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Euro Area Growth and European Institutional Reforms

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Abstract

Euro area countries have experienced profound economic, financial and institutional changes over the last three decades. GDP growth has been very volatile, and very uneven, across countries. Which factors played a role in stirring growth and/or reducing it? We provide an atheoretical toolkit looking at a large set of real, financial, monetary and institutional variables, as possible factors behind fluctuations and differences in growth rates among euro area countries since 1990. The main outcome stresses the key positive role for long-run growth of higher European institutional integration, overall and for the periphery in specific. This result is robust across specifications and setups. If we split the European institutional integration in its main components, we can see a significant positive role for financial and political integration in the long-run. However the first seems to have beneficial effects for the core only while the opposite holds for the political integration which influences positively the periphery.

JEL: C23, E40, F33, F43
Keywords: euro area, GDP growth, monetary policy, fiscal policy, institutional integration, financial crisis, systemic stress, and synchronization.

1. Introduction

Over the last three decades Euro area countries have experienced profound economic, financial and institutional changes, as well as diverse shocks. This is the period with the run-up to the launch of the euro, and the initial 20 years with the single currency. GDP growth has been very volatile and uneven across countries. Which factors played a role in stirring growth and/or reducing it? We assemble a large set of real, financial, monetary and institutional variables covering the period between 1990Q1-2016Q4 for euro area countries. Each of these blocks contains diverse variables. Our goal is to investigating which played a role and at which frequency. This is a novelty in the growth literature, which normally focuses on determinants largely based on the classic Solow exogenous growth model (Solow, 1956) or on the endogenous growth theory pioneered by Romer (1990). Our aim and main contribution is to provide an atheoretical toolkit looking at the "usual suspects" in the policy debate, but rather "unusual" in the academic literature, as possible factors behind fluctuations and differences in growth rates among euro area countries since 1990.

We focus on euro area countries because they: were bound by the process of European economic and monetary integration that started in the 1970s; experienced nominal convergence along the Maastricht convergence criteria; and have shared a single currency and monetary policy, and faced the same nominal exchange rate since 1999. Upon the launch of the euro, money markets and sovereign bond markets rapidly converged. Thus, several forces narrowed differences across countries, i.e., a catching-up process. Or to be more precise a three layered economic, financial and institutional convergence process.

At the same time, euro area countries have also experienced diverse shocks: some slow moving and some fast, some exogenous and some endogenous to the euro area. At the risk of oversimplifying, since 1990 we have witnessed, amongst others: last nominal exchange rate gyrations during 1992-1993, burst of the Dot-Com Bubble and September 11, the great Moderation and a broad financial cycle spurred by globalization, financial innovation and securitization, a Financial Turmoil starting in August 2007, the Global Financial Crisis starting in September 2008 followed by the Great Recession. The latter episode spread around the world exacerbating euro area imbalances that contributed to the Sovereign Debt Crisis of the euro area (May 2010).[1] Break-up risks were acute until summer 2012 and the announcement of OMT in September 2012. This followed a period of low inflation with risks of deflation.

During this prolonged and mutating crisis, the ECB implemented exceptional standard and non-standard monetary policies (already since the start in August 2007). Moreover, there were institutional reforms throughout the crisis, and we witnessed an enhanced pace of structural reforms. Structural reforms support steady growth by increasing price and wage flexibility and by supporting the swift reallocation of resources within and across sectors and countries and, more generally, by encouraging innovation. Institutional reforms improve the governance and steady convergence. Thus all reforms strengthen resilience. Hence, what do we see in terms of growth dynamic over last 3 decades? Which are the different dynamics in growth's *variance*? Which factors played a role in

[1] There was a lack of financial backstops for sovereigns and banks. The incompleteness of EMU's architecture and governance emerged. For an account of the factors underlying the SDC of the euro area crisis and the contagion, see Mongelli (2013).

stirring growth and/or reducing it? Were they real, financial, monetary and/or institutional? For now, ours is a broad-brush detective story.

The different growth rates across the considered period (1990-2016) are clearly shown in both our nine considered member states (Figure 1)[2] and it is even more so for the entire euro area (this includes new member states). Not only growth rates are heterogeneous across countries but also, they differ depending on the time sub-samples, i.e. until 1999 (launch of the euro), before the Global Financial Crisis (GFC) in 2008 and before/after the sovereign debt crisis in the second half of 2010.

We also look at two sub-groups, defined in a very simple way as euro area "core" (BE, DE, FI, FR, LU, NL) and "periphery" (ES, IT, PT).[3] The core countries had high growth rates before the launch of the euro. This is especially true for Finland in the 90s, in which the country changed trade partners and most of its industrial policies after the collapse of the USSR. From the mid-2000s, Germany has experienced the most rapid increase in GDP, thanks to many structural reforms under Schröder´s government period. Later on, the euro area core has recovered faster and then stabilise at around 2%. Luxembourg is instead an outlier, having a very volatile and generally higher GDP growth over the period. Within the periphery group, Italy has a stagnating GDP growth since the beginning of the 90s and the weakest recovery after the GFC and sovereign crisis (Papadia, 2017). Spain on the other hand had a boom period lasting a decade, from mid-90a to mid-00s fuelled by reforms and an increase in the magnitude of the credit cycle (Comunale, 2017b).

