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Article

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Reference: Štiblárová, Ľubica (2022). European cohesion policy to the rescue? : revising (counter)-cyclical effects in the EU-28 recipient countries. In: Ekonomický časopis 70 (9/10), S. 681 - 702. https://www.sav.sk/journals/uploads/0125120209-10%2022%20Stiblarova%20+%20SR.pdf. doi:10.31577/ekoncas.2022.09-10.01.

European Cohesion Policy to the Rescue? Revising (Counter)-Cyclical Effects in the EU-28 Recipient Countries[1]

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Abstract

This paper empirically verifies recent efforts of EU policymakers and government authorities to apply the European Cohesion Policy (ECP) as a possible counter-cyclical instrument to boost economies in their economic downturns. Compared to limited country-specific studies, we allow for an endogeneity issue between the business cycles and the ECP payments and apply a system GMM estimation for the EU-28 recipient countries sample in the time period 2000 – 2018. Even though the overall ECP payments follow a pro-cyclical path, the model estimations for the sub-periods based on individual programming periods reveal a time-varying cyclical character of the ECP. Whereas the observed pro-cyclicality can be mainly contributed to the period 2000 – 2006, we find the conditional counter-cyclical effects in 2007 – 2013 and 2014 – 2018, when a lower price level and obeying the rule of law seem to have an extra counter-cyclical dimension, confirming a rationale of the convergence criteria and the Stability and the Growth Pact.

Keywords: *allocation, European Cohesion Policy, cyclicality, system gmm estimation*

JEL Classification: E32, E63, F36, F45

DOI: https://doi.org/10.31577/ekoncas.2022.09-10.01

Introduction

Making up over 30% of the common EU budget 2014 – 2020 (approx. 351.8 billion EUR), the European Cohesion Policy (ECP) presents one of the most important EU investment strategies aimed at promoting economic growth and

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[1] This work was supported by the Scientific Grant Agency VEGA under Grant No. 1/0394/21 and by the Technical University of Košice under Grant No. 03/TUKE/2020.

reducing socio-economic disparities among the member states (Kamps, Leiner-Killinger and Martin, 2009; Crescenzi, Fratesi and Monastiriotis, 2020).

Following this primary objective, the literature encompasses extensive evidence regarding the ECP effects on economic growth, convergence measured by GDP per capita growth or on the employment of the recipient countries (see, e.g., Cappelen et al., 2003; Ederveen, de Groot and Nahuis, 2006; Dall'erba and Le Gallo, 2008; Mohl and Hagen, 2010; Becker, Egger and von Ehrlich, 2012; Pellegrini et al., 2013; Di Cataldo, 2017; Crescenzi and Giua, 2020). On the other hand, the empirical studies leave unexplored the recent efforts of EU policymakers and government authorities to additionally apply the ECP as a counter-cyclical instrument for boosting economies in their economic downturns. Yet, this subject has lately received significant attention in policy communities (e.g., Kamps, Leiner-Killinger and Martin, 2009; Nunez Ferrer and Alcidi, 2018), especially after the Great Recession in 2008, since which time the ECP has been used as a part of the European Economic Recovery Plan (EERP) with a goal of providing an immediate fiscal stimulus to the European economy through boosting investment, particularly in the infrastructure projects (European Commission, 2009).

In a similar vein, the European Commission more recently prepared the ambitious Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) package. Not only that the ECP programs of the programming period (PP) 2014 – 2020 have been re-oriented through 239 amendments using the flexibilities offered by the Coronavirus Response Investment Initiative (CRII) and the Coronavirus Response Investment Initiative Plus (CRII+), but the REACT-EU with more than 47 billion EUR of additional funds should help to tackle the challenges brought by the recent coronavirus crisis. These additional resources should be distributed mostly from the existing European Regional Development Fund (ERDF) and the European Social Fund (ESF) with the aim to support investment and job maintenance, i.e., provide a counter-cyclical impulse to the member states after the crisis (European Commission 2020).

However, it remains questionable to which extent the ECP is effective in boosting the EU economies in their downturns. While the ECP aims to strengthen economic and social cohesion within the EU through the system of funds, may the payments from them also be considered as a complementary counter-cyclical fiscal instrument stabilizing the member states' business cycles? Theoretically, financially constrained firms are more likely in need of the EU resources in recessions compared to the expansions. Such allocation should lead to absorption of a greater share of the ECP payments in a counter-cyclical manner, i.e., the ECP can seemly act as a discretionary tool boosting EU economies in recessionary periods. On the other hand, the ECP payments might perform a cyclical behavior

if the expansions are positively correlated with a rise in aggregate demand. This should lead to more EU project applications and thus, a higher amount of allocated EU resources in expansions. The cyclical ECP payments can also result from the pro-cyclical nature of the politically driven public investment, which partly co-funds the EU projects (see, e.g., Bove, Efthyvoulou and Navas, 2017); in such case, the ECP as a part of the pro-cyclical fiscal policy may be associated with the inability to create fiscal buffers in recessionary periods, followed by lower economic growth, higher output volatility or inflation (McManus and Ozkan, 2015). The pro-cyclical character may also come from the absorption paradox which occurs when countries in deteriorated economic conditions are not able to absorb EU funds effectively (OECD, 2019).

Even both opposite views rely on solid theoretical assumptions, the empirical research still lacks systematic evidence regarding this matter. This study fills a knowledge gap and empirically verifies this issue for all EU member states within dynamic panel data model estimations during three multiannual PP – 2000 – 2006, 2007 – 2013, and 2014 – 2018, which has not been done in previous country-specific works. Our results suggest that the ECP payments perform a pro-cyclical behavior in the time period 2000 – 2018, however, a disaggregated view on the sub-periods based on individual PPs reveals a time-varying cyclical character, which can be explained by specific objectives and instruments implied in each Cohesion Policy PP. We also observe the conditional counter-cyclical effects of the ECP in the PP 2007 – 203 and 2014 – 2018 related to the price level and the rule of law.

