate effects on a particular territory. The main challenge that policy evaluation has to face is

to distinguish the changes in the economic situation caused by policies from those caused by other factors. As is well known (see, for instance, Blundell and Costa Dias, 2000), the fundamental problems in this respect are the omitted variable bias (linked to the difficulty of measuring the effects of intervention separately from other factors) and the selection bias (linked to the fact that Funds are not distributed randomly but on the basis of given criteria, possibly impairing the comparison between target and non-target areas).

Here we address these problems through the following fixed-effect panel specification for a standard growth equation:

$$(4.1)\quad x_{it} = \alpha_1 x_{it-1} + \alpha_{2j}FUNDS_{jit} + \alpha_3 Z_{it} + \alpha_4 gfi_{it} + \alpha_5 \Delta n_{it} + \\ + \alpha_6 PERIOD\_2*SOUTH + \alpha_7\, PERIOD\_3*SOUTH + \alpha_i + \alpha_t$$

where *i=1,… 20*, refers to the region, *t=1, 2, 3* to the period, and *j=1, 2, 3* to the Fund types (EAGGF, ERDF, ESF, …); x_{it} is the natural logarithm of the (real) GDP per capita.

Following a customary template to the empirical analysis of GDP long-run growth, we include in (4.1) gfi_{it}, the (log of the) gross fixed investment per capita, and Δn_{it}, the (log) variation of population. $FUNDS_{it}$ are the various funds (ERDF, ESF, EAGGF, in terms of amounts paid to the regions from the *Fondo di Rotazione*, the Italian government unit gathering funds from the UE), included in the equation in natural logs (adding a unit constant to address cases in which funds were equal to zero). Therefore, the α_{2j} coefficients can be interpreted as elasticities. We include the three Funds jointly or in various combinations in (4.1) in an attempt to avoid spurious results. Finally, the Z_{it} variable includes a vector of national funds (related to regional and industrial policies) accruing to a given region. Among them are capital account expenditures (*spese in conto capitale*), the funds from national cohesion policies (they include the national resources of the *Fondo di rotazione* and such funds as the *Fondo innovazione tecnologica*, *Fondo contributo imprese*, *Fondo solidarietà nazionale*, and when available, the *Fondi aree depresse*) and the

current-account subsidies to firms (*trasferimenti in conto corrente alle imprese*).[8] These funds, especially capital account expenditures, are often believed (see e.g. Viesti and Prota, 2008; Prota and Viesti 2012) to be an important stimulus to regional growth. Their amounts changed considerably during the period under analysis, generally decreasing. Therefore, omitting these variables is a potential source of misspecification.

The adoption of a fixed-effect approach, as suggested in Wooldridge (2002) for the purposes of policy evaluation, can account for systematic differences across time and regions and address, at least to some extent, both omitted variable and selection bias. Through the x_{it-1} variable, we allow for the dynamic structure inherent to the data. The omission of this variable could potentially lead to seriously biased estimates. We want moreover to pursue further the search for a treatment of the selection bias problem, along the lines of the selection on observables approach. Following Bouvet and Dall'erba (2010), $FUNDS_{it}$ can be modelled as the outcome of a process including a set of economic and political determinants. Here we model $FUNDS_{jit}$ as the function of PERIOD_2 - a dummy variable equal to 1 in the second Funds' programming period (2000-2006); PERIOD_3 - a dummy variable equal to 1 in the third period (2007-2013); and the interaction terms PERIOD_n*SOUTH. SOUTH is a dummy variable equal to 0 for the non-Mezzogiorno regions and to 1 for the Mezzogiorno regions. Using these variables, we can account for systematic differences across time and regions and address, at least to some extent, both omitted variable and selection bias (in essence, Funds are awarded to the Mezzogiorno regions).

Equation (4.1) is estimated through system-GMM, in order to take care of the potential endogeneity of most regressors. This equation, especially because of the careful consideration of nationally-financed funds, already innovates vis-à-vis the existing literature about the impact of Structural Funds. There is however another point, which has received little attention in the literature: the sectoral impact of the Funds (Coppola and Destefanis, 2007, 2015, being, to the best of our knowledge the only analyses on this). It could be thought that in order to deal with this issue it is enough to replicate model (4.1) sector by sector. However, there are not data about the amount of European (or nationally-financed) funds spent in each sector. Regressing sectoral output on these

[8] For reasons of data availability we could not produce a series of *capital-account* subsidies to firms separated by the rest of capital account expenditures.

funds would assume away both the impact of the funds on the rest of the economy and the impact of the rest of the economy on the sector under scrutiny. For this reason, just including in a sectoral equation the output of the rest of the economy along with the other regressors would not be a satisfactory way of modelling this nexus. In this case, we would implicitly assume that the rest of the economy is not affected by the funds. We believe that a better solution is to draw upon the literature on multi-output multi-input transformation functions (see Coelli and Perelman, 1999; Kumbhakar 2012, 2013; for further details on this kind of specification), and to model the relationship between sectoral GDP per capita and funds as:

(4.2) $x_{s\,it} = -\alpha_1(x_{non\text{-}s\,it} - x_{s\,it}) + \alpha_2 x_{s\,it-1} + \alpha_3(x_{non\text{-}s\,it-1} - x_{s\,it-1}) + \alpha_{4j}FUNDS_{jit} + \alpha_5 Z_{it} + \alpha_6 gfi_{it} + \ldots$

where gfi_{it}, Δn_{it}, $FUNDS_{it}$ and Z_{it} have the same meaning as in (4.1). On the other hand, $x_{s\,it}$ is the GDP of sector *s* divided by total population, and $x_{non\text{-}s\,it}$ is the GDP of all sectors of the economy, *but sector* s, always divided by total population. In the Cobb-Douglas transformation (4.2), $x_{s\,it}$ and $x_{non\text{-}s\,it}$ are joint outputs produced by inputs gfi_{it}, Δn_{it}, $FUNDS_{it}$ and Z_{it}. We could however go one step further, and ask ourselves whether gfi_{it}, Δn_{it}, $FUNDS_{it}$ and Z_{it} may have different impacts across different sectors. In order to so, we rely on interaction terms that *conflate both the sectoral endowment and effect of these policy variables*.[9] We end up with the following equation:

(4.3) $x_{s\,it} = -\alpha_1(x_{non\text{-}s\,it} - x_{s\,it}) + \alpha_2 x_{si\,t-1} + \alpha_3(x_{non\text{-}s\,it-1} - x_{s\,it-1}) + \alpha_{4j}FUNDS_{jit} + \alpha_{5j}FUNDS_{jit}\,(x_{non\text{-}s\,it} - x_{s\,it}) + \ldots$

whose long-run solution can be rewritten as:

(4.4) $(\alpha_s\, x_{s\,i} - \alpha_{5j}FUNDS_{jit} - \alpha_7 Z_{it}) + (\alpha_{non\text{-}s}\, x_{non\text{-}s\,i} + \alpha_{5j}FUNDS_{jit} + \alpha_7 Z_{it}) = \alpha_{4j}FUNDS_{jit} + .$

[9] For gfi_{it}, it could make more sense to take advantage of the available data and split this variable into $gfi_{s\,it}$ and $gfi_{non\text{-}s\,it}$. However, this can complicates considerably the estimated specification, and we leave this extension for future work. On the other hand, sectoral data for $FUNDS_{it}$ and Z_{it}, are unavailable.

If the interaction terms are significant, $FUNDS_{it}$ and Z_{it} not only affect aggregate GDP but also its sectoral composition. Hence our analysis can be used to identify sectors where policy intervention is particularly effective (or detrimental). Also drawing upon the literature on multi-output multi-input transformation functions, equation (4.3) can be modified in order to include interaction terms among investment and the various funds, making allowance for positive or negative externalities among these factors.

Regional data for real GDP, value added, gross fixed investment, employment and labour units are taken from ISTAT's regional accounting. These data are separately considered for four industries: agriculture, energy and manufacturing, construction, services. The latter cannot be precisely split in market and non-market services because the allocation of these services to different industries considerably changed with the new SEC95 national accounting (see for instance Collesi, 2000). Given the interest of this issue, we still attempt splitting up of this sector into two parts, related to the distinction between market and non-market services. The latter were proxied by public administration, health and education, which we separated from the other services. Policy considerations also urged us to consider two further sectoral aggregations: manufacturing (a key sector of the Italian economy), and energy plus market services, an aggregation that accounts for most of the private nontradables.

European Structural Funds and national funds were taken from the *Spesa statale regionalizzata* database of the Ministry of Economy and Finance. All these series were deflated using a regional GDP deflator and divided by the regional number of inhabitants. It must be stressed that these series relate to the amounts disbursed by the various regions, as taken from the *Spesa Statale Regionalizzata*. These data are available from 1994 up to 2013.

5. Structural Funds and GDP per capita across the Italian Regions

The empirical framework presented in the previous section is geared to assess the effects of Structural Funds (as well as of nationally-financed funds) on regional growth. In order to give some perspective to this impact it is customary in the literature to provide some descriptive

evidence about convergence. We do so for σ-convergence in Table 3, by comparing across the programming periods the standard errors for (the natural logs of) real GDP per capita and value added per labour unit. This exercise reveals the existence of, first, some convergence between the economies of the Italian regions and then some divergence to be ascribed to the Great Recession. Overall, some very weak convergence between the economies of the Italian regions seems to emerge, apparently driven by what happens in services. High sectoral heterogeneity appears however from Table 3, enhancing the potential interest of our results. Indeed, this descriptive evidence, however, obviously does not clarify what type of convergence process is at work and especially the role that regional policies play in it.