Overall, the drop-in growth for the periphery was less substantial during 2008-2009. Only after 2014, we can see a further increasing growth trend for periphery as well. We expect therefore differences in the changes of growth rates and in their volatilities over time. Not only the growth rates themselves performed differently, but we can see also specific paths in the second moments. Finland and Luxembourg experienced the higher volatilities especially before the introduction of the euro, and this is in line with the findings shown in Figure 1. France, Italy and Belgium seem more stable. The largest volatilities are found if we include the Global Financial Crisis (2008Q3-2013Q4), as expected.

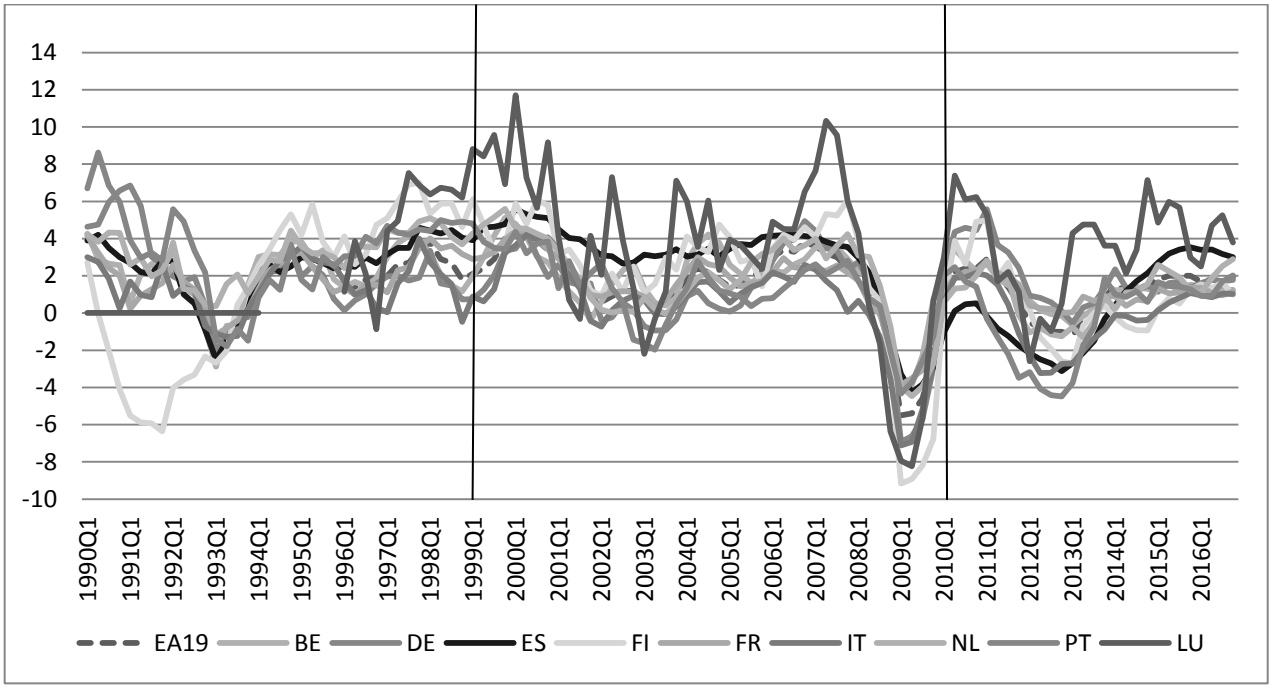
Given these heterogeneities, we provide an atheoretical tool to track them among euro area countries trying to look at "usual suspects" in the policy debate. Our study is clearly at the intersection of a rich literature on growth models as well as the determinants of real convergence and heterogeneity in the euro area, as also recently analysed in Diaz del Hoyo et al. (2017) and Alcidi et al (2018). We make use of several techniques to select the relevant factors, which may have influenced growth based on the events and situations abovementioned. The Weighted-Average Least Squares (WALS) is a statistical method by Magnus et al. (2010) and Magnus and De Luca (2016)

[2] The countries are: Belgium, Germany, Spain, Finland, France, Italy, Luxembourg, the Netherlands and Portugal. The reason is that we rely on the database from the ESCB WGEM team on real and financial cycles (ECB, 2018), based on ECB, BIS and national data sources. The data for the other euro area countries are either not included in this database – e.g., Austria and Ireland - or have very limited time-dimension (Greece and new member states).

[3] This sub-sampling includes in the core more countries than the seminal paper by Bayoumi and Eichengreen (1993), following the idea of two groups´ members somehow changing over time (see Campos and Macchiarelli, 2018). Our sub-groups refer indeed to country performances after the global financial crisis and the sovereign debt crisis. This can be also described as member states with high versus low spreads or ratings. As a robustness check we also provided a different splitting based on high versus low growth volatility. The differences between the groups in the latter case are not significant (see robustness check).

which provides us with clues about the variables to select. Then we apply a heterogeneous panel Error Correction Model (ECM) to quantify their contributions to growth in the short and long run.[4]

Figure 1: Growth rates of euro area countries and EA 19



Note: These are the real growth rate compared to the same quarter of previous year.

The main outcomes stress the important positive role for long-run growth of institutional reforms at EU level overall and for the periphery in specific and it is a robust result across specifications and setups. If we split our institutional index in its main components, we can see a big and significant positive role for financial and political integration, while economic and financial integration are ineffective in boosting growth. A deeper financial integration seems to have beneficial effects on the core only, while is not significant in the periphery. The opposite holds for political integration, as an increase in the latter boosts long-run growth only for the periphery of the euro area.