The remainder of the paper is as follows; the second section provides a literature review dealing with the ECP and its effect on the EU member states found by previous empirical studies. The third section describes a system GMM estimation applied on 28 EU countries in the time period 2000 – 2018. We provide the main estimation results in the fourth section and conclude our findings with policy implications regarding the EU common budget framework in the last section.

1. Literature Review

In line with the primary objective of the Cohesion Policy, that is, promoting harmonious development and reducing disparities between the levels of development of the EU regions (Art. 174 Treaty on the Functioning of the European Union), the existing empirical research has been focused on finding evidence of the ECP effects on the economic growth, convergence, and/or employment in the recipient countries. Most empirical studies find positive effects of the ECP (see, e.g., Cappelen et al., 2003; Mohl and Hagen, 2010; Becker, Egger and von

Ehrlich, 2012; Pellegrini et al., 2013; Di Cataldo, 2017; Crescenzi and Giua, 2020). However, some authors do not confirm significant ECP effects at all (e.g., Rodriguez-Pose and Fratesi, 2004; Dall'erba and Le Gallo, 2008) or even find decelerating effects of the ECP on economic growth (e.g., Eggert et al., 2007).

Well-cited, Mohl and Hagen (2010) examine the ECP effects on economic growth at the NUTS-1/NUTS-2 regional level. The authors find that the ECP payments to Objective 1, i.e., financial sources allocated to the regions with GDP per capita below 75% of the EU-wide GDP, stimulate regional economic growth in 1995 – 2005. Pellegrini et al. (2013) confirm these findings; by applying the regression discontinuity design (RDD), the authors find evidence of the positive effect of the ECP on economic growth. While comparing economic growth between regions, Pellegrini et al. (2013) identify a difference of 0.6 – 0.9 percentage points in annual GDP per capita growth in favor of the Objective 1 region for 1995 – 2006.

In addition to these findings, Mohl and Hagen (2010) observe spatial spillovers since economic growth in a particular EU region may also depend on the growth performance of the neighboring region. Such evidence is in accordance with later findings of Di Comite et al. (2018) who detect the interregional spillover effects as well. Moreover, there seems to be a heterogeneous spatial distribution across the EU regions in the short run. Similar findings are provided by Crescenzi and Giua (2020), who by use of a spatial RDD find that regional effects differ between the member states. For instance, the authors identify a concentration of the regional growth initiated by the ECP in Germany, while the Southern European countries do not show such plausible results regarding the ECP. According to Crescenzi and Giua (2020), the ECP effects on employment have been mainly found in the United Kingdom whose well-established macroeconomic and institutional conditions contributed to successful results of the ECP in terms of job creation and additional employee programs. It is worth mentioning that spatial differences found in the short run, should be mitigated in the long run, i.e., homogenous spatial distribution should be observed (see, e.g., Di Comite et al., 2018).

The effectiveness of the ECP has been also investigated by Di Cataldo (2017) who finds a positive ECP effect on the socio-economic conditions of the recipients. In a similar vein, Becker, Egger and von Ehrlich (2012) find that the ECP has boosted economic growth in the NUTS-3 regions during the PPs 1994 – 1999 and 2000 – 2006. Although, the authors using generalized propensity score estimation demonstrate that in several regions, the reduction of the ECP payments would not have a negative effect on their growth, which suggests that the final allocation could be improved so that better reflects the economic needs of the regions. Cappelen et al. (2003) also confirm positive economic effects of the ECP

but stress out that these effects seem to be stronger in more developed recipient countries, which somehow dampens the primary purpose of the Cohesion Policy to support less developed countries. Dall'erba and Le Gallo (2008) observe the convergence of the European regions over 1989-99 but do not find any significant effect of the ECP on it. In a similar way, Rodriguez-Pose and Fratesi (2004) do not detect a significant effect of the ECP payments on infrastructure and business support in this period but find that the payments to agriculture seem to have a short-term effect on growth.

Eggert et al. (2007) observe that the ECP accelerates the convergence of the German regions in 1995 – 2004, however, the ECP seems to have a negative effect on the aggregate growth in the long run. How can one understand such ambiguous findings? Ederveen, de Groot and Nahuis (2006) shed more light on this by exploring the conditional effectiveness of the ECP in 13 EU member states. The research of conditionality of the ECP prevails in the later studies (e.g., Huliaras and Petropoulos, 2016; Dicharry, Nguyen-Van and Pham, 2019). Based on the OLS and system GMM estimations, Ederveen, de Groot and Nahuis (2006) state that on average, the ECP is ineffective and the only statistically significant effects are the conditional ones. The reason for this lies in the institutional environment of the recipient countries. The ECP seems to have a positive effect in the recipients showing a high level of trade openness and/or good institutional quality. Such findings validate previous results from the foreign aid literature (e.g., Burnside and Dollar, 2000) where a growth potential seems to be conditional on e.g., good fiscal, monetary or trade policies. Dicharry, Nguyen-Van and Pham (2019) confirm these findings as well, highlighting conditional impact of the ECP on public debt and inflation level.

Becker, Egger and von Ehrlich (2012) also point out the possible inefficiency in the ECP spending which can contribute to diminishing effects on economic growth and/or employment. The payments can be inefficiently spent because of lower absorption capacity and already mentioned absorption paradox, or due to corrupt practices (Tatulescu and Patruti, 2014). To overcome these shortcomings, Cappelen et al. (2003) suggest policies improving the recipients' environment, such as those which speed up the structural changes and increase the R&D capacities of the recipients.

Apart from this main strand of the ECP empirical literature, the focal point of the latest studies seems to be a discussion on the ability of the ECP to combat consequences of the current Covid-19 crisis (see, e.g., Arbolino and Di Caro, 2021; Crescenzi, Giua and Sonzogno, 2021). However, to the best of our knowledge, the question of the ECP (counter)-cyclicality has not been investigated for the EU as a whole yet. The rare country-specific examples in which the authors

evaluate this aspect present the studies of Kamps, Leiner-Killinger and Martin (2009), Tatulescu and Patruti (2014) and Chmelova (2018). Kamps, Leiner-Killinger and Martin (2009) discuss the ECP effects with regard to stylized facts for nine later entered Central and Eastern European countries.[2] Whereas authors acknowledge the stabilizing effect of the ECP in the recessionary periods, they point out the opposite – i.e., periods of unsustainably fast economic growth where additional demand stimulus in form of the ECP payments may contribute to the internal and/or external macroeconomic imbalances in these countries. Kamps, Leiner-Killinger and Martin (2009) therefore suggest fiscal tightening in such periods or the government actions which would assure that increased public expenditures are not associated with additional wage pressures in the private sector.