Table 3 - σ-convergence

Standard errors of logs	***Period***		
Real VA per Labour Unit	***1994-99***	***2000-06***	***2007-13***
Total Economy	0.282	0.267	0.280
Agriculture	0.314	0.324	0.372
Energy & Manufacturing	0.524	0.506	0.540
Construction	0.331	0.274	0.342
Services	0.268	0.263	0.265

Source: own elaboration on Regional Accounting Data from Istat

Tables A.1-A.3 in the Appendix present the main evidence concerning the direct impact of Funds (and other development funds) on our variables of interest. Overall, our results imply that the Funds had a significant impact on GDP per capita. Table A.1 conveys this message well. A, say, doubling of Structural Funds per capita increase the steady-state level of GDP per capita by a sizeable proportion (about a fifth) of the same proportional increase of gross fixed investment per capita, and, on average, much more than the increase associated to nationally-financed subsidies to firms per capita. This impact diminishes for single Funds taken in isolation. Different types of Structural Funds have substantially different influences. The ERDF has the strongest impact. What is however noticeable that Funds' aggregations are much more significant than single Funds. Possibly the estimation of the growth equation is more affected by omitted variable bias when the Funds are taken in isolation. We also want to stress that while we find that (nationally-financed) subsidies to firms seldom have a positive impact on GDP per capita growth, other

national funds (especially national *cohesion* funds) were not significant at all.

Let us now turn to the sectoral estimates, which we present in Tables A.2 (specification with only EU funds) and Table A.3 (specification with EU and national funds). We provide estimates for the various sectors and funds that we have already mentioned. Moreover, we show evidence for three models. A Model 0 without interaction terms (basically replicating eq. 4.1), a Model 1 with the interaction terms allowing for a sectoral bias of the funds (basically replicating eq. 4.3), and a Model 2 with all interaction terms (an augmented eq. 4.3, including the interaction terms among investment and the funds include in the equation).

The first thing to be noticed about the sectoral models is that they are characterised by a higher goodness of fit than the aggregate model from Table A.1. To see this, consider the variability of the dependent variables that we adopt (see Table 4).

Table 4 – The dependent variables of the regression analysis.
A measure of dispersion throughout the estimation period (1995-2013)

Variable	Std. Dev.
ly_agr	.3351676
ly_iss	.5116271
ly_cos	.2806681
ly_ser	.2554063
ly_pri	.3346013
ly_pub	.1676296
ly_mfg	.627092
ly_uti	.3301526
ly	.2622357

Note: see the Legend in the Appendix for the notation adopted

Sectoral variables have almost always a larger standard deviation than aggregate output per capita, while the square root of the estimated variance of the equation residuals is usually lower. Hence, the transformation function uses the available information in a more efficient way than aggregate estimates.

More to the point, the gist of the aggregate results is maintained. Examining Table A.2 (but these main results hold true for Table A.3), one can easily see that EU funds matter, the ERDF most of all, and, again, standalone funds matter less. However, there are very interesting insights

coming from the interaction terms involving $FUNDS_{it}$ and Z_{it}. The generally weaker results for the ESF acquire a more precise shape in terms of significant evidence that this fund is detrimental to the construction share in GDP (as well as favourable to services). The ERDF fosters the manufacturing share, while being detrimental to the share of services in GDP. Also the sum of all Agriculture-oriented Funds (that we label *al2*) tends to increase the share of services in the economy, as well as the share of agriculture. Funds' aggregations tend to follow the pattern set by the ERDF. However, when the widest aggregation is considered (*fdr*, the sum of ERDF, ESF, Agriculture-oriented Funds and national co-financing), there is no sectoral bias from the EU funds. Whether this holds true by chance or by design is a matter to be left for future research. It is also interesting to notice that there seems to exist a negative spillover effect between the EDF and gross fixed investment.

Turning to nationally-financed subsidies to firms per capita (and Table A.3), they mostly matter through the interaction terms (their direct effect being most significant in conjunction with the ERDF alone). These funds appear to affect equally all sectors of the economy. These subsidies enhance the share of energy and manufacturing over GDP, and depress the share of services.

A final point: our sectoral disaggregation allows us to see that the EU funds matter for a wide array of sectors in the economy, both directly and indirectly. National funds, on the other hand, mostly matter only when their effect is interacted with another variable.

6. Concluding Remarks

In this paper we consider the impact of the European Structural Funds on convergence across Italian regions across the three waves of the Funds concerning the 1994-2013 period. We focus on the impact of Funds on productivity and employment in the Italian regions, considering separately the Funds' effects on various sectoral aggregates (the four sectors agriculture, energy and manufacturing, construction, services, plus some smaller aggregates: market services, non-market services, manufacturing, energy plus market services) of the regional economies. We consider the Funds' effects on GDP per capita in the Italian regions. Unlike in most of the earlier work, we

allow for official series for disbursed European Structural Funds and for different types of nationally-financed funds.

Our evidence implies that the Funds had a significant impact on GDP per capita. Different types of Structural Funds are found to have substantially different influences, with the ERDF having the strongest impact. We also find that (nationally-financed) subsidies to firms have a much smaller impact on GDP per capita. Sectoral evidence implies that various EU funds influence the sectoral composition of economy, but, that taken as an aggregate, these biases wash out. On the other hand, nationally-financed subsidies to firms per capita seem to depress the share of energy and manufacturing and increase the share of services over GDP.

Further work is needed on the modelling of the mechanism of funds' allocation. In this sense, the nexus between European and nationally-financed funds should be more carefully appraised. Also other variables (regional unemployment rates, etc.) should be included in this kind of exercise.

REFERENCES

Aiello F., Pupo V. (2007), L'impatto della politica regionale dell'Unione Europea. uno studio sulle regioni italiane, *Rivista Italiana degli Economisti*, 14 (3), 421-454.

Allen K., Stevenson A. (1974), *An Introduction to the Italian Economy*, London, Martin Robertson.

Arcelus F.J., Arocena P. (2000), Convergence and productive efficiency in fourteen OECD countries: A non-parametric frontier approach, *International Journal of Production Economics*, 66, 105-117

Beugelsdijk M., Eijffinger S.C.W. (2005), The Effectiveness of Structural Policy in the European Union: An Empirical Analysis for the EU-15 in 1995–2001, *Journal of Common Market Studies*, 43 (1), 37–51.

Biehl D. (1986), *The Contribution of Infrastructure to Regional Development. Final Report*, Luxembourg, European Communities Commission.

Blundell R., Costa Dias M. (2000), Evaluation Methods for Non-Experimental Data*, Fiscal Studies*, 21 (4), 427-468.

Boldrin M., Canova F. (2001), Europe's Regions, Income Disparities and Regional Policies, *Economic Policy*, n. 32, 207-253.

Bouvet F., Dall'erba S. (2010) European Regional Structural Funds: How Large is the Influence of Politics on the Allocation Process, *Journal of Common Market Studies*, 48 (3), 501–528.

Cappelen A., Castellacci F., Fagerberg J., Verspagen B. (2003); The Impact of EU Regional Support on Growth and Convergence in the European Union, *Journal of Common Market Studies*, 41 (4), 621–644.

Charron, N., Dijkstra, L., Lapuente, V., 2014. Regional Governance Matters: Quality of Government within European Union Member States. *Regional Studies*, 48, 68–90.

Coelli T., Perelman S. (1999), Comparison of Parametric and Non-Parametric Distance Functions: With Application to European Railways, European Journal of Operational Research 117(2), 326-339.

Collesi D. (2000), *La distinzione market – non market*, seminar on "La nuova Contabilità Nazionale", Istat, Rome.

Coppola G., Destefanis S. (2007), Fondi strutturali, produttività e occupazione. Uno studio sulle regioni italiane, *Rivista di economia e statistica del territorio*, n. 2, 85-113.

Coppola G., Destefanis S. (2015) *Structural Funds and Regional Convergence: Some Sectoral Estimates in Italy* In Mussida C: Pastore F. (2015) Geographical Labor Market Imbalances Springer pp 307-333.

D'Acunto S., Destefanis S., Musella, M. (2004), Exports, Supply Constraints and Growth: An Investigation using Regional Data**,** *International Review of Applied Economics,* 18 (2), 167–188.

Destefanis S. (2003), The Verdoorn Law: Some Evidence from Non-parametric Frontier Analysis**,** in: McCombie J., Pugno M., Soro B. (eds.) *Productivity Growth and Economic Performance: Essays on Verdoorn's Law,* Palgrave Macmillan, Basingstoke.

European Union Regional Policy (2006), *Inforegio Panorama*, June 2006 n. 28.

Ederveen, S., de Groot, H., Nahuis, R. (2006), Fertile Soil for Structural Funds? A Panel Data Analysis of the Conditional Effectiveness of European Cohesion Policy, *Kyklos*, 59, n. 1, 17-42.

European Commission (2000), *Agenda 2000*, Luxembourg, European Communities Commission.

Esposti R., Bussoletti S. (2008), The Impact of Objective 1 Funds on Regional Growth Convergence in the EU A panel-data approach, *Regional Studies*, 42 (2), 159-173.

Garcìa-Solanes I., Maria-Dolores R. (2002a), The Impact of European Structural Funds on Economic Convergence in European Countries and Regions, in: *Convergence Issues in the European Union*, Edward Elgar, Aldershot.

Garcìa-Solanes I., Maria-Dolores R. (2002b), Convergencia Real de las Regiones Españolas: El Impacto de los Fondos Estructurales, *Papeles de Economía Española*, n. 93.