As for the other factors taken into account, an improvement in competitiveness seems to matter for growth in the euro area in the long-run as well as a decline in sovereign and systemic stress. A decrease in systemic stress matters even more for growth. The debt over GDP influences negatively growth for the periphery only in the short-run. The equity price cycle affects positively GDP growth only pre-crisis and in short-run, while the loans to NFCs had a positive impact for core in a longer perspective. An increase in global GDP is also positive for growth.

This chapter is organised as follows. Section 2 describes our set of data and the econometric setup. Section 3 shows the main results. Section 4 concludes.

[4] A panel VAR and country-by-country VARs for a subset of determinants, to count for endogeneities and transmissions, are also provided in the companion working paper by Comunale and Mongelli (2018, forthcoming). We do not claim any causality here in the single equation setup.

2. Data description and econometric analysis

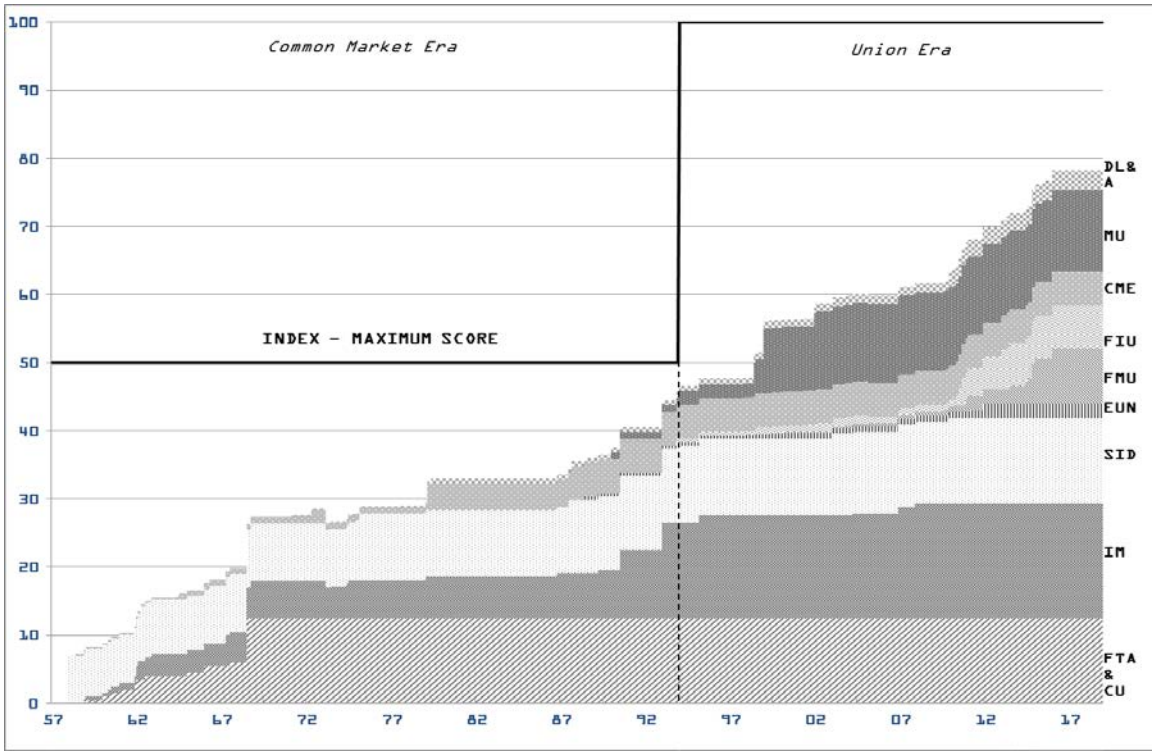
2.1.Data

We consider several possible factors which may have influenced GDP growth in euro area countries in the short and in the long-run. This analysis tries to include real, financial, monetary and institutional factors in order to explain GDP growth in euro area, various sub-sample as well as pre- and post-crisis. This section describes these variables, while more details are provided in a companion paper (Comunale and Mongelli, 2018).[5] The **real GDP growth** data for the countries as well as the real and financial cycles come from the database of the above-mentioned ESCB WGEM team (see ECB, 2018).[6]

We firstly include our main variable of interest as a regressor: a **European Index of Regional Institutional Integration** (EURII), which maps developments in European integration for 6 euro area founding members on the basis of a monthly dataset from Dorrucci et al. (2015), extended to include 2016.[7] This index is common across all the countries and it is time-varying. This index represents a novelty in this type of studies (see figure 2). The EURII index captures the path of institutional integration in Europe since the launch of the EU in 1958. We define two overarching periods. The first is the "Common Market Era", from 1958 until 1993. During this overarching period integration advanced along five stages (originally identified by Balassa (1961)). They are a free trade area and customs union, the gradual build-up of the European internal market, some degree of coordination of, for instance, exchange rate policies or monetary policies, and a number of institutions, laws, and decision-making processes which can be defined – though to different degrees – as supranational in nature (like the EU Parliament and Court of Justice). The second overarching period is the "Union Era" which starts after 1993. This era has four main components which are the economic union, the fiscal union, the financial union and the political union.[8] Conceptually the Union Era became the center of the European debate at end-2012, with the Four Presidents' Report and in 2015 with the Five Presidents' Report. These reports postulated the need to complement the monetary union with the other four unions. A maximum score of 50 is assigned to each of these eras, with the index starting at 0 on 1 January 1958 (when the Treaty of Rome entered into force) and then making progress up to the current cumulated value of slightly above 76 as of 1 January 2015. The gap between 100 – i.e., the maximum total score that would be assigned in the index if all objectives of the Common Market and Union Eras were fully accomplished – and the current total score gives an indication of the distance still to be covered until a 'new perceived steady state' is achieved in the process of integration. The EURII index exhibits a discontinuity in the integration process that was implied by the start of stage two of EMU in 1994. That is when the nature of institutional integration profoundly changed in the EU/euro area. In our sample we start from the period just before the latter (starting in 1990) until 2016.