Using Romania as a case study, Tatulescu and Patruti (2014) focus on the determinants which may be related to the absorption of the EU funds in this country. More precisely, the authors discuss the macroeconomic and financial capacity, the administrative efficiency, and the citizens' uncertainty regarding the ECP payments. The results suggest that Romanian capacity to spend the ECP payments has been deteriorated in the recessionary period, i.e., the ECP in Romania seemed to have a pro-cyclical character. Moreover, increasing corruption levels and the lack of trust in the private sector resulted in the worst absorption rate among the EU member states in the PP 2007 – 2013.

Finally, Chmelova (2018) examines the ECP effects on the Czech business cycle in the years 2004 – 2015. Similar to the previous study, Chmelova (2018) finds a pro-cyclical nature of the EU Regional Policy; a 1% increase in the output gap of the Czech Republic should be followed by an increase in capital revenues (including the ECP payments) by 8.4 billion CZK. Although, it is worth mentioning that Chmelova (2018) relies on the simple regression analysis without correcting for potential endogeneity issue between the business cycles and the ECP payments, which may result in biased estimates. In a similar vein, Kamps, Leiner-Killinger and Martin (2009) and Tatulescu and Patruti (2014) do not provide a proper analysis of the ECP's cyclicality, and rather discuss this issue based on the stylized facts.

By employing our analysis, we contribute to this limited strand of empirical literature at least in two ways. Firstly, we systematically verify the cyclicality for all EU member states within dynamic panel data model estimations during three PPs (2000 – 2006, 2007 – 2013, 2014 – 2018). By doing this, we provide unbiased and robust evidence stemming from different multiannual common financial frameworks as each PP implies specific objectives and instruments. Secondly,

[2] Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, and the Slovak Republic.

we contribute to the heated debates on the New Generation EU – since this concept predominantly relies on the ECP, it is crucial to examine whether it can act as a complementary fiscal stimulus. Moreover, we further connect the European integration, alongside the EU co-funding system, and the business cycle strands of the literature. Thus, we provide a more complex view on this topic.

2. Methodology and Data

In contrast to previous country-specific studies, we examine a cyclical behavior of the ECP using a dynamic panel framework.[3] Since the allocation of the ECP payments may be driven by contemporaneous economic conditions (see, e.g. Coelho, 2019; Dicharry and Stiblarova, 2020), there might be a potential endogeneity problem between the business cycles and the ECP payments. To deal with this issue, we employ a system GMM estimation (Blundell and Bond, 1998) where the ECP is considered as an endogenous variable.[4] We estimate the model in the following form:

$$BC_{it} = \beta_0 + \sum_{j=1}^{J} \alpha_j \, BC_{it-j} + \beta_2 \log ECP_{it-1} + \sum_{c=1}^{C} \delta_c \log CV_{cit-1} + \nu_t + \varepsilon_{it} \qquad (1)$$

$$\varepsilon_{it} = \mu_i + \upsilon_{it} \qquad (2)$$

where *BC* stands for the business cycle of the EU country *i* in year *t*, *ECP* presents our variable of interest, the ECP payments, and *CV* stands for control variables. Additionally, v_t accounts for the year-specific effects and ε_{it} presents the error term, consisting of the unobserved (time-invariant) individual-level effects and the observation-specific errors.

The dependent variable business cycle (*BC)* has been estimated in standard fashion by applying the Hodrick-Prescott (HP) filter on the log-transformed data of real GDP (see Figure A1 in the Appendix). Despite some criticism of the HP filter (i.e., the end-point bias problem), we choose this filtering technique due to its widespread and accepted use in the business cycle research (see, e.g., Antonakakis and Tondl, 2014; Papageorgiou, Michaelides and Tsionas, 2016), allowing comparability of our results.[5]

[3] In the presented methodology, we do not consider spatial interdependencies among the EU countries since previous studies do not confirm the sensitivity of the country-level ECP analysis to spillover effects (see, e.g., Ederveen, de Groot and Nahuis, 2006).

[4] In particular, we consider the lagged explanatory variable and the variable of interest, ECP, to be endogenous variables in the model, while the remaining (control) variables are considered to be predetermined (i.e., conclusions regarding the control variables on the business cycle should be taken with caution as correlation with contemporaneous errors is not fully considered). The year dummies are the strictly exogenous variables in our model specification.

In line with previous studies, we use a set of lagged explanatory variables (1 year) since we expect that their effects on the business cycles should not appear immediately, but rather with a time lag. In particular, it has been proved that it may take some time for the effects of ECP to be reflected in the countries' economic performance, especially the projects such as infrastructure investments (see, e.g., Ederveen, de Groot and Nahuis, 2006; Mohl and Hagen, 2010).[6] The persistence of the economic activity is incorporated in the model by including the lagged dependent variable (BC_{it-j}) on the right side of Eq. (1) as well.[7]

The variable of our interest, ECP_{it-1}, stands for the lagged ECP payments including the European Regional Development Fund (ERDF), the Cohesion Fund (CF), and the European Social Fund (ESF). We choose these funds since they have been previously used in a counter-cyclical manner and their payments remain consistent through examined periods. The exclusion of some of these funds could dampen the results of our analysis; the counter-cyclical potential of the ERDF and the CF arises from the allocation of their payments mainly into infrastructure projects which can act as a fiscal boost. Additionally, the ESF could stimulate the EU member states through the creation of new jobs, increasing employment in deteriorated times. The cyclical behavior of the total ECP payments is then evaluated through a value of estimated β_2 coefficient – positive value would suggest a pro-cyclical character of the ECP, while the negative would imply the counter-cyclical one.