Iuzzolino G., 2009, I divari territoriali di sviluppo in Italia nel confronto internazionale, in Mezzogiorno e politiche regionali, Cannari L., Iuzzolino G. (eds), Banca d'Italia, Roma.

Kumbhakar S. C., 2013. Specification and estimation of multiple output technologies: A primal approach, European Journal of Operational Research, 231(2), 465-473.
Kumbhakar S. C., 2012. Specification and estimation of primal production models, European Journal of Operational Research, 217(3), 509-518.
Marinuzzi G., Tortorella W. (2015), Il fondo europeo di sviluppo regionale un anno prima della chiusura del ciclo, *Amministrare*, n. 1/2015, 139-150.
Marzinotto B. (2012), The Growth Effect of EU Cohesion Policy: "A Meta-Analysis" Bruegel Working Paper n.14.
Ministero dell'Economia e delle Finanze (2001), "*Quarto Rapporto del Dipartimento per le Politiche dello Sviluppo 2000-2001*", Rome.
Ministero dell'Economia (various years), "*La Spesa Statale Regionalizzata*", Rome.
Prota F. Viesti G., (2013), *Senza Cassa. Le politiche per lo sviluppo del Mezzogiorno dopo l'Intervento straordinario*, il Mulino, Bologna.
Paci R., Saba A. (1998), The empirics of regional economic growth in Italy. 1951-1993, *International Review of Economics and Business,* 45, 515-542.
Puigcerver-Peñalver M.C. (2007), The Impact of Structural Funds Policy on European Regions' Growth : A Theoretical and Empirical Approach, *European Journal of Comparative Economics*, 4 (2), 179-208.
Putnam R.D. (1993) *Making Democracy Work. Civic Traditions in Modern Italy*, Princeton University Press, Princeton, NJ.
Quandt R.E. (1972), A New Approach to Switching Regressions, *Journal of the American Statistical Association*, 78, 306-310.
Ray S., Desli E. (1997), Productivity Growth, Technical Progress and Efficiency Change in Industrial Countries: Comment, *American Economic Review*, 87, 1033-1039.
Rodriguez-Pose A., Fratesi U. (2004), Between Development and Social Policies: The Impact of European Structural Funds in Objective 1 Regions, *Regional Studies*, 38(1), 97-113.
Tondl G. (2004), EU Regional Policy, in Van der Hoek M.P. (a cura di), *Handbook of Public Administration and Public Policy in the European Union*, Taylor & Francis, New York. 810-844.
Tortorella W. (ed.) (2011, 2012, 2013, 2014, 2015), La dimensione territoriale nel Quadro Strategico Nazionale 2007-2013. Stato d'attuazione e ruolo dei Comuni. IFEL Fondazione ANCI.
Tortorella W. (2015), Politica di coesione e questione urbana, Carocci Editore, Roma.
Viesti G., Prota F. (2007), *Le nuove politiche regionali dell'Unione Europea*, il Mulino, Bologna.
Wooldridge, J.M., 2002. Econometric Analysis of Cross Section and Panel Data*.* MIT Press, Cambridge MA.

APPENDIX

Legend of Tables A.1-A.3

By construction, we include fixed region-idiosyncratic effects in our panel estimates. We also include year-specific effects, not shown in the interest of parsimony, in all specifications. Coefficient significance is highlighted by star number:
* means a p-value < .1; ** a p-value < .05; *** a p-value < .01.
N is the number of observations; *sigma* is the square root of the estimated variance of the equation residuals.

As far as labelling is concerned,
agr stands for agriculture, *iss* for energy and manufacturing, *cos* for construction, *ser* for services, *pri* for market services, *pub* for non-market services, *mnf* for manufacturing, *uti* for energy plus market services.
lifl_pc stands for gross fixed investment,
ltrasf_pcp indicates the nationally-financed subsidies to firms from current account expenditures (the only national fund we explicitly treat here),
Labels *erdf* and *esf* are self-explanatory,
al2 denotes the sum of all Agriculture-oriented Funds,
due is the sum of ERDF and ESF,
dua the sum of ERDF and Agriculture-oriented Funds,
tre the sum of ERDF, ESF and Agriculture-oriented Funds,
fdr the sum of ERDF, ESF, Agriculture-oriented Funds and national co-financing.
ly_XXX_ly_~c denotes interaction variable $(x_{non\text{-}s\ it} - x_{s\ it}) \times gfi_{it}$ for sector xxx,
ly_xxx_ly~f denotes interaction variable $(x_{non\text{-}s\ it} - x_{s\ it}) \times FUNDS_{jit}$ for sector xxx and each fund in turn,
lifl_pc_XXXf denotes interaction variable $gfi_{it} \times FUNDS_{jit}$ for fund XXX,
ly_XXX~f_pcp denotes interaction variable $(x_{non\text{-}s\ it} - x_{s\ it}) \times ltrasf\_pcp_{it}$ for each sector XXX in turn,
lifl_pc_lt~p denotes interaction variable $lifl\_pc \times ltrasf\_pcp_{it}$
al2f_ltras~p denotes interaction variable $FUNDS_{jit} \times ltrasf\_pcp_{it}$ for each fund in turn.

An *l* initial letter (in a variable name) indicates a natural logarithm; an *f* termination indicates a first-order forwarded variable.
In each table, column, e.g., **`agr0_erdf`**, refers to an equation estimated for **`agr`**, Model **`0`**, including the **`erdf`**.

Table A.1a – Eq. (4.1), Total Economy

Variable	tot0_erdf	tot2_erdf	tot0_esf	tot2_esf	tot0_al2	tot2_al2
lifl_pc	0.0363***	0.0535**	0.0380***	0.0508	0.0371***	0.0581**
erdff	0.0027**	0.0191***				
esff			0.0005	0.0042		
al2f					0.0004	-0.0149***
ltrasf_pcp	-0.0017	0.0050	-0.0008	-0.0045	-0.0008	0.0193*
lifl_pc_lt~p		0.0002		0.0007		-0.0099**
lifl_pc_fe~f		-0.0063*				
erdff_ltra~p		-0.0013				
lifl_pc_esff				-0.0051		
esff_ltras~p				0.0009		
lifl_pc_al2f						0.0107***
al2f_ltras~p						-0.0006
N	380	380	380	380	380	380
sigma	0.0127	0.0125	0.0127	0.0126	0.0127	0.0125

Table A.1a – Augmented Eq. (4.3), Total Economy

Variable	tot0_due	tot2_due	tot0_dua	tot2_dua	tot0_tre	tot2_tre	tot0_fdr	tot2_fdr
lifl_pc	0.0353***	0.0705**	0.0345***	0.0416*	0.0335***	0.0400	0.0301**	0.0420
duef	0.0044**	0.0253***						
duaf			0.0052***	0.0112				
tref					0.0056***	0.0179**		
fdrf							0.0061***	0.0215**
ltrasf_pcp	-0.0019	0.0045	-0.0027	0.0087	-0.0021	0.0092	-0.0024	0.0033
lifl_pc_lt~p		0.0003		-0.0028		-0.0014		0.0012
lifl_pc_duef		-0.0094**						
duef_ltras~p		-0.0011						
lifl_pc_duaf				0.0018				
duaf_ltras~p				-0.0016**				
lifl_pc_tref						-0.0001		
tref_ltras~p						-0.0020**		
lifl_pc_fdrf								-0.0034
fdrf_ltras~p								-0.0015
N	380	380	380	380	380	380	380	380
sigma	0.0127	0.0125	0.0125	0.0125	0.0126	0.0125	0.0126	0.0126

Table A.2a - Eq. (4.3), erdf

Variable	agr0_erdf	agr1_erdf	agr2_erdf	iss0_erdf	iss1_erdf	iss2_erdf
lifl_pc	0.0400***	0.0187	0.0553	0.0319***	0.0176	0.0287
erdff	0.0027*	0.0046	0.0089*	0.0017*	-0.0059*	0.0039
ly_AGR_ly_~c		0.0058	0.0052			
ly_ISS_ly_~c					0.0088	0.0123
ly_xxx_ly~f		-0.0005	0.0025			
ly_xxx_ly~f					0.0047***	0.0034**
lifl_pc_fe~f			-0.0093***			-0.0048**
N	380	380	380	380	380	380
sigma	0.0124	0.0124	0.0124	0.0119	0.0118	0.0118

Variable	cos0_erdf	cos1_erdf	cos2_erdf	ser0_erdf	ser1_erdf	ser2_erdf
lifl_pc	0.0434***	0.0842*	0.0995**	0.0307***	0.0251	0.0367*
erdff	0.0031***	-0.0035	0.0170	0.0024***	-0.0045	0.0047
ly_COS_ly_~c		-0.0150	-0.0113			
ly_SER_ly_~c					-0.0063	-0.0113
ly_xxx_ly~f		0.0024	-0.0011			
ly_xxx_ly~f					-0.0067*	-0.0052*
lifl_pc_fe~f			-0.0068**			-0.0047***
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0124	0.0118	0.0118	0.0117

Variable	pri0_erdf	pri1_erdf	pri2_erdf	pub0_erdf	pub1_erdf	pub2_erdf
lifl_pc	0.0339***	0.0348***	0.0647***	0.0394***	0.0814**	0.1069***
erdff	0.0023*	0.0021*	0.0150***	0.0016	0.0072**	0.0110***
ly_PRI_ly_~c		0.0054	0.0011			
ly_PUB_ly_~c					-0.0301	-0.0367*
ly_xxx_ly~f		-0.0043	-0.0063			
ly_xxx_ly~f					-0.0042	-0.0015
lifl_pc_fe~f			-0.0081***			-0.0044*
N	380	380	380	380	380	380
sigma	0.0122	0.0123	0.0121	0.0117	0.0115	0.0114