[5] More details on data and also econometrics are available in Comunale and Mongelli (2018, forthcoming).
[6] Updating these series from the ESCB WGEM team is a complex exercise and would require the collaboration of all the National Central Banks involved in the team. This is the main reason why our panel data ends in 2016Q4.
[7] A concise explanation is in Dorrucci et al. (2015).
[8] A check by using these 4 components separately is also provided.

Figure 2: The EURII index



Source: authors' updated series from Dorrucci et al. (2015). Free trade area (FTA) and customs union (CU), Internal market (IM), Co-ordination of monetary and exchange rate policies (CME), Supranational institutions and decision-making (SID), Economic Union (EUN), Financial Markets Union (FMU), Fiscal Union (FIU), Monetary Union (MU), Democratic legitimacy and accountability (DL&A).

Then we include other possible factors that can affect growth. For the **financial variables** we use several measures of the financial cycle based on credit, house prices and equity prices. We also make use of a new set of within-country synchronicity indices between real and financial cycles from Comunale (2017b). Each index results in a value of either 1 or -1, where 1 means that the cycles are perfectly synchronized at time t and therefore they have the same sign (either positive or negative). In the set of **real variables**, we include fiscal variables, such as (seasonally adjusted) fiscal deficit and debt over GDP, and a proxy for price competitiveness represented by the growth rate of the REER *vis-à-vis* 41 partners and deflated by CPI. Lastly, we make use to global GDP growth in the robustness checks, to look at possible global/spillover effects on growth in the euro area countries. For the **monetary factor**, with the ECB policy rate constrained by the zero-lower bound (ZLB) over a significant portion of the sample under investigation, we use shadow interest rates of Wu and Xia (2016) to represent both conventional and unconventional monetary policy actions.[9] We include indicators **for sovereign and systemic stress**, especially important for the last 10 years of data. We

[9] We decided to apply the specific Wu and Xia (2016) shadow rate because has been already widely used in the literature and it is constantly updated. Moreover, if we use a simple VAR with GDP and inflation adding several different shadow rates, the results of the transmissions are very much alike. Results based on shadow rates series described in Comunale and Striaukas (2017). The results are available on request. There are other shadow rates or methods used in the literature in order to capture the unconventional monetary policy phase. However, all have pros and cons and there is no consensus on the best to be used (see once more Comunale and Striaukas, 2017).

have the country-specific Composite Indicator of Sovereign Stress (SOVCISS)[10] and the common Composite Indicator of Systemic Stress (CISS) as computed by Holló at al. (2012).

2.2. Selection of variables and econometric analysis

Given our atheoretical approach to the analysis, we first test for the relevance of each of our regressors in explaining GDP growth (over the short- and long-term). We use methods that combine information taken from parameters of each model using weighted average of conditional estimates. This incorporates the uncertainty we have of models and of estimations together. We apply as a preferred way to do so, the Weighted-Average Least Squares (WALS) method by Magnus et al. (2010) and Magnus and De Luca (2016). This is a more flexible approach and reduces the computational burden compared to other methods, especially when we include synchronicity indices. This method combines Bayesian weights with frequentist, i.e. (constraint) least squares, estimations. Thereafter, the Bayesian Model Averaging (BMA) method, which relies fully on Bayesian weights and estimates, has been applied as a robustness-check.

Summing up (Table 1), by means of what overlaps in the WALS and the BMA techniques, we can have some robust factors which need to be added as regressors: debt over GDP, CISS and SOVCISS, REER growth, the EURII and shadow rates. Among the cycles, we will add the cycles for house prices and loan to NFCs and lastly one representative for synchronicity, i.e. the one between long term rates and loan to households.[11] This is our baseline setup. Our alternative baseline is without the synchronicity measure, which is not captured in BMA. This results in an especially robust set of factors, which is in line with the findings in Magnus et al. (2010). One clear cut is that, by using either of these techniques, the fiscal deficit should not be included and only some specific financial cycles.

Table 1: Comparison and selection of baseline

	BMA		WALS	
	Posterior inclusion probability	Posterior inclusion probability	t-values	t-values
L.GDP growth	1.0		20.45	
Fiscal deficit	0.1	0.1	-0.91	0.79
Debt/GDP	0.9	1.0	-3.73	-6.64
REER growth	1.0	1.0	-5.52	-5.32
CISS	1.0	1.0	-5.49	-2.39
SOVCISS	0.2	1.0	-1.99	-3.83
Shadow rates	0.1	1.0	2.11	7.34
EURII institutional index	0.1	1.0	2.33	8.15
Equity price cycle	0.8	0.1	1.66	1.30
Long term rates cycle	0.1	0.2	-0.59	-1.05
Real GDP cycle	0.1	1.0	0.31	3.62

[10] See Garcia-de-Andoain and Kremer (2017) for more details.

11 If we do not include the lagged GDP growth, we find that other synchronicity indices could be also one of the factors to take into account. Among the cycles, the business cycle seems to capture what was given by the lagged GDP growth in the previous specification. More checks are available in Comunale and Mongelli (2018, forthcoming).