We also include a set of control variables. Firstly, we control for human capital measured by the education level (*Human capital*). The cyclicality of schooling has been previously examined by, for instance, Dellas and Sakellaris (2003) who find a counter-cyclical pattern in the college enrollment decisions in the US. This counter-cyclicality can be explained by a substitution effect between human capital investment and competing economic activities.

Secondly, we consider macroeconomic stability (*Stability*) which can be treated as one of the proxies for the institutional quality (Antonakakis and Tondl, 2014). We expect that a stable environment should contribute to increased growth and thus, we might observe a positively correlated stability index with the business cycle.

[5] For the robustness check, we estimate models using the first differenced real GDP as our business cycle variable. The results are qualitatively similar and thus, omitted for the sake of brevity (available upon request).

[6] We do not consider higher lags of the ECP payments following, for instance, the N + 2 allocation rule, as we do not operate with the funds' commitments, but with the actually spent ECP expenditure in particular years (for more, see, e.g., Mohl and Hagen, 2010).

[7] The number of lags of the dependent variable in the model specification is selected based on the results of Arellano-Bond AR(1) and AR(2) tests assuming that the error term in first differences has a first-order serial correlation, but the second-order serial correlation is not present.

As suggested by Papageorgiou, Michaelides and Tsionas (2016), we also include social benefits (Benefits) which present an automatic stabilizer of the economy. Following this, the social benefits should have a counter-cyclical character.

Finally, we consider price level (*HICP*) and the rule of law (*Rule*) index. The relationship between inflation and business cycles has been already embodied in the Phillips curve which implies that a lower level inflation rate occurs should occur in recessionary periods (i.e., in times of a higher level of unemployment). However, the price level might show a counter-cyclical behavior (see, e.g., Kydland and Prescott, 1990; Backus and Kehoe, 1992). We choose HICP (annual average index) instead of the inflation rate since we are estimating the model in logarithms. For the rule of law index, we expect to behave in a pro-cyclical manner as a part of increasing institutional quality (Kaufmann, Kraay and Mastruzzi, 2010).

The latter control variables (*HCIP, Rule*) are also included in our baseline model because of the potential conditional effects of the ECP. Since previous authors pointed out the conditional effects of the ECP on economic growth/employment of the recipient countries, it seems reasonable to investigate this issue also from the cyclicality point of view. Therefore, we consider two interaction terms between the ECP and (i) the price level (*ECP*HICP*), and (ii) the rule of law (*ECP*Rule*) in time *t*. The selection of these terms has been made based on previous conditional findings regarding inflation, the Stability and Growth Pact (SGP) rules (Dicharry, Nguyen-Van and Pham, 2019), and the recent focus of the European Commission on the rule of law. In particular, the latest legislation from December 2020 has defined conditional access to the structural EU funds with respect to the rule of law. In case of violation, the European Commission may now propose to cut or freeze ECP payments to a given member state. Thus, the inclusion of this interaction term can either disprove or validate such a mechanism with regard to the possible counter-cyclical effect of the ECP.

Our sample covers 28 EU countries in 2000 – 2018. In addition to the model estimation for the full sample, we provide results for the sub-periods based on individual PPs of the ECP, that is, 2000 – 2006, 2007 – 2013, and 2014 – 2018.[8]

By doing this, we are able to capture the possible time-varying cyclical nature of the ECP as each PP implies different instruments to boost EU economies. Descriptive statistics for all considered variables are available in Table 1, showing, for instance, that the EU business cycles and the ECP payments have been the most volatile in 2007 – 2013. In this period, it can be observed the highest

[8] The PP starting in 2014 does not end until 2020, although, data are only available up to 2018. Also, it is worth noting that since we operate with the actually spent ECP expenditure in particular years, the resources spent in the initial years of PP might be related to the activities supported by previous PP.

mean value of the payments within the Cohesion Policy. Complete variables definitions with data sources are available in Table A1 and correlation matrix in Table A2 in the Appendix.

T a b l e 1

Descriptive Statistics

	Obs.	Mean	S.D.	Min.	Max.
Full sample (2000 – 2018):					
BC	532	0.001	0.336	–1.115	1.864
ECP	506	0.669	0.891	0.001	4.341
Human capital	526	69.791	13.509	20.500	88.300
Stability	532	6.567	0.852	4.052	8.520
Benefits	519	21.813	5.453	10.300	33.100
HICP	532	88.930	12.456	28.010	108.050
Rule	532	7.239	1.237	4.480	9.201
PP 2000 – 2006:					
BC	196	–0.021	0.253	–0.603	1.247
ECP	171	0.310	0.425	0.004	2.258
Human capital	190	64.949	14.842	20.500	83.600
Stability	196	6.735	0.929	4.235	8.520
Benefits	184	20.563	5.197	11.600	29.500
HICP	196	75.881	9.519	28.010	93.700
Rule	196	7.184	1.272	4.480	8.998
PP 2007 – 2013:					
BC	196	0.025	0.450	–1.115	1.864
ECP	195	0.905	1.045	0.009	4.341
Human capital	196	70.624	12.584	28.600	87.100
Stability	196	6.533	0.820	4.052	8.025
Benefits	195	22.511	5.316	10.300	33.100
HICP	196	93.217	5.631	72.580	103.420
Rule	196	7.284	1.206	4.777	9.027
PP 2014 – 2018:					
BC	140	–0.007	0.239	–0.951	0.576
ECP	140	0.778	0.943	0.001	4.055
Human capital	140	75.196	10.255	43.700	88.300
Stability	140	6.380	0.737	4.539	7.879
Benefits	140	22.486	5.709	13.600	33.000
HICP	140	101.199	1.869	98.680	108.050
Rule	140	7.254	1.236	4.806	9.201

Source: Own calculations based on data from the European Commission, Eurostat, and the World Bank.