Variable	mfg0_erdf	mfg1_erdf	mfg2_erdf	uti0_erdf	uti1_erdf	uti2_erdf
lifl_pc	0.0347***	0.0203	0.0345	0.0458***	0.0491*	0.0755**
erdff	0.0012	-0.0053**	0.0061	0.0020**	0.0043***	0.0120***
ly_MFG_ly_~c		0.0067	0.0102			
ly_UTI_ly_~c					0.0081	0.0175
ly_xxx_ly~f		0.0033***	0.0025**			
ly_xxx_ly~f					0.0050**	0.0018
lifl_pc_fe~f			-0.0060***			-0.0057**
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0118	0.0131	0.0131	0.0130

Table A.2b - Eq. (4.3), esf

Variable	agr0_esf	agr1_esf	agr2_esf	iss0_esf	iss1_esf	iss2_esf
lifl_pc	0.0442***	0.0252	0.0379	0.0333***	0.0201	0.0312
esff	0.0005	0.0083	0.0086	0.0000	-0.0016	0.0088
ly_AGR_ly_~c		0.0052	0.0040			
ly_ISS_ly_~c					0.0077	0.0102
ly_xxx_ly~f		-0.0021	-0.0011			
ly_xxx_ly~f					0.0010	-0.0006
lifl_pc_esff			-0.0026			-0.0048
N	380	380	380	380	380	380
sigma	0.0125	0.0124	0.0124	0.0119	0.0119	0.0118

Variable	cos0_esf	cos1_esf	cos2_esf	ser0_esf	ser1_esf	ser2_esf
lifl_pc	0.0438***	0.0993	0.1045*	0.0334***	0.0332	0.0441**
esff	0.0011	0.0124*	0.0220**	0.0006	0.0009	0.0096
ly_COS_ly_~c		-0.0204	-0.0181			
ly_SER_ly_~c					-0.0003	-0.0028
ly_xxx_ly~f		-0.0044	-0.0059*			
ly_xxx_ly~f					0.0003	0.0022
lifl_pc_esff			-0.0034			-0.0042
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0125	0.0119	0.0119	0.0118

Variable	pri0_esf	pri1_esf	pri2_esf	pub0_esf	pub1_esf	pub2_esf
lifl_pc	0.0356***	0.0400***	0.0481***	0.0410***	0.0833**	0.0779**
esff	0.0005	0.0003	0.0045	0.0000	0.0041	0.0031
ly_PRI_ly_~c		0.0137	0.0146			
ly_PUB_ly_~c					-0.0290	-0.0277
ly_xxx_ly~f		0.0083**	0.0072*			
ly_xxx_ly~f					-0.0032	-0.0038
lifl_pc_esff			-0.0025			0.0011
N	380	380	380	380	380	380
sigma	0.0123	0.0121	0.0121	0.0117	0.0116	0.0116

Variable	mfg0_esf	mfg1_esf	mfg2_esf	uti0_esf	uti1_esf	uti2_esf
lifl_pc	0.0354***	0.0225	0.0310	0.0455***	0.0539*	0.0443
esff	0.0003	-0.0019	0.0075	-0.0004	0.0036**	0.0003
ly_MFG_ly_~c		0.0061	0.0094			
ly_UTI_ly_~c					0.0133	0.0093
ly_xxx_ly~f		0.0012	0.0003			
ly_xxx_ly~f					0.0094**	0.0107***
lifl_pc_esff			-0.0047*			0.0024
N	380	380	380	380	380	380
sigma	0.0119	0.0119	0.0118	0.0132	0.0130	0.0130

Table A.2c - Eq. (4.3), al2

Variable	agr0_al2	agr1_al2	agr2_al2	iss0_al2	iss1_al2	iss2_al2
lifl_pc	0.0432***	-0.0055	0.0040	0.0330***	0.0266	-0.0073
al2f	0.0005	-0.0136*	-0.0188***	0.0001	0.0054**	-0.0090
ly_AGR_ly_~c		0.0123	0.0044			
ly_ISS_ly_~c					0.0039	0.0138
ly_xxx_ly~f		0.0037**	0.0016			
ly_xxx_ly~f					-0.0035**	-0.0018
lifl_pc_al2f			0.0076***			0.0067***
N	380	380	380	380	380	380
sigma	0.0125	0.0124	0.0123	0.0119	0.0118	0.0117

Variable	cos0_al2	cos1_al2	cos2_al2	ser0_al2	ser1_al2	ser2_al2
lifl_pc	0.0428***	0.1000*	-0.0012	0.0338***	0.0373*	0.0000
al2f	0.0006	0.0036	-0.0200***	0.0000	0.0035*	-0.0106**
ly_COS_ly_~c		-0.0208	0.0086			
ly_SER_ly_~c					0.0026	-0.0149
ly_xxx_ly~f		-0.0011	0.0020			
ly_xxx_ly~f					0.0036**	0.0015
lifl_pc_al2f			0.0087***			0.0068***
N	380	380	380	380	380	380
sigma	0.0125	0.0126	0.0123	0.0119	0.0118	0.0117

Variable	pri0_al2	pri1_al2	pri2_al2	pub0_al2	pub1_al2	pub2_al2
lifl_pc	0.0356***	0.0346***	0.0097	0.0391***	0.0627	0.0617
al2f	0.0002	-0.0001	-0.0134***	0.0007	-0.0065***	-0.0114***
ly_PRI_ly_~c		-0.0036	-0.0348			
ly_PUB_ly_~c					-0.0165	-0.0259
ly_xxx_ly~f		-0.0039	-0.0025			
ly_xxx_ly~f					0.0051***	0.0019
lifl_pc_al2f			0.0077***			0.0053**
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0121	0.0117	0.0116	0.0115

Variable	mfg0_al2	mfg1_al2	mfg2_al2	uti0_al2	uti1_al2	uti2_al2
lifl_pc	0.0352***	0.0321	0.0009	0.0437***	0.0394	0.0232
al2f	0.0001	0.0044	-0.0092*	0.0009	-0.0013	-0.0103***
ly_MFG_ly_~c		0.0023	0.0090			
ly_UTI_ly_~c					-0.0071	-0.0131
ly_xxx_ly~f		-0.0024	-0.0016			
ly_xxx_ly~f					-0.0044*	-0.0024
lifl_pc_al2f			0.0069***			0.0057***
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0116	0.0132	0.0131	0.0130

Table A.2d - Eq. (4.3), due

Variable	agr0_due	agr1_due	agr2_due	iss0_due	iss1_due	iss2_due
lifl_pc	0.0396***	0.0202	0.0754	0.0312***	0.0120	0.0381
duef	0.0040*	0.0127	0.0189**	0.0028*	-0.0049	0.0122*
ly_AGR_ly_~c		0.0052	0.0032			
ly_ISS_ly_~c					0.0117	0.0170
ly_xxx_ly~f		-0.0023	0.0009			
ly_xxx_ly~f					0.0050*	0.0029
lifl_pc_duef			-0.0112***			-0.0084***
N	380	380	380	380	380	380
sigma	0.0124	0.0124	0.0123	0.0119	0.0118	0.0117

Variable	cos0_due	cos1_due	cos2_due	ser0_due	ser1_due	ser2_due
lifl_pc	0.0415***	0.0671	0.0885*	0.0293***	0.0183	0.0448**
duef	0.0053***	-0.0000	0.0220	0.0041***	-0.0018	0.0135*
ly_COS_ly_~c		-0.0095	-0.0032			
ly_SER_ly_~c					-0.0109	-0.0181
ly_xxx_ly~f		0.0020	-0.0010			
ly_xxx_ly~f					-0.0061	-0.0039
lifl_pc_duef			-0.0088**			-0.0081***
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0124	0.0118	0.0118	0.0117

Variable	pri0_due	pri1_due	pri2_due	pub0_due	pub1_due	pub2_due
lifl_pc	0.0325***	0.0325***	0.0791***	0.0384***	0.0852**	0.1240***
duef	0.0036*	0.0036*	0.0208***	0.0027*	0.0096**	0.0157***
ly_PRI_ly_~c		-0.0000	-0.0021			
ly_PUB_ly_~c					-0.0326	-0.0411*
ly_xxx_ly~f		0.0004	-0.0026			
ly_xxx_ly~f					-0.0051	-0.0016
lifl_pc_duef			-0.0107***			-0.0064**
N	380	380	380	380	380	380
sigma	0.0122	0.0122	0.0121	0.0117	0.0114	0.0114

Variable	mfg0_due	mfg1_due	mfg2_due	uti0_due	uti1_due	uti2_due
lifl_pc	0.0341***	0.0169	0.0449*	0.0449***	0.0489*	0.0825***
duef	0.0024	-0.0047	0.0129**	0.0031**	0.0069***	0.0163***
ly_MFG_ly_~c		0.0082	0.0134			
ly_UTI_ly_~c					0.0081	0.0179
ly_xxx_ly~f		0.0039*	0.0026			
ly_xxx_ly~f					0.0095***	0.0064*
lifl_pc_duef			-0.0093***			-0.0066**
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0117	0.0131	0.0130	0.0129