Credit to households cycle	0.1	0.1	0.88	-0.83
Credit to NFCs cycle	0.1	1.0	-2.04	-4.33
Property price cycle	0.2	1.0	2.23	3.82
Total credit to private sector cycle	0.1	0.1	-1.19	-2.18
Synchronicity: long term rates and credit to households cycles	0.1	0.0	-1.76	-1.02
Synchronicity: long term rates and credit to NFCs cycles	0.1	0.1	1.62	-0.02

Note: The cycles are based on data from real GDP (YER), equity price indices (EQP), real total credit to private non-financial sector (TCN), real credit to non-financial corporations (LNF), real credit to households (LHH), property prices (RPP), nominal long-term rates (LTN). The synchronicities are based on cycle's pairs. In case of WALS, only t values greater than 1.5 in absolute terms are included (grey). For BMA we include only regressors for which the posterior inclusion probability (pip) is minimum 0.8.[12]

In order to select the most proper empirical setup for the estimations, we tested for cross-sectional dependence (CSD), non-stationarity and also cointegration, finding that our dynamic panel experiences all the above. On the basis of these findings, we reparametrized our single equation setup from an Autoregressive Distributed Lag (ARDL) form (equation 1) into a panel error correction model (PECM), as shown in equation (2).[13] Another reason for the choice of the PECM is also that this framework allows us to study both the short-term and the long-term influence of factors on growth. In this case, the estimators we can use are 3, namely the Mean Group (MG), the Pooled Mean Group (PMG) and the Dynamic Fixed Effects (DFE). The MG estimator is the only one that gives heterogeneous coefficients in both the short and long-run analysis and we decide to use it to keep the information coming from the heterogeneity of our sample.

$$GDPG_{i,t} = \beta_{1i} GDPG_{i,t-1} + \beta_{2i} X_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$\Delta GDPG_{i,t} = \phi_i \left(GDPG_{i,t-1} - \theta'_{0i} - \theta'_{1i} X_{i,t-1} \right) + \delta^{'*}_{11i} \Delta X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

The coefficients θ capture the long-run effects, while the coefficients δ correspond to the impact of the variables in the short-run. The X is the vector of the factors taken into account. Lastly ϕ_i represents the error correcting speed of adjustment term. This parameter is expected to be significantly negative and signals that the variables show a return to a long-run equilibrium (Blackburne and Frank, 2007).

[12] As reported by Magnus et al. (2010), we can consider as a rough guideline for "robustness" of a regressor, if it does have a value posterior inclusion probability (pip) of 0.5 (Raftery, 1995) in the BMA, corresponding approximately with an absolute t-ratio of abs(t)=1 (Masanjala and Papageorgiou, 2008) for instance in WALS. Initially we opt for a more restrictive case for BMA, adding only regressors for which the pip is close to one (minimum of 0.8). If pip is exactly equal to one, the regressor needs to be included by probability one. In case of WALS, only t values greater than 1.5 in absolute terms are included.

[13] A panel VAR and country-by-country VARs for a subset of determinants, to count for endogeneities and transmissions, are also provided in the companion working paper by Comunale and Mongelli (2018, forthcoming). We do not claim any causality here in the single equation setup.

3. Results

3.1 Main results

The comparison between the two baselines by using the ECM and with or without the synchronicity between real GDP and equity prices is in Table 2. We also look at two sub-groups (Table 3), defined as euro area "core" (BE, DE, FI, FR, LU, NL) and "periphery" (ES, IT, PT) and if the difference in the coefficients is significantly non-zero.[14]

[Insert Tables 2 and 3 here]

The key outcome of our analysis is the important positive role for long-run growth of the European Index of Regional Institutional Integration before and after the crisis and above all the positive impact on the periphery overall. This finding is very robust across specifications including a panel VAR.[15] This is in line with the literature showing that countries with stronger institutions (see Acemoglu et al. 2005 among others) grow faster in the long-run than their counterparts. Moreover, pour finding confirms the results coming from studies on the positive long-run effect of economic integration on growth (Henrekson et al., 1997). In the short run, instead, we do see a negative impact only prior to the crisis. We only look at the cumulative index for EURII in the baseline reported in Table 2 and 3, but we also run a specification in which the 4 main components of EURII, namely: the economic integration, the fiscal integration, the financial integration and the political integration, are taken into account separately. As shown in Table 4, we also provide the split in core and periphery.

[Insert Table 4 here]

An interesting narrative comes out from the different EURII components and the difference between core and periphery.[16] For the full EA sample, we can see a big and significant positive role for financial and political integration, while economic and financial integration are ineffective in boosting growth. In the short-run we do not see any positive outcomes coming from the components and even the political integration seems to affect growth negatively in the very short-run. Looking instead at the sub-sample of core and periphery, the latter result holds, but what is good noting in the short-run is the opposite sign for the economic integration. While it is strongly positive for the periphery, it goes negative for the core. In the short-run we can also see a positive effect of fiscal integration on periphery countries, which, however, it does not translate to any long-run effects. For the long-run instead a deeper financial integration seems to have beneficial effects on the core, while

[14] The results for the data until 2010Q1 (European sovereign debt crisis) are available in Comunale and Mongelli (2018, forthcoming). In this case, we did not split the samples into core and periphery because we have too few observations. The results for the data until 2008Q3 are available on request. In a nutshell, the factors seem to matter mostly only in the short run and equity prices and competitiveness are key. The sample from 2010Q2 to 2016Q4 also lack of degree of freedom in the time series to perform an error correction model in a proper way, so we compare the pre-crisis rather with the entire sample.