3. Results and Discussion

3.1. ECP Effects in 2000 – 2018

The estimation results for the full sample (2000 – 2018) are provided in Table 2. In all model specifications, the number of individual dimensions (countries) is larger than time dimensions (N > T), making the system GMM preferable (Roodman, 2009). The Arellano-Bond and the Hansen tests are also generally verified.[9]

To ensure no second-order serial correlation of the error term, we include two lags of the dependent variable BC as the regressors into this model estimation.[10] The choice of such a dynamic panel framework seems to be reasonable since we can observe statistically significant estimates for the lags of the dependent variable BC_{t-1} and BC_{t-2} (see Table 2). The output gap shows persistence over time as the current business cycle stage is strongly related to the previous ones.

T a b l e 2

Estimation Results – Full Sample

	(I)	(II)	(III)	(IV)	(V)	(VI)
BC_{t-1}	1.092*** (0.144)	1.084*** (0.144)	1.069*** (0.141)	0.809*** (0.121)	0.982*** (0.093)	0.930*** (0.095)
BC_{t-2}	–0.453*** (0.066)	–0.461*** (0.068)	–0.466*** (0.068)	–0.678*** (0.0815)	–0.549*** (0.070)	–0.524*** (0.067)
ECP_{t-1}	0.066** (0.031)	0.056** (0.021)	0.061** (0.022)	0.057 (0.060)	0.132* (0.069)	0.113* (0.063)
Human capital$_{t-1}$		0.038 (0.122)	0.049 (0.130)	0.097 (0.155)	0.003 (0.252)	0.046 (0.235)
Stability$_{t-1}$			0.372 (0.416)	1.528** (0.698)	1.810** (0.845)	1.925** (0.759)
Benefits$_{t-1}$				0.022 (0.534)	1.074** (0.501)	0.533 (0.508)
$HICP_{t-1}$					–3.061** (1.242)	–2.894** (1.197)
$Rule_{t-1}$						0.503 (0.627)
Constant	0.141*** (0.033)	0.063 (0.225)	–0.251 (0.515)	–1.274 (0.937)	3.460* (1.887)	3.236* (1.746)
Arellano-Bond test						
AR(1) (p-value)	0.001	0.001	0.001	0.001	0.001	0.001
AR(2) (p-value)	0.324	0.352	0.373	0.134	0.907	0.831
Hansen test (p-value)	0.533	0.895	0.965	0.161	0.831	0.767
Year-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	463	460	460	456	456	456

Note: Robust standard errors are reported in parentheses; *p < 0.1, **p < 0.05, ***p < 0.01.

Source: Own calculations based on data from the European Commission, Eurostat, and the World Bank.

Turning now to the variable of our interest, we find that the ECP payments follow a pro-cyclical path in 2000 – 2018. The coefficient related to the variable ECP_{t-1} remains positive in all model specifications (see Models (I) – (VI)) and statistically significant (except Model (IV)). The ECP payments, therefore, seem to be positively correlated with the aggregate demand and mimic business cycles of the EU-28 countries in the period 2000 – 2018.

[9] The GMM-type instruments are collapsed with maximum of two lags.

[10] The model estimation for the full sample with only one lag of the dependent variable does not meet the condition of non-present second-order correlation of the error term (results available upon request).

Our evidence is in accordance with a country-specific study of Chmelova (2018) who using a linear regression finds a pro-cyclical nature of the EU Regional Policy in the Czech Republic in 2004 – 2015. Considering the ECP as one of the fiscal policy instruments within the EMU, such findings validate previous results regarding a pro-cyclical nature of the fiscal policy found, for instance, by Ihori and Itaya (2018) or Cronin and McQuinn (2021). Despite the general view on the counter-cyclical role of the fiscal policy, the recent evidence suggests a pro-cyclical behavior in most developing countries, but also in the EU member states where the government consumption seems to be pro-cyclical mostly ex-post.

The pro-cyclicality of the ECP payments may be further explained by the politically driven pro-cyclical public investment which with the EU funding co-finances the cohesion projects. Here, we should refer to Lane (2003), who finds that the most pro-cyclical component of government spending seems to be investment, validating this evidence.

Moreover, the structural convergence, which presents a goal of the ECP, can be more easily achieved during the expansion periods, resulting in pro-cyclical effects (for more, see, e.g., Franks et al., 2018).

Among the control variables, the stability index (*Stability*) and price level (*HICP*) are statistically significant at a 5% significance level. The results are in accordance with our expectations; the increasing level of macroeconomic stability is related to ameliorated economic conditions (i.e., expansionary phase of a business cycle) as we observe a positive coefficient related to variable *Stability*. Such findings correspond to the SGP, according to which the EU member states follow a path of sound public finances and macroeconomic stability, which apparently allow them to pursue growth.

On the contrary, price level shows a counter-cyclical behavior. It is generally known that inflation tends to increase during an expansion and drop after the peak, which suggests its pro-cyclical nature. Although, the same may not hold for the price level. If the business cycle fluctuations are driven by demand shocks, prices are likely to be pro-cyclical. However, when the supply shocks present the source of the business cycle, we might observe the counter-cyclical behavior as in our case. In a similar way, the counter-cyclical character of the price level has been previously confirmed, for instance, by Chadha and Prasad (1994) for the G-7 economies, Kydland and Prescott (1990) for the US economy in the post-Korean War period, or Backus and Kehoe (1992) for a larger set of industrialized economies.

Additional to these controls, variable *Benefits* is statistically significant only in Model (V), which, however, cannot be considered as a robust result.

3.2. ECP Effects in the Sub-Periods Based on Individual PPs

It seems that the effort of the EU policymakers to apply the ECP as a counter-cyclical tool has not been paid off. However, one of the possible drawbacks of the presented results may lie in this general view, taking into account the whole period 2000 – 2018. Since the counter-cyclical instruments have been applied only in particular PPs, the approach presented in the previous section may mitigate these period-specific effects.