Table A.2e - Eq. (4.3), dua

Variable	agr0_dua	agr1_dua	agr2_dua	iss0_dua	iss1_dua	iss2_dua
lifl_pc	0.0369***	0.0201	0.0303	0.0288***	0.0145	0.0121
duaf	0.0049***	-0.0154	-0.0127	0.0037***	0.0022	0.0009
ly_AGR_ly_~c		0.0042	0.0059			
ly_ISS_ly_~c					0.0084	0.0084
ly_xxx_ly~f		0.0054**	0.0067*			
ly_xxx_ly~f					0.0010	0.0011
lifl_pc_duaf			-0.0042			0.0006
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0123	0.0118	0.0118	0.0118

Variable	cos0_dua	cos1_dua	cos2_dua	ser0_dua	ser1_dua	ser2_dua
lifl_pc	0.0401***	0.0675	0.0649	0.0278***	0.0219	0.0173
duaf	0.0052***	-0.0069	-0.0081	0.0043***	0.0012	-0.0010
ly_COS_ly_~c		-0.0111	-0.0108			
ly_SER_ly_~c					-0.0052	-0.0055
ly_xxx_ly~f		0.0047	0.0048			
ly_xxx_ly~f					-0.0034	-0.0037
lifl_pc_duaf			0.0004			0.0011
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0123	0.0117	0.0117	0.0117

Variable	pri0_dua	pri1_dua	pri2_dua	pub0_dua	pub1_dua	pub2_dua
lifl_pc	0.0305***	0.0278***	0.0404**	0.0356***	0.0735	0.0923**
duaf	0.0043***	0.0041***	0.0093	0.0039***	0.0003	0.0044
ly_PRI_ly_~c		-0.0129	-0.0097			
ly_PUB_ly_~c					-0.0262	-0.0254
ly_xxx_ly~f		-0.0099	-0.0107			
ly_xxx_ly~f					0.0026	0.0059
lifl_pc_duaf			-0.0029			-0.0048
N	380	380	380	380	380	380
sigma	0.0121	0.0122	0.0122	0.0116	0.0115	0.0115

Variable	mfg0_dua	mfg1_dua	mfg2_dua	uti0_dua	uti1_dua	uti2_dua
lifl_pc	0.0322***	0.0182	0.0159	0.0433***	0.0425	0.0644**
duaf	0.0033***	0.0021	0.0010	0.0046***	0.0020	0.0095*
ly_MFG_ly_~c		0.0067	0.0067			
ly_UTI_ly_~c					-0.0024	0.0029
ly_xxx_ly~f		0.0006	0.0007			
ly_xxx_ly~f					-0.0056**	-0.0074**
lifl_pc_duaf			0.0006			-0.0047
N	380	380	380	380	380	380
sigma	0.0118	0.0118	0.0118	0.0131	0.0130	0.0130

Table A.2e - Eq. (4.3), tre

Variable	agr0_tre	agr1_tre	agr2_tre	iss0_tre	iss1_tre	iss2_tre
lifl_pc	0.0368***	0.0197	0.0418	0.0286***	0.0123	0.0191
tref	0.0055***	-0.0125	-0.0086	0.0042***	0.0025	0.0058
ly_AGR_ly_~c		0.0045	0.0060			
ly_ISS_ly_~c					0.0095	0.0095
ly_xxx_ly~f		0.0048*	0.0068*			
ly_xxx_ly~f					0.0011	0.0008
lifl_pc_tref			-0.0063			-0.0016
N	380	380	380	380	380	380
sigma	0.0123	0.0124	0.0124	0.0118	0.0118	0.0118

Variable	cos0_tre	cos1_tre	cos2_tre	ser0_tre	ser1_tre	ser2_tre
lifl_pc	0.0396***	0.0508	0.0551	0.0275***	0.0181	0.0222
tref	0.0062***	-0.0096	-0.0076	0.0049***	0.0016	0.0034
ly_COS_ly_~c		-0.0054	-0.0058			
ly_SER_ly_~c					-0.0083	-0.0082
ly_xxx_ly~f		0.0062	0.0059			
ly_xxx_ly~f					-0.0038	-0.0036
lifl_pc_tref			-0.0007			-0.0009
N	380	380	380	380	380	380
sigma	0.0123	0.0124	0.0124	0.0117	0.0117	0.0117

Variable	pri0_tre	pri1_tre	pri2_tre	pub0_tre	pub1_tre	pub2_tre
lifl_pc	0.0299***	0.0260**	0.0521***	0.0353***	0.0765	0.1079***
tref	0.0048**	0.0051**	0.0150**	0.0042***	0.0013	0.0072
ly_PRI_ly_~c		-0.0157	-0.0100			
ly_PUB_ly_~c					-0.0289	-0.0292
ly_xxx_ly~f		-0.0092	-0.0106			
ly_xxx_ly~f					0.0023	0.0071
lifl_pc_tref			-0.0056			-0.0070
N	380	380	380	380	380	380
sigma	0.0121	0.0122	0.0122	0.0116	0.0115	0.0115

Variable	mfg0_tre	mfg1_tre	mfg2_tre	uti0_tre	uti1_tre	uti2_tre
lifl_pc	0.0321***	0.0161	0.0236	0.0430***	0.0439	0.0779***
tref	0.0038***	0.0021	0.0055	0.0047***	0.0029	0.0137**
ly_MFG_ly_~c		0.0076	0.0077			
ly_UTI_ly_~c					0.0015	0.0093
ly_xxx_ly~f		0.0010	0.0009			
ly_xxx_ly~f					-0.0043	-0.0070
lifl_pc_tref			-0.0018			-0.0067
N	380	380	380	380	380	380
sigma	0.0118	0.0118	0.0118	0.0131	0.0131	0.0130

Table A.2f - Eq. (4.3), fdr

Variable	agr0_fdr	agr1_fdr	agr2_fdr	iss0_fdr	iss1_fdr	iss2_fdr
lifl_pc	0.0341***	0.0485	0.0629	0.0270**	0.0162	0.0231
fdrf	0.0057***	0.0164	0.0174	0.0039***	-0.0029	0.0000
ly_AGR_ly_~c		-0.0037	-0.0037			
ly_ISS_ly_~c					0.0063	0.0066
ly_xxx_ly~f		-0.0028	-0.0018			
ly_xxx_ly~f					0.0044	0.0042
lifl_pc_fdrf			-0.0027			-0.0014
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0123	0.0119	0.0119	0.0119

Variable	cos0_fdr	cos1_fdr	cos2_fdr	ser0_fdr	ser1_fdr	ser2_fdr
lifl_pc	0.0364**	0.0864	0.1024	0.0261***	0.0267	0.0343
fdrf	0.0066***	-0.0018	0.0069	0.0043**	-0.0008	0.0021
ly_COS_ly_~c		-0.0189	-0.0181			
ly_SER_ly_~c					0.0012	0.0007
ly_xxx_ly~f		0.0033	0.0023			
ly_xxx_ly~f					-0.0054	-0.0052
lifl_pc_fdrf			-0.0034			-0.0015
N	380	380	380	380	380	380
sigma	0.0124	0.0124	0.0124	0.0118	0.0118	0.0118

Variable	pri0_fdr	pri1_fdr	pri2_fdr	pub0_fdr	pub1_fdr	pub2_fdr
lifl_pc	0.0278**	0.0291**	0.0527*	0.0331***	0.0866*	0.0785*
fdrf	0.0046**	0.0047**	0.0126	0.0050***	0.0140*	0.0127
ly_PRI_ly_~c		0.0116	0.0141			
ly_PUB_ly_~c					-0.0369	-0.0361
ly_xxx_ly~f		-0.0021	-0.0043			
ly_xxx_ly~f					-0.0066	-0.0074
lifl_pc_fdrf			-0.0045			0.0013
N	380	380	380	380	380	380
sigma	0.0122	0.0122	0.0122	0.0117	0.0114	0.0114

Variable	mfg0_fdr	mfg1_fdr	mfg2_fdr	uti0_fdr	uti1_fdr	uti2_fdr
lifl_pc	0.0307**	0.0198	0.0382	0.0403***	0.0607*	0.0436
fdrf	0.0034**	-0.0012	0.0058	0.0065***	0.0111***	0.0064
ly_MFG_ly_~c		0.0047	0.0060			
ly_UTI_ly_~c					0.0340	0.0312
ly_xxx_ly~f		0.0024	0.0023			
ly_xxx_ly~f					0.0104	0.0120
lifl_pc_fdrf			-0.0039			0.0030
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0118	0.0131	0.0130	0.0130

Table A.3a – Augmented Eq. (4.3), erdf

Variable	agr0_erdf	agr1_erdf	agr2_erdf	iss0_erdf	iss1_erdf	iss2_erdf
lifl_pc	0.0421***	0.0073	0.0482	0.0366***	0.0161	0.0346
erdff	0.0029**	0.0044	0.0141**	0.0021**	-0.0040	0.0073
ltrasf_pcp	-0.0019	-0.0094	0.0018	-0.0038**	0.0073	0.0161
ly_AGR_ly_~c		0.0095	0.0046			
ly_ISS_ly_~c					0.0130	0.0084
ly_xxx_ly~f		-0.0004	0.0024			
ly_xxx_ly~f					0.0039**	0.0031
ly_AGR~f_pcp		0.0019	0.0009			
ly_ISS~f_pcp					-0.0076**	-0.0072**
lifl_pc_fe~f			-0.0078**			-0.0017
lifl_pc_lt~p			0.0004			-0.0016
erdff_ltra~p			-0.0014			-0.0014*
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0123	0.0119	0.0117	0.0116