[15] In a nutshell, in the VAR analysis, we find that the European Index of Regional Institutional Integration has a negative impact on growth only in the short run (up to 1 year), while in the long run is always positive and significant. Interestingly in Spain and Portugal, we don't see any negative impact in the short-run of the institutional EU index and the long-run positive impact is bigger in magnitude and way more persistent over time.

[16] The main findings from the other factors are confirmed in this specification.

is not significant in the periphery. The opposite holds for political integration, as an increase in the latter boosts long-run growth only for the core members of the euro area.

As for other factors, in the long-run also an improvement in competitiveness seems to matter as well as a decline in sovereign and systemic stress.[17] The link between competitiveness and growth in the EU has been found in the literature and our results are in line with these studies. It is good to stress that, as reported in Berg and Miao (2010), the REER is not a policy instrument, but mainly a result of policy actions and externalities. So, the direction of funding the appropriate, more productive sectors can increase competitiveness and then long-run growth (Comunale, 2017a).[18] The debt over GDP influences negatively growth for the periphery only in the short-run (and this drives the same results for the entire sample) but the result is not significant when EURII components are used. This is somehow in line with the general empirical literature on the relationship between public debt and economic growth, which is far from being conclusive on this issue (Panizza and Presbitero, 2013, 2014 and Mika and Zumer, 2017). The equity price cycle affects positively GDP growth just pre-crisis, when some countries experienced a substantial increase in the magnitude of the positive side of the cycle. This affected growth only in the very short-run and it did not have a persistent effect on the overall performance. The loan to NFCs instead had a positive and robust role for growth in the long-run for the core countries. This result may depend on how the funding has been used in the different economies, i.e. for more productive or less-productive sectors. As reported in Hassan et al. (2017) the differences in the efficient allocations of funds could have mattered. In Italy the credit is allocated less efficiently than in France and Germany. Lastly, the monetary policy, proxied by the shadow rates,[19] has a very different impact in the short and long-run, as well as pre- and post-crisis. The sign is as expected over the period, because monetary policy is set endogenously: when GDP rises, interest rates are set to go up. In fact in the early part of the sample GDP leads interest rates. Stagnation after Great Recession gives the reason for the monetary policy stance to react to the situation. From the sovereign debt crisis the transmission mechanism broke down and monetary policy has been most accommodating (to increasing degrees).[20]

3.2 Additional robustness checks

Having checked for the presence of cross-sectional dependence (CSD) in our panel, we add, as a further determinant, a measure of global GDP growth.[21][22] The global GDP growth seems to do

[17] An increase in REER and REER growth means a decrease in competitiveness and vice versa.

[18] Results of Gala and Lucinda (2006) and Rodrik (2008) indicate that a real depreciation, i.e. increase in competitiveness, is associated with higher GDP growth. Comunale (2017a) find that the REER misalignments associated with foreign capital inflows in the EU were a further cause of declining GDP, in a long-run perspective, while they played no role in the short run. Indeed situations of protracted or recurrent REER misalignments have been associated with lower economic growth mostly over the medium and long run in the literature (Edwards 2000).

[19] We use pre-1992 country-specific short term interest rates and then EONIA.

[20] There was a strong co-movement between EONIA (in levels) and GDP growth before the rate reached the ZLB. Afterwards, a lower shadow rate signals a further use of unconventional monetary policy measures. This causes the coefficient to be positive and significant in the long-run (or not significant after 2010) while in the short-run, when we use the changes, we do experience a negative effect when the sample is split.

[21] We also check for the importance of global GDP growth with WALS and this method confirmed that the variable could be indeed included. Results are available on request.

[22] A more complete way to deal with CSD would be using a dynamic factor model á la Pesaran and Tosetti (2011) instead of adding a global proxy. However, we cannot disentangle between short and long run effects, which are at the core of this work, in the dynamic factor models.

positively spillover to euro area GDP growth in the short-run. The main result is once again robust: the institutional index is crucial in the long-run.

As a further check we also added the fiscal deficit, to go deeper into the fiscal side of growth, which we expect being crucial after the sovereign debt crisis. The positive and significant role for the institutional index is here confirmed in almost all the checks. This gives a very robust factor that helps growth in the more long run perspective. The fiscal deficit does not have a clear role on influencing growth in the short run, while we find a significant negative effect only in some cases in the long run.

Lastly, we applied a different way to split the sample, not based on level of debt or sovereign stress (core vs. periphery) but rather on low vs. high volatilities of growth in the whole period. The first group is composed by Belgium, Germany, France, Italy and the Netherlands. The high growth volatility group includes the other four countries, namely: Spain, Finland, Luxembourg and Portugal. With this alternative way of dividing the sample, the coefficients for the institutional index and REER growth are very similar and extremely robust in comparison with the baseline for the entire sample (Table 2). When we had core vs. periphery (Table 3) they mattered more for the latter group of countries. This means that institutional reforms at EU level and competitiveness may be more substantial factors in affecting growth for countries with higher debt or more affected by the sovereign crisis. SOVCISS, the country-specific index of stress in sovereign bond markets, has a negative impact on growth in the short-run when growth volatility is high. However it impacts negatively growth in the long run for countries with lower volatilities in GDP growth.