To overcome this issue, we additionally estimate models for each PP – 2000 – 2006, 2007 – 2013, and 2014 – 2018. We also investigate possible conditional counter-cyclical ECP effects on price level and rule of law which we already discussed in the methodological section. The results are provided in Table 3.[11]

T a b l e 3

Estimation Results – the Sub-Periods Based on Individual PPs

	2000 – 2006		**2007 – 2013**		**2014 – 2018**	
	(I)	**(II)**	**(III)**	**(IV)**	**(V)**	**(VI)**
BC_{t-1}	1.010*** (0.098)	1.018*** (0.096)	0.540** (0.216)	0.527*** (0.143)	0.029 (0.279)	0.047 (0.249)
ECP_{t-1}	0.085* (0.045)	0.047 (0.056)	0.050 (0.230)	0.001 (0.109)	–0.143** (0.064)	–0.045* (0.023)
Human $capital_{t-1}$	0.464*** (0.155)	0.407** (0.197)	0.349 (0.815)	–0.325 (0.401)	–1.206 (1.074)	–1.288** (0.536)
$Stability_{t-1}$	–0.211 (0.407)	0.300 (0.602)	5.372* (2.895)	2.256 (1.803)	5.955** (2.780)	0.801 (0.862)
$Benefits_{t-1}$	–0.877*** (0.253)	–0.887** (0.349)	0.733 (1.620)	1.290 (1.022)	–0.663 (0.727)	–1.279** (0.587)
$HICP_{t-1}$	0.357 (0.562)	0.303 (0.880)	–12.318** (4.616)	–7.480*** (2.629)	–11.696 (10.489)	–17.420** (6.403)
$Rule_{t-1}$	0.551 (0.620)	0.891 (1.376)	1.801 (2.680)	–2.450* (1.321)	–2.008 (1.388)	–0.116 (0.954)
ECP_t*$HICP_t$		–0.384 (0.535)		0.855* (0.455)		0.804** (0.316)
ECP_t*$Rule_t$		0.868 (1.115)		–2.029* (1.074)		–1.858** (0.695)
Constant	–0.409 (0.753)	–0.905 (1.040)	16.841* (8.590)	13.743** (5.641)	23.686 (22.146)	38.695*** (13.055)
Arellano-Bond test						
AR(1) (p-value)	0.018	0.031	0.504	0.532	0.647	0.457
AR(2) (p-value)	0.138	0.250	0.104	0.018	0.675	0.319
Hansen test (p-value)	0.753	0.365	0.144	0.054	0.339	0.533
Year-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	136	136	167	167	112	112

Note: Robust standard errors are reported in parentheses; *p < 0.1, **p < 0.05, ***p < 0.01.

Source: Own calculations based on data from the European Commission, Eurostat, and the World Bank.

[11] We provide model estimation with a full set of regressors (as in column (IV), Table 2). Compared to the model estimation for the full sample, it is necessary to include only one lag of the lagged dependent variable as one of the regressors (see the results of AR(1) and AR(2) Arellano-Bond tests in Table 3).

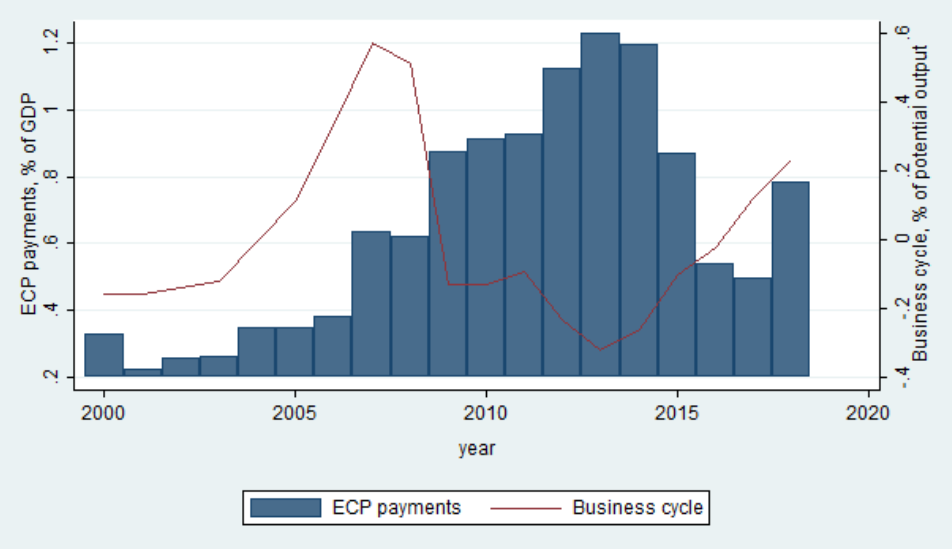
The model estimation for the sub-periods based on individual PPs seems to be reasonable since we can observe several differences. The system GMM estimation provides evidence of the time-varying cyclical character of the ECP, which can be explained by specific objectives and instruments implied in each Cohesion Policy PP.

It seems that the pro-cyclicality of the ECP in the full sample can be mainly contributed to the first PP 2000 – 2006, where we find positive coefficients for ECP_{t-1} (Table 3, columns (I) and (II)). This evidence can be simply explained by the fact that the ECP did not involve any particular counter-cyclical feature in this period. This explanation is also supported by the results from the conditional analysis as we do not find any conditional counter-cyclical effects of the ECP in 2000 – 2006 (see column (II)).

We should mention that the conditionality of the ECP officially appeared in 2000 – 2006, although, in a very limited range. It was only applied for the recipients of the Cohesion Fund which should prepare an economic convergence program and avoid excessive government deficit (see Art. 104c Treaty on European Union, signed at Maastricht on 7 February 1992). The average ECP payments in 2000 – 2006 for the whole EU-28 have been slowly increasing alongside the economic growth of the member states, confirming the relationship and previous claims about the pro-cyclicality of the fiscal policy as well (see Figure 1).

Figure 1

Average Annual ECP Payments and EU-28 Business Cycle



Source: Own calculations based on data from the European Commission and Eurostat.

We do not find any direct significant relationship between the ECP payments and the business cycles in the EU-28 during PP 2007 – 2013 (columns (III) and (IV), Table 3). The coefficient related to the variable ECP is positive, suggesting this pro-cyclical nature, but it is not statistically significant in both model specifications. The ECP has therefore not shown itself to be fully flexible in responding to the Great Recession in 2008. The absence of direct counter-cyclical effect in 2007 – 2013 might be also explained by the fact that the counter-cyclical or emergency funds have not presented a major feature of the common EU budget so far and only acted in exceptional instances.