Variable	cos0_erdf	cos1_erdf	cos2_erdf	ser0_erdf	ser1_erdf	ser2_erdf
lifl_pc	0.0452***	0.0898*	0.0984**	0.0353***	0.0223	0.0400
erdff	0.0033***	-0.0024	0.0249	0.0028***	-0.0041	0.0064
ltrasf_pcp	-0.0017	-0.0034	0.0098	-0.0036	0.0054	0.0150*
ly_COS_ly_~c		-0.0165	-0.0104			
ly_SER_ly_~c					-0.0139	-0.0088
ly_xxx_ly~f		0.0021	-0.0026			
ly_xxx_ly~f					-0.0068**	-0.0057*
ly_COS~f_pcp		0.0006	-0.0014			
ly_SER~f_pcp					0.0092**	0.0090**
lifl_pc_fe~f			-0.0061*			-0.0016
lifl_pc_lt~p			-0.0012			-0.0019
erdff_ltra~p			-0.0010			-0.0013
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0123	0.0118	0.0116	0.0116

Variable	pri0_erdf	pri1_erdf	pri2_erdf	pub0_erdf	pub1_erdf	pub2_erdf
lifl_pc	.0361***	.0370***	0.0494	0.0386***	0.0791*	0.1017**
erdff	0.0025**	0.0023**	0.0202***	0.0014	0.0072*	0.0179***
ltrasf_pcp	-0.0020	-0.0017	0.0034	0.0015	0.0003	0.0139**
ly_PRI_ly_~c		0.0014	0.0004			
ly_PUB_ly_~c					-0.0294	-0.0252
ly_xxx_ly~f		-0.0047	-0.0053			
ly_xxx_ly~f					-0.0043	-0.0030
ly_PRI~f_pcp		0.0040	0.0061			
ly_PUB~f_pcp					0.0011	0.0021
lifl_pc_fe~f			-0.0066*			-0.0027
lifl_pc_lt~p			0.0018			-0.0040
erdff_ltra~p			-0.0015			-0.0015*
N	380	380	380	380	380	380
sigma	0.0122	0.0122	0.0120	0.0117	0.0115	0.0114

Variable	mfg0_erdf	mfg1_erdf	mfg2_erdf	uti0_erdf	uti1_erdf	uti2_erdf
lifl_pc	0.0386***	0.0163	0.0290	0.0460***	0.0487*	0.0804**
erdff	0.0016	-0.0036	0.0075*	0.0021**	0.0044***	0.0180***
ltrasf_pcp	-0.0037**	0.0029	0.0061	-0.0010	-0.0012	0.0171**
ly_MFG_ly_~c		0.0115	0.0100			
ly_UTI_ly_~c					0.0072	0.0070
ly_xxx_ly~f		0.0028**	0.0023**			
ly_xxx_ly~f					0.0050**	0.0059*
ly_MFG~f_pcp		-0.0040	-0.0033			
ly_UTI~f_pcp					-0.0005	0.0001
lifl_pc_fe~f			-0.0037			-0.0022
lifl_pc_lt~p			0.0001			-0.0050
erdff_ltra~p			-0.0008			-0.0018*
N	380	380	380	380	380	380
sigma	0.0119	0.0117	0.0117	0.0131	0.0131	0.0129

Table A.3b, Augmented Eq. (4.3), esf

Variable	agr0_esf	agr1_esf	agr2_esf	iss0_esf	iss1_esf	iss2_esf
lifl_pc	0.0450***	0.0182	0.0434	0.0374***	0.0216	0.0240
esff	0.0005	0.0076	0.0052	0.0001	0.0001	0.0055
ltrasf_pcp	-0.0006	-0.0097	-0.0115	-0.0031*	0.0063	-0.0010
ly_AGR_ly_~c		0.0073	0.0041			
ly_ISS_ly_~c					0.0105	0.0151
ly_xxx_ly~f		-0.0019	-0.0005			
ly_xxx_ly~f					0.0001	-0.0013
ly_AGR~f_pcp		0.0023	0.0027			
ly_ISS~f_pcp					-0.0070**	-0.0063**
lifl_pc_esff			-0.0036			-0.0055*
lifl_pc_lt~p			-0.0006			0.0014
esff_ltras~p			0.0006			0.0012
N	380	380	380	380	380	380
sigma	0.0125	0.0124	0.0124	0.0119	0.0118	0.0117

Variable	cos0_esf	cos1_esf	cos2_esf	ser0_esf	ser1_esf	ser2_esf
lifl_pc	0.0444***	0.0960	0.1070	0.0373***	0.0326	0.0385
esff	0.0011	0.0128**	0.0081	0.0007	0.0016	0.0041
ltrasf_pcp	-0.0005	0.0052	-0.0023	-0.0028	0.0029	-0.0033
ly_COS_ly_~c		-0.0187	-0.0175			
ly_SER_ly_~c					-0.0060	-0.0102
ly_xxx_ly~f		-0.0046*	-0.0024			
ly_xxx_ly~f					0.0009	0.0019
ly_COS~f_pcp		-0.0021	-0.0005			
ly_SER~f_pcp					0.0065*	0.0054
lifl_pc_esff			-0.0043			-0.0047
lifl_pc_lt~p			-0.0002			0.0008
esff_ltras~p			0.0012			0.0012
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0124	0.0119	0.0118	0.0116

Variable	pri0_esf	pri1_esf	pri2_esf	pub0_esf	pub1_esf	pub2_esf
lifl_pc	0.0369***	0.0413***	0.0447	0.0397***	0.0814*	0.1096**
esff	0.0006	0.0004	0.0049	-0.0001	0.0038	0.0002
ltrasf_pcp	-0.0011	-0.0011	-0.0002	0.0021	0.0004	0.0010
ly_PRI_ly_~c		0.0111	0.0114			
ly_PUB_ly_~c					-0.0289	-0.0308
ly_xxx_ly~f		0.0083**	0.0082**			
ly_xxx_ly~f					-0.0030	-0.0015
ly_PRI~f_pcp		0.0018	0.0020			
ly_PUB~f_pcp					0.0013	0.0049
lifl_pc_esff			-0.0016			-0.0014
lifl_pc_lt~p			0.0003			-0.0044
esff_ltras~p			-0.0004			0.0008
N	380	380	380	380	380	380
sigma	0.0123	0.0121	0.0121	0.0117	0.0116	0.0115

Variable	mfg0_esf	mfg1_esf	mfg2_esf	uti0_esf	uti1_esf	uti2_esf
lifl_pc	0.0388***	0.0211	0.0190	0.0455***	0.0555*	0.0842**
esff	0.0004	-0.0007	0.0041	-0.0004	0.0037**	-0.0013
ltrasf_pcp	-0.0031*	0.0028	-0.0068	-0.0001	0.0008	0.0057
ly_MFG_ly_~c		0.0096	0.0152			
ly_UTI_ly_~c					0.0159	0.0221
ly_xxx_ly~f		0.0007	-0.0004			
ly_xxx_ly~f					0.0097**	0.0083
ly_MFG~f_pcp		-0.0038	-0.0032			
ly_UTI~f_pcp					0.0022	-0.0016
lifl_pc_esff			-0.0062**			-0.0000
lifl_pc_lt~p			0.0020			-0.0052
esff_ltras~p			0.0014			0.0009
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0117	0.0132	0.0130	0.0130

Table A.3c, Augmented Eq. (4.3), al2

Variable	agr0_al2	agr1_al2	agr2_al2	iss0_al2	iss1_al2	iss2_al2
lifl_pc	0.0440***	-0.0123	0.0399	0.0364***	0.0256	0.0276
al2f	0.0006	-0.0147*	-0.0218***	0.0004	0.0056**	-0.0084
ltrasf_pcp	-0.0007	0.0032	0.0168	-0.0033*	0.0005	0.0117
ly_AGR_ly_~c		0.0147	0.0063			
ly_ISS_ly_~c					0.0082	0.0131
ly_xxx_ly~f		0.0040*	0.0018			
ly_xxx_ly~f					-0.0035**	-0.0022
ly_AGR~f_pcp		-0.0013	0.0002			
ly_ISS~f_pcp					-0.0036	-0.0026
lifl_pc_al2f			0.0095***			0.0077***
lifl_pc_lt~p			-0.0096			-0.0063*
al2f_ltras~p			-0.0002			-0.0002
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0123	0.0119	0.0118	0.0116

Variable	cos0_al2	cos1_al2	cos2_al2	ser0_al2	ser1_al2	ser2_al2
lifl_pc	0.0433***	0.1028*	0.0447	0.0370***	0.0364*	0.0410
al2f	0.0006	0.0038	-0.0315***	0.0003	0.0033*	-0.0101**
ltrasf_pcp	-0.0006	-0.0022	0.0075	-0.0028	-0.0003	0.0127
ly_COS_ly_~c		-0.0217	0.0044			
ly_SER_ly_~c					-0.0026	-0.0107
ly_xxx_ly~f		-0.0012	0.0042			
ly_xxx_ly~f					0.0033**	0.0019
ly_COS~f_pcp		0.0007	0.0016			
ly_SER~f_pcp					0.0032	0.0014
lifl_pc_al2f			0.0099***			0.0083***
lifl_pc_lt~p			-0.0081			-0.0072
al2f_ltras~p			0.0008			-0.0004
N	380	380	380	380	380	380
sigma	0.0125	0.0126	0.0123	0.0119	0.0117	0.0116