We thus calculated the contributions of each of the factors in determining changes in the growth rates during the years before 2010 and then from 2010 to 2016. These two periods are chosen to stress possible differences in the contribution between before and after the sovereign debt crisis and in order to have a clearer idea of the magnitudes. We do so by using the long run coefficients (group-specific coefficients as in Table 3) multiplied by the difference in the factors in the considered period.[23] The REER growth has been recalculated here to the reader convenience and an increase means a better competitiveness performance. The results for the two periods: before 2010 and then from 2010 to 2016, are provided respectively in Figure 3 and 4.

[Insert Figures 3 and 4 here]

The institutional factor is again the main one associated with higher GDP growth. The contribution is bigger in magnitude in the first period, given the major advancement in EMU design between the 90s to the 2000s, however the positive contribution for increase in GDP growth is very evident also after the sovereign debt crisis. For Spain, Italy and Portugal, both before and after 2010, the magnitude of the contribution of EURII to growth is bigger compared to the core countries by 6pp before the GFC and by around 3pp afterwards.[24]

Ultimately, as for the other factors, in 2010-2016 we also see a decrease in the CISS, which capture systemic stress, and this has had a positive influence for growth. To a lesser extent we see in

[23] This is because the index is always equal to 1 or -1.

[24] We use the different coefficients for the EURII for core and periphery (as Table 3) but the overall index is the same across countries because represents the common advancements in EU institutional integration.

2016 a positive contribution to growth of a decrease in the sovereign stress indicator. We can see an increase in the important positive role of price competitiveness between 2010 and 2016. The role of cycles is mostly negative but small in relative terms. Lastly, the impact of the short-term interest rates could be somehow counterintuitive. This is because the coefficients are for the whole period positive and only after the ZLB a more accommodative monetary policy means a decrease in the shadow rate.[25]

4. Policy conclusions

Over the last three decades, euro area countries have experienced profound economic, financial and institutional changes, plus diverse shocks. Growth has been volatile, and almost missing, in some countries. In this study we have assembled a rich panel to find which factors played a more important role in stirring growth, and/or reducing it in the short- versus long-term and pre- versus post crisis. After excluding several variables with no bearing on growth, we apply a series of time series techniques for large panels of heterogeneous data.

Our main findings are that further institutional integration at EU level supports long-run growth for all countries, and in particular, in the periphery. This finding is robust across specifications and setups: a fact for which there might be diverse complementary explanations. One possible explanation might be a rising confidence in the evolving European governance and institutional framework. Another explanation might lie in a convergence of policy preferences and lesser policy activism, and greater financial stability (until the sovereign crisis!). The contribution is bigger in magnitude in the first period, given the major advancement in EMU design between the 90s to the 2000s, however the positive contribution for increase in GDP growth is evident also after the sovereign debt crisis. If we split our institutional index in its components, we can see a big and significant positive role for financial and political integration, while economic and financial integration are ineffective in boosting growth. A deeper financial integration seems to have beneficial effects on the core only, while is not significant in the periphery. The opposite holds for political integration, as an increase in the latter boosts long-run growth only for the periphery.

We also find that an improvement in competitiveness matters for sustained growth in the long-run. A decline in systemic stress is also associated with growth. An increase in global GDP is also positive for growth, generally in the medium-run. The debt over GDP influences negatively growth for the periphery but only in the short-run.[26] Surprisingly, the deficit plays no role. Instead, higher sovereign stress is associated with lower growth. Prior to the zero-lower bound, higher monetary policy rates are associated with growth. These relations turn past the ZLB and when using the shadow rate that capture exceptional standard and non-standard monetary policies. The equity price cycle affects positively GDP growth only pre-crisis and only in the very short-run, while the loans to NFCs had a positive impact for core euro area.

Our results need to be seen as preliminary. Correlations and associations are no-causations. Evidence in this paper needs to be corroborated by model-based analysis. We cover a very intense

[25] Again, for reader's convenience, the sign is here reversed in the analysis for 2010 onwards.
[26] This is less clear by using the VARs and it is in line with the lack of consensus in the literature about the impact of public debt on economic growth.

and mutating period in European economic, financial, monetary and institutional history. Hence, our findings should be refined in several directions. For most countries in the sample, there were switches in policy regimes. Hence, national paths matter. Future research might also consider the role of net contributions to the EU Budget and the role of EU funds. We have not included this aspect because of a (still) limited availability of data. Similarly, we are constrained in reflecting the improved quality of the euro area governance that unfolded in recent years, and especially. A case in point is the launch of the Single Supervisory Mechanism (SSM) which brought a clean-up of bank balance sheet, better banks' management and in fact coincides with rising credit growth (in combination with exceptional monetary policies).

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Tables and figure

Table 2: Baseline results for the whole sample

	Short-run	**Long- run**
Error correction term	-0.501***	
	(0.052)	
EURII institutional index	**0.058**	**0.523*** **
	(0.141)	**(0.121)**
Debt/GDP	-0.069**	-0.039
	(0.0323)	(0.081)
CISS	0.028	-0.070
	(0.020)	(0.049)
SOVCISS	0.041***	-0.037
	(0.011)	(0.042)
REER growth	0.088	-0.509***
	(0.096)	(0.121)
ST rates and shadow rates	0.057	1.098**
	(0.163)	(0.446)
Equity prices cycle	0.061	-0.011
	(0.046)	(0.017)
House prices cycle	0.413*	0.160
	(0.226)	(0.223)
Credit to NFCs cycle	-0.108	0.239*
	(0.307)	(0.133)
Synchronicity credit HH and rates	2.73e-05	-0.002
	(0.000)	(0.001)
Constant	-0.137**	
	(0.066)	
Observations	535	535

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The cycles are based on data from real GDP (YER), equity price indices (EQP), real total credit to private non-financial sector (TCN), real credit to non-financial corporations (LNF), real credit to households (LHH), property prices (RPP), nominal long-term rates (LTN). The synchronicities are based on cycle's pairs. EURII is the European Index of Regional Institutional Integration.