However, it is worth mentioning that few changes have been made to induce a counter-cyclical behavior of the ECP. Firstly, the level of the pre-payments in 2007 – 2009 has increased, which accounted for more than 8% of all funds in this PP. The rules have been simplified as well in order to combat recession and accelerate spending on the ground, in tandem with individual fiscal stimuli made by the member states themselves.

Following this, we confirm conditional counter-cyclical effect of the ECP which was not present in the previous period. More precisely, we find both interaction terms – between the ECP and the price level (*ECP*HICP*), and the ECP and the rule of law (*ECP*Rule*) statistically significant. Based on our results, we confirm again a negative relationship between the price level and the business cycle (see coefficient related to variable *HICP*), and the interaction term *ECP*HICP* shows a statistically significant conditional dimension, according to which an increase in price level contributes to the pro-cyclicality of the ECP. Such findings validate a rationale of price stability as a part of the convergence criteria and the aim of the single monetary policy in the EMU; it also seems that a lower price level may have an effect on diminishing a pro-cyclical behavior of the ECP, which can finally lead to sound economic growth. Similar results are provided by Dicharry, Nguyen-Van and Pham (2019) who find that a high level of inflation weakens the effectiveness of the ECP.

Additionally, the pro-cyclical effects of the ECP are mitigated in countries with a higher level of rule of law index as we observe a negative (and statistically significant) coefficient related to the interaction variable *ECP*Rule*. Thus, obeying the rule of law as a part of the institutional quality of the recipients seems to not only promote the effectiveness of the ECP with regard to the economic growth/employment (see, e.g., Ederveen, de Groot and Nahuis, 2006; Huliaras and Petropoulos, 2016), but we can expect an extra counter-cyclical effect of the ECP as well.

We also confirm the conditional counter-cyclical ECP effects in the last examined period 2014 – 2018 (Table 3, columns (V) and (VI)). The results are not surprising as, in addition, more than 40 ex-ante conditionalities have been

introduced which specified multiple legal, policy, and administrative requirements (for more, see, e.g., Tita, 2018).

Among them, for instance, the conditional measure allowing 10% top-ups where the member states in deteriorated economic conditions could be exempted upon request from the additional principle by 10 percentage points (i.e., a decrease of a national co-funding by 10 percentage points, without exceeding the total ECP allocation). Such measure was created to alleviate the pro-cyclical absorption paradox of the member states which have liquidity constraints in recessions and are not able to fully apply the ECP as a counter-cyclical fiscal tool. Perhaps also from this reason, we can also observe a direct counter-cyclical effect of the ECP in 2014 – 2018 (columns (V) and (VI), Table 3), which is in contrast to previous PPs. Needless to say, the effort of EU policymakers and government authorities to use the ECP as a possible counter-cyclical tool through various amendments has peaked in this PP, confirming the model results. Another potential explanation of these results might be the fact that at the beginning of the PP 2014 – 2020, there have also been allocated the remaining financial resources from the PP 2017 – 2013, which combined with a slow implementation of the PP 2014 – 2020 formed a downward trend of the ECP. At the same time, we can observe on average a business cycle growth phase in the EU-28 countries (see Figure 1).

Among the control variables, we observe several effects which were not detected for the baseline model (full sample). In particular, we confirm the results of Dellas and Sakellaris (2003) regarding a counter-cyclical character of the human capital for the PP 2014 – 2018. However, we rather observe a pro-cyclical pattern for the period 2000 – 2006. The human capital proxied by the education level might also show this pro-cyclical behavior if it results from student support in form of student loans or grants which tend to reflect a business cycle, approving this evidence.

On the contrary, social benefits are behaving counter-cyclically as we observe negative and statistically significant coefficient related to the *Benefits* variable in most model specifications. The role of the automatic stabilizer has been therefore confirmed. We also find a positive (and statistically significant) effect of macroeconomic stability on the business cycle and the negative one for the price level, validating the results of our baseline model (Table 2).

Conclusion

Even though the ECP payments in form of the *European structural and investment funds* are often referred as the main tool to achieve convergence of less developed EU economies in terms of GDP per capita, investment support has

been targeted to all member states, especially during the Great Recession in 2008 as a key part of the EERP. Moreover, the EU officials and government authorities are considering that the structural funds may represent the instrument by which EU member states can recover from the present crisis. For that reason, it is crucial to investigate the linkage between the member states' business cycles and the ECP payments, which are left by the existing empirical studies almost completely unexplored.

This paper provides novel evidence regarding the ECP's side effects on the EU-28 business cycles. Compared to the limited country-specific studies (e.g., Chmelova, 2018), we correct for potential endogeneity issue between the business cycles and the ECP payments and employ the system GMM estimation, by which we provide unbiased estimates. Overall, the results suggest a pro-cyclical nature of the ECP in 2000 – 2018. Considering the ECP payments as one of the instruments of the fiscal policy, we, therefore, confirm its pro-cyclical nature which has been found by recent studies (e. g., Ihori and Itaya, 2018; Cronin and McQuinn, 2021).

In addition to this aggregate view, we estimate the model for the sub-periods based on individual PPs (2000 – 2006, 2007 – 2013, and 2014 – 2018) since each implies a different set of counter-cyclical measures. The observed pro-cyclicality in the full sample can be mainly contributed to the PP 2000 – 2006 with only limited features (i.e., related to the Cohesion Fund and excessive government deficit). In the PP 2007 – 2013 and 2014 – 2018, we find a conditional counter-cyclical effect of the ECP; a lower price level and obeying the rule of law seem to have an extra counter-cyclical effect which confirms a rationale of the convergence criteria and the SGP. The analysis, therefore, provides evidence that the recent focus of the European Commission on the rule of law can not only prevent misuse of the EU funds and non-compliance with the common EU values, but this mechanism can indirectly contribute to more striking counter-cyclical effects of the ECP.