Variable	pri0_al2	pri1_al2	pri2_al2	pub0_al2	pub1_al2	pub2_al2
lifl_pc	0.0366***	0.0370***	0.0466*	0.0383***	0.0639	0.1314***
al2f	0.0003	-0.0003	-0.0142***	0.0006	-0.0082***	-0.0185***
ltrasf_pcp	-0.0011	-0.0010	0.0144	0.0019	0.0078	0.0165
ly_PRI_ly_~c		-0.0098	-0.0300			
ly_PUB_ly_~c					-0.0168	-0.0339
ly_xxx_ly~f		-0.0057	-0.0019			
ly_xxx_ly~f					0.0064***	0.0048*
ly_PRI~f_pcp		0.0077	0.0020			
ly_PUB~f_pcp					-0.0056	0.0022
lifl_pc_al2f			0.0098***			0.0040
lifl_pc_lt~p			-0.0078			-0.0115**
		-0.0005			0.0010	
N	380	380	380	380	380	380
sigma	0.0123	0.0122	0.0120	0.0117	0.0115	0.0114

Variable	mfg0_al2	mfg1_al2	mfg2_al2	uti0_al2	uti1_al2	uti2_al2
lifl_pc	0.0379***	0.0273	0.0258	0.0438***	0.0388	0.1112***
al2f	0.0004	0.0052**	-0.0091*	0.0010	-0.0022	-0.0166***
ltrasf_pcp	-0.0032*	-0.0022	0.0069	-0.0005	0.0009	0.0224*
ly_MFG_ly_~c		0.0073	0.0124			
ly_UTI_ly_~c					-0.0086	0.0043
ly_xxx_ly~f		-0.0027**	-0.0023**			
ly_xxx_ly~f					-0.0064***	-0.0055*
ly_MFG~f_pcp		-0.0015	-0.0001			
ly_UTI~f_pcp					0.0061	-0.0073
lifl_pc_al2f			0.0080***			0.0055**
lifl_pc_lt~p			-0.0062*			-0.0163***
al2f_ltras~p			-0.0000			0.0011
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0116	0.0132	0.0131	0.0130

Table A.3d, Augmented Eq. (4.3), due

Variable	agr0_due	agr1_due	agr2_due	iss0_due	iss1_due	iss2_due
lifl_pc	0.0418***	0.0081	0.0600	0.0359***	0.0099	0.0295
duef	0.0045**	0.0127	0.0249**	0.0034**	-0.0020	0.0142**
ltrasf_pcp	-0.0020	-0.0105	0.0021	-0.0039**	0.0067	0.0115
ly_AGR_ly_~c		0.0091	0.0049			
ly_ISS_ly_~c					0.0164	0.0166
ly_xxx_ly~f		-0.0023	0.0005			
ly_xxx_ly~f					0.0038	0.0024
ly_AGR~f_pcp		0.0022	0.0012			
ly_ISS~f_pcp					-0.0076**	-0.0069*
lifl_pc_duef			-0.0092**			-0.0051*
lifl_pc_lt~p			-0.0001			-0.0001
duef_ltras~p			-0.0014			-0.0011
N	380	380	380	380	380	380
sigma	0.0124	0.0124	0.0123	0.0119	0.0117	0.0116

Variable	cos0_due	cos1_due	cos2_due	ser0_due	ser1_due	ser2_due
lifl_pc	0.0436***	0.0750	0.0894	0.0341***	0.0142	0.0343
duef	0.0057***	0.0010	0.0292*	0.0047***	-0.0010	0.0135
ltrasf_pcp	-0.0020	-0.0072	0.0014	-0.0039*	0.0041	0.0100
ly_COS_ly_~c		-0.0118	-0.0043			
ly_SER_ly_~c					-0.0203	-0.0204
ly_xxx_ly~f		0.0018	-0.0026			
ly_xxx_ly~f					-0.0062	-0.0044
ly_COS~f_pcp		0.0019	0.0009			
ly_SER~f_pcp					0.0087*	0.0080*
lifl_pc_duef			-0.0079**			-0.0046
lifl_pc_lt~p			-0.0005			-0.0006
duef_ltras~p			-0.0008			-0.0010
N	380	380	380	380	380	380
sigma	0.0125	0.0125	0.0124	0.0118	0.0116	0.0116

Variable	pri0_due	pri1_due	pri2_due	pub0_due	pub1_due	pub2_due
lifl_pc	0.0347***	0.0341***	0.0611*	0.0377***	0.0834*	0.1235**
duef	0.0040**	0.0041**	0.0262***	0.0025*	0.0094**	0.0219***
ltrasf_pcp	-0.0023	-0.0023	0.0050	0.0014	0.0002	0.0132
ly_PRI_ly_~c		-0.0071	-0.0078			
ly_PUB_ly_~c					-0.0321	-0.0321
ly_xxx_ly~f		0.0002	-0.0005			
ly_xxx_ly~f					-0.0051	-0.0029
ly_PRI~f_pcp		0.0021	0.0035			
ly_PUB~f_pcp					0.0010	0.0030
lifl_pc_duef			-0.0083**			-0.0046
lifl_pc_lt~p			0.0013			-0.0044
duef_ltras~p			-0.0017			-0.0014
N	380	380	380	380	380	380
sigma	0.0122	0.0122	0.0120	0.0117	0.0114	0.0113

Variable	mfg0_due	mfg1_due	mfg2_due	uti0_due	uti1_due	uti2_due
lifl_pc	0.0380***	0.0118	0.0302	0.0450***	0.0489*	0.0887*
duef	0.0030**	-0.0022	0.0127**	0.0032**	0.0071***	0.0221***
ltrasf_pcp	-0.0039**	0.0021	0.0017	-0.0011	-0.0011	0.0187*
ly_MFG_ly_~c		0.0136	0.0159			
ly_UTI_ly_~c					0.0078	0.0098
ly_xxx_ly~f		0.0031	0.0021			
ly_xxx_ly~f					0.0096***	0.0108***
ly_MFG~f_pcp		-0.0039	-0.0030			
ly_UTI~f_pcp					0.0002	-0.0005
lifl_pc_duef			-0.0070*			-0.0026
lifl_pc_lt~p			0.0009			-0.0058*
duef_ltras~p			-0.0004			-0.0019
N	380	380	380	380	380	380
sigma	0.0119	0.0117	0.0117	0.0131	0.0130	0.0129

Table A.3e, Augmented Eq. (4.3), dua

Variable	agr0_dua	agr1_dua	agr2_dua	iss0_dua	iss1_dua	iss2_dua
lifl_pc	0.0399***	0.0090	0.0066	0.0341***	0.0137	0.0286
duaf	0.0055***	-0.0193*	-0.0113	0.0045***	0.0027	0.0051
ltrasf_pcp	-0.0029	0.0050	0.0145	-0.0047***	0.0026	0.0125
ly_AGR_ly_~c		0.0083	0.0122			
ly_ISS_ly_~c					0.0130	0.0056
ly_xxx_ly~f		0.0067**	0.0077*			
ly_xxx_ly~f					0.0009	0.0010
ly_AGR~f_pcp		-0.0023	-0.0031			
ly_ISS~f_pcp					-0.0053	-0.0052
lifl_pc_duaf			-0.0021			0.0028
lifl_pc_lt~p			-0.0005			-0.0026
duaf_ltras~p			-0.0014			-0.0013**
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0122	0.0118	0.0117	0.0116

Variable	cos0_dua	cos1_dua	cos2_dua	ser0_dua	ser1_dua	ser2_dua
lifl_pc	0.0428***	0.0672	0.0792	0.0331***	0.0197	0.0421*
duaf	0.0057***	-0.0169	-0.0230	0.0050***	0.0001	0.0035
ltrasf_pcp	-0.0027	0.0066	0.0174	-0.0045**	0.0017	0.0165*
ly_COS_ly_~c		-0.0098	-0.0117			
ly_SER_ly_~c					-0.0135	0.0002
ly_xxx_ly~f		0.0087*	0.0095*			
ly_xxx_ly~f					-0.0047	-0.0039
ly_COS~f_pcp		-0.0040	-0.0051			
ly_SER~f_pcp					0.0064*	0.0069*
lifl_pc_duaf			0.0030			0.0036
lifl_pc_lt~p			-0.0039			-0.0043
duaf_ltras~p			-0.0002			-0.0016**
N	380	380	380	380	380	380
sigma	0.0123	0.0123	0.0123	0.0117	0.0116	0.0115

Variable	pri0_dua	pri1_dua	pri2_dua	pub0_dua	pub1_dua	pub2_dua
lifl_pc	0.0333***	0.0313***	0.0299	0.0355***	0.0738	0.0980**
duaf	0.0048***	0.0043***	0.0138**	0.0038***	-0.0002	0.0052
ltrasf_pcp	-0.0029	-0.0029	0.0001	0.0003	0.0013	0.0099
ly_PRI_ly_~c		-0.0251	-0.0242			
ly_xxx_ly~f					-0.0263	-0.0187
ly_xxx_ly~f		-0.0141*	-0.0125			
ly_PRI~f_pcp		0.0094	0.0134*			
ly_PUB~f_pcp					-0.0011	0.0017
lifl_pc_duaf			-0.0010			-0.0019
lifl_pc_lt~p			0.0016			-0.0053
duaf_ltras~p			-0.0014*			-0.0006
N	380	380	380	380	380	380
sigma	0.0121	0.0121	0.0120	0.0116	0.0115	0.0115

Variable	mfg0_dua	mfg1_dua	mfg2_dua	uti0_dua	uti1_dua	uti2_dua
lifl_pc	0.0366***	0.0133	0.0184	0.0435***	0.0410	0.0854**
duaf	0.0040***	0.0039	0.0047	0.0050***	0.0012	0.0081
ltrasf_pcp	-0.0046***	-0.0019	0.0038	-0.0022	-0.0021	0.0106
ly_MFG_ly_~c		0.0121	0.0083			
ly_UTI_ly_~c					-0.0062	0.0007
ly_xxx_ly~f		-0.0000	0.0002			
ly_xxx_ly~f					-0.0083***	-0.0077
ly_MFG~f_pcp		-0.0021	-0.0019			
ly_UTI~f_pcp					0.0028	-0.0001
lifl_pc_duaf			0.0023			-0.0021
lifl_pc_lt~p			-0.0013			-0.0066
duaf_ltras~p			-0.0009			-0.0004
N	380	380	380	380	380	380
sigma	0.0118	0.0117	0.0117	0.0130	0.0130	0.0130

Table A.3f, Augmented Eq. (4.3), tre

Variable	agr0_tre	agr1_tre	agr2_tre	iss0_tre	iss1_tre	iss2_tre
lifl_pc	0.0393***	0.0099	0.0086	0.0335***	0.0117	0.0246
tref	0.0059***	-0.0135*	-0.0021	0.0048***	0.0022	0.0111
ltrasf_pcp	-0.0023	-0.0015	0.0116	-0.0042***	0.0037	0.0115
ly_AGR_ly_~c		0.0080	0.0130			
ly_ISS_ly_~c					0.0139	0.0076
ly_xxx_ly~f		0.0052***	0.0069**			
ly_xxx_ly~f					0.0014	0.0007
ly_AGR~f_pcp		-0.0003	-0.0013			
ly_ISS~f_pcp					-0.0057*	-0.0053
lifl_pc_tref			-0.0034			0.0005
lifl_pc_lt~p			-0.0004			-0.0010
tref_ltras~p			-0.0020*			-0.0015*
N	380	380	380	380	380	380
sigma	0.0123	0.0124	0.0123	0.0118	0.0117	0.0117

Variable	cos0_tre	cos1_tre	cos2_tre	ser0_tre	ser1_tre	ser2_tre
lifl_pc	0.0418***	0.0537	0.0631	0.0323***	0.0158	0.0340
tref	0.0066***	-0.0159	-0.0145	0.0055***	-0.0001	0.0096
ltrasf_pcp	-0.0022	-0.0011	0.0073	-0.0040**	0.0021	0.0155
ly_COS_ly_~c		-0.0056	-0.0073			
ly_SER_ly_~c					-0.0166	-0.0042
ly_xxx_ly~f		0.0089*	0.0084*			
ly_xxx_ly~f					-0.0057	-0.0038
ly_COS~f_pcp		-0.0009	-0.0017			
ly_SER~f_pcp					0.0064	0.0067
lifl_pc_tref			0.0014			0.0018
lifl_pc_lt~p			-0.0022			-0.0026
tref_ltras~p			-0.0004			-0.0019**
N	380	380	380	380	380	380
sigma	0.0124	0.0124	0.0124	0.0117	0.0117	0.0116

Variable	pri0_tre	pri1_tre	pri2_tre	pub0_tre	pub1_tre	pub2_tre
lifl_pc	0.0323***	0.0283**	0.0300	0.0349***	0.0765	0.1056**
tref	0.0052***	0.0053**	0.0216**	0.0041***	0.0019	0.0092
ltrasf_pcp	-0.0024	-0.0026	0.0025	0.0008	-0.0004	0.0101
ly_PRI_ly_~c		-0.0267	-0.0269			
ly_PUB_ly_~c					-0.0292	-0.0206
ly_xxx_ly~f		-0.0122	-0.0105			
ly_xxx_ly~f					0.0017	0.0040
ly_PRI~f_pcp		0.0056	0.0108			
ly_PUB~f_pcp					0.0008	0.0036
lifl_pc_tref			-0.0025			-0.0028
lifl_pc_lt~p			0.0023			-0.0057
tref_ltras~p			-0.0021**			-0.0008
N	380	380	380	380	380	380
sigma	0.0122	0.0122	0.0121	0.0116	0.0115	0.0115

Variable	mfg0_tre	mfg1_tre	mfg2_tre	uti0_tre	uti1_tre	uti2_tre
lifl_pc	0.0362***	0.0117	0.0178	0.0431***	0.0421	0.0919**
tref	0.0045***	0.0034	0.0100	0.0049***	0.0030	0.0129
ltrasf_pcp	-0.0042***	-0.0007	0.0027	-0.0015	-0.0026	0.0122
ly_MFG_ly_~c		0.0127	0.0095			
ly_UTI_ly_~c					-0.0019	0.0047
ly_xxx_ly~f		0.0005	0.0004			
ly_xxx_ly~f					-0.0049	-0.0042
ly_MFG~f_pcp		-0.0025	-0.0022			
ly_UTI~f_pcp					-0.0011	-0.0039
lifl_pc_tref			-0.0004			-0.0028
lifl_pc_lt~p			0.0003			-0.0070*
tref_ltras~p			-0.0010			-0.0007
N	380	380	380	380	380	380
sigma	0.0118	0.0117	0.0117	0.0131	0.0131	0.0130

Table A.3g, Augmented Eq. (4.3), fdr

Variable	agr0_fdr	agr1_fdr	agr2_fdr	iss0_fdr	iss1_fdr	iss2_fdr
lifl_pc	0.0364***	0.0364	0.0330	0.0313**	0.0166	0.0140
fdrf	0.0062***	0.0198*	0.0271**	0.0048***	-0.0035	0.0014
ltrasf_pcp	-0.0025	-0.0159	-0.0063	-0.0045***	0.0063	0.0070
ly_AGR_ly_~c		0.0002	0.0027			
ly_ISS_ly_~c					0.0098	0.0085
ly_xxx_ly~f		-0.0036	-0.0032			
ly_xxx_ly~f					0.0051	0.0047
ly_AGR~f_pcp		0.0036	0.0033			
ly_ISS~f_pcp					-0.0074**	-0.0067*
lifl_pc_fdrf			-0.0003			-0.0001
lifl_pc_lt~p			-0.0008			0.0010
fdrf_ltras~p			-0.0014			-0.0007
N	380	380	380	380	380	380
sigma	0.0124	0.0123	0.0123	0.0119	0.0118	0.0117

Variable	cos0_fdr	cos1_fdr	cos2_fdr	ser0_fdr	ser1_fdr	ser2_fdr
lifl_pc	0.0386**	0.1025*	0.1118**	0.0304***	0.0250	0.0276
fdrf	0.0072***	-0.0021	0.0063	0.0051***	-0.0029	0.0043
ltrasf_pcp	-0.0025	-0.0127	-0.0151	-0.0041**	0.0033	0.0089
ly_COS_ly_~c		-0.0244	-0.0233			
ly_SER_ly_~c					-0.0061	-0.0020
ly_xxx_ly~f		0.0038	0.0025			
ly_xxx_ly~f					-0.0077	-0.0066
ly_COS~f_pcp		0.0035	0.0041			
ly_SER~f_pcp					0.0077*	0.0074
lifl_pc_fdrf			-0.0029			0.0003
lifl_pc_lt~p			0.0006			-0.0001
fdrf_ltras~p			0.0000			-0.0011
N	380	380	380	380	380	380
sigma	0.0124	0.0125	0.0125	0.0118	0.0117	0.0117

Variable	pri0_fdr	pri1_fdr	pri2_fdr	pub0_fdr	pub1_fdr	pub2_fdr
lifl_pc	0.0299***	0.0301**	0.0338	0.0329***	0.0840*	0.0660
fdrf	0.0052**	0.0051**	0.0173*	0.0049***	0.0156**	0.0173*
ltrasf_pcp	-0.0026	-0.0025	0.0030	0.0006	-0.0050	0.0052
ly_PRI_ly_~c		0.0045	0.0016			
ly_PUB_ly_~c					-0.0357	-0.0259
ly_xxx_ly~f		-0.0029	-0.0021			
ly_xxx_ly~f					-0.0080	-0.0102
ly_PRI~f_pcp	0.0028					0.0007
ly_PUB~f_pcp			0.0043	0.0055		
lifl_pc_fdrf	-0.0019			0.0040		
lifl_pc_lt~p	0.0012			-0.0034		
fdrf_ltras~p	-0.0015			-0.0010		
N	380	380	380	380	380	380
sigma	0.0121	0.0117	0.0114	0.0114	0.0122	0.0122

Variable	mfg0_fdr	mfg1_fdr	mfg2_fdr	uti0_fdr	uti1_fdr	uti2_fdr
lifl_pc	0.0343***	0.0166	0.0181	0.0404***	0.0570*	0.0562
fdrf	0.0043***	-0.0009	0.0074	0.0068***	0.0124***	0.0105
ltrasf_pcp	-0.0043***	0.0021	-0.0028	-0.0020	-0.0048	0.0142
ly_MFG_ly_~c		0.0091	0.0105			
ly_UTI_ly_~c					0.0282	0.0241
ly_xxx_ly~f		0.0026	0.0025			
ly_xxx_ly~f					0.0119*	0.0171**
ly_MFG~f_pcp		-0.0038	-0.0031			
ly_UTI~f_pcp					-0.0068	-0.0090
lifl_pc_fdrf			-0.0035			0.0065
lifl_pc_lt~p			0.0028			-0.0072**
fdrf_ltras~p			-0.0003			-0.0012
N	380	380	380	380	380	380
sigma	0.0119	0.0118	0.0118	0.0131	0.0130	0.0130