We also find a direct counter-cyclical effect boosting the European economies in their downturns in the last period, 2014 – 2018. The ECP, therefore, seems to gradually gain stability potential coming from a sharp focus on investment, which should support long-term growth and economic resilience in the EU. The recent REACT-EU initiative in 2021 – 2022 from the Next Generation EU promises to reach this potential by a flexible and fully-fledged crisis-response mechanism, including the possibility to increase the rate for co-financing. Nevertheless, the actions of the ECP post-2020 should be prompt in times of heavy budgetary constraints and aimed at removing rigid administrative boundaries since we can still observe low disbursement in the first years of the PPs followed by allocation pressure in subsequent years, which can alleviate possible cyclical stabilization features.

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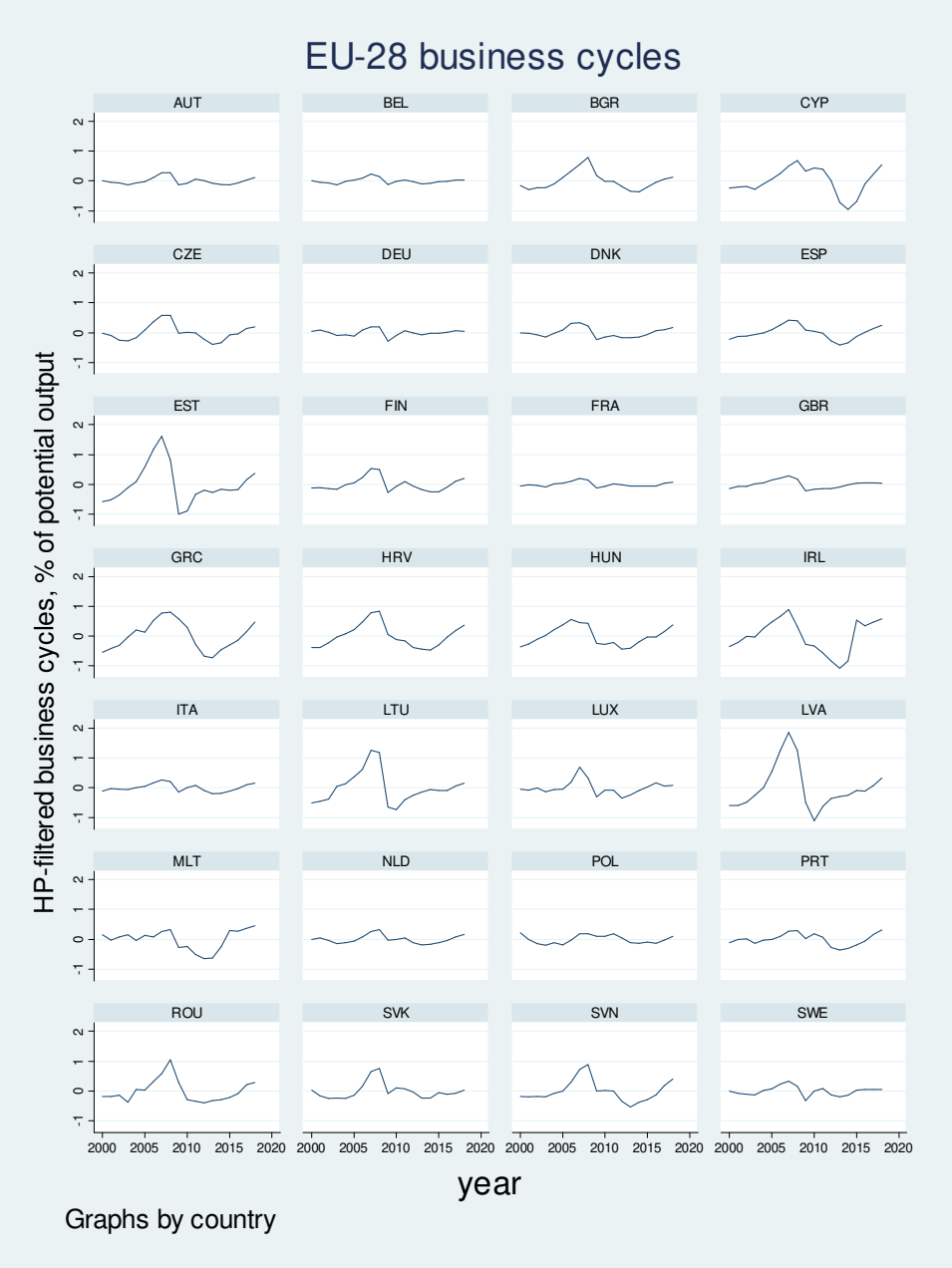
Appendix

Figure A1

EU-28 Business Cycles



Source: Own calculations based on data from Eurostat.

T a b l e A1

Variables Definition and Data Sources

Variable	Definition	Source
BC	HP filtered business cycles retrieved from real GDP time series (in log)	Author's calculations based on Eurostat
ECP	ECP annual payment from the ERDF, CF, and ESF (in EUR in current prices of the year) as a percentage of GDP	Author's calculations based on European Commission and Eurostat
Human capital	Percentage of population with upper secondary, post-secondary non-tertiary and tertiary education (levels 3 – 8, from 15 to 64 years)	Eurostat
Stability	Political stability and absence of violence/terrorism index (scale 0 – 10)	World Bank
Benefits	Social protection benefits as a percentage of GDP	Eurostat
HICP	Annual average HICP (2015 = 100), annual data	Eurostat
Rule	Rule of law index (scale 0 – 10)	World Bank

Source: Own elaboration.

T a b l e A2

Correlation Matrix

	BC	ECP	Human capital	Stability	Benefits	HICP	Rule
BC							
ECP	–0.127						
Human capital	–0.008	0.096					
Stability	0.034	–0.186	–0.035				
Benefits	–0.143	–0.437	–0.045	0.135			
HICP	–0.016	0.251	0.219	–0.046	0.309		
Rule	0.017	–0.406	–0.048	0.589	0.597	0.201	

Source: Own elaboration.