Table 3: Baseline results for core and periphery

	CORE	**PERIPHERY**	**CORE**	**PERIPHERY**
	Short-run	Short-run	Long-run	Long-run
Error correction term	-0.581***	-0.341***		
	(0.049)	(0.034)		
EURII institutional index	**0.088**	**-0.002**	**0.442*** **	**0.684** **
	(0.216)	**(0.037)**	**(0.115)**	**(0.300)**
Debt/GDP	-0.077	-0.053*	-0.050	-0.015
	(0.048)	(0.027)	(0.123)	(0.048)
CISS	0.037	0.010***	-0.061	-0.087***
	(0.031)	(0.001)	(0.075)	(0.025)
SOVCISS	0.048***	0.027***	-0.003	-0.106*
	(0.017)	(0.002)	(0.053)	(0.058)
REER growth	0.140	-0.015	-0.431***	-0.665***
	(0.134)	(0.116)	(0.136)	(0.254)
ST rates and shadow rates	0.067	0.037	1.072*	1.150**
	(0.244)	(0.146)	(0.642)	(0.569)
Equity prices cycle	0.069	0.045	-0.009	-0.014
	(0.069)	(0.033)	(0.021)	(0.036)
House prices cycle	0.452	0.336	0.166	0.148
	(0.334)	(0.231)	(0.340)	(0.127)
Credit to NFCs cycle	0.0775	-0.479	0.255**	0.209
	(0.378)	(0.558)	(0.112)	(0.384)
Synchronicity credit HH and rates	0.000	-0.000	-0.004*	0.001
	(0.001)	(0.001)	(0.002)	(0.003)
Constant	-0.145	-0.123**		

	(0.099)	(0.050)		
Observations	357	178	357	178

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The cycles are based on data from real GDP (YER), equity price indices (EQP), real total credit to private non-financial sector (TCN), real credit to non-financial corporations (LNF), real credit to households (LHH), property prices (RPP), nominal long-term rates (LTN). The synchronicities are based on cycle's pairs. EURII is the European Index of Regional Institutional Integration.

Table 4: Results with separated EURII components

	EA countries	CORE	PERIPHERY		EA countries	CORE	PERIPHERY
VARIABLES	**Short-run**	**Short-run**	**Short-run**		**Long-run**	**Long-run**	**Long-run**
Error correction term	-0.542***	-0.642***	-0.343***				
	(0.0731)	(0.0827)	(0.00353)				
Financial integration	-0.0352	0.129	-0.363***		1.322***	1.239*	1.489
	(0.204)	(0.289)	(0.0537)		(0.509)	(0.641)	(1.017)
Economic integration	-0.125	-0.432**	0.489***		-0.326	0.209	-1.397
	(0.202)	(0.192)	(0.152)		(0.550)	(0.527)	(1.175)
Fiscal integration	-0.0743	-0.233	0.244***		0.541	0.490	0.644
	(0.162)	(0.216)	(0.0836)		(0.414)	(0.433)	(1.055)
Political integration	-2.483**	-3.052**	-1.347*		2.749**	1.822	4.603*
	(1.034)	(1.504)	(0.745)		(1.308)	(1.570)	(2.374)
Debt/GDP	-0.0693*	-0.0806	-0.0468		0.0280	0.0413	0.00136
	(0.0415)	(0.0621)	(0.0318)		(0.128)	(0.191)	(0.118)

CISS	0.00912	0.00819	0.0110***		-0.0254	-0.000411	-0.0754***
	(0.0194)	(0.0301)	(0.00299)		(0.0510)	(0.0766)	(0.00722)
SOVCISS	0.0447**	0.0537*	0.0267**		-0.0759	-0.0519	-0.124**
	(0.0191)	(0.0283)	(0.0114)		(0.0490)	(0.0699)	(0.0514)
REER growth	0.0996	0.167	-0.0348		-0.291*	-0.220	-0.432*
	(0.128)	(0.187)	(0.0878)		(0.169)	(0.236)	(0.221)
ST rates and shadow rates	-0.561*	-0.804*	-0.0753		1.883***	2.244***	1.161*
	(0.304)	(0.429)	(0.102)		(0.532)	(0.726)	(0.606)
Equity prices cycle	0.112**	0.136*	0.0641		-0.0218	-0.0247	-0.0160
	(0.0566)	(0.0803)	(0.0670)		(0.0254)	(0.0365)	(0.0323)
House prices cycle	0.611	0.979*	-0.125		0.0599	0.0186	0.143
	(0.446)	(0.584)	(0.527)		(0.233)	(0.351)	(0.169)
Credit to NFCs cycle	-0.0397	0.0508	-0.221		0.447**	0.562*	0.218
	(0.283)	(0.425)	(0.181)		(0.218)	(0.309)	(0.233)
Synchronicity credit HH and rates	0.00156*	0.00224**	0.000198		-0.00604***	-0.00746***	-0.00322
	(0.000822)	(0.00110)	(0.000837)		(0.00185)	(0.00239)	(0.00256)
Constant	-0.253***	-0.373***	-0.154*				
	(0.0905)	(0.102)	(0.0875)				
Observations	535	357	178		535	357	178

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 3: Factor analysis until 2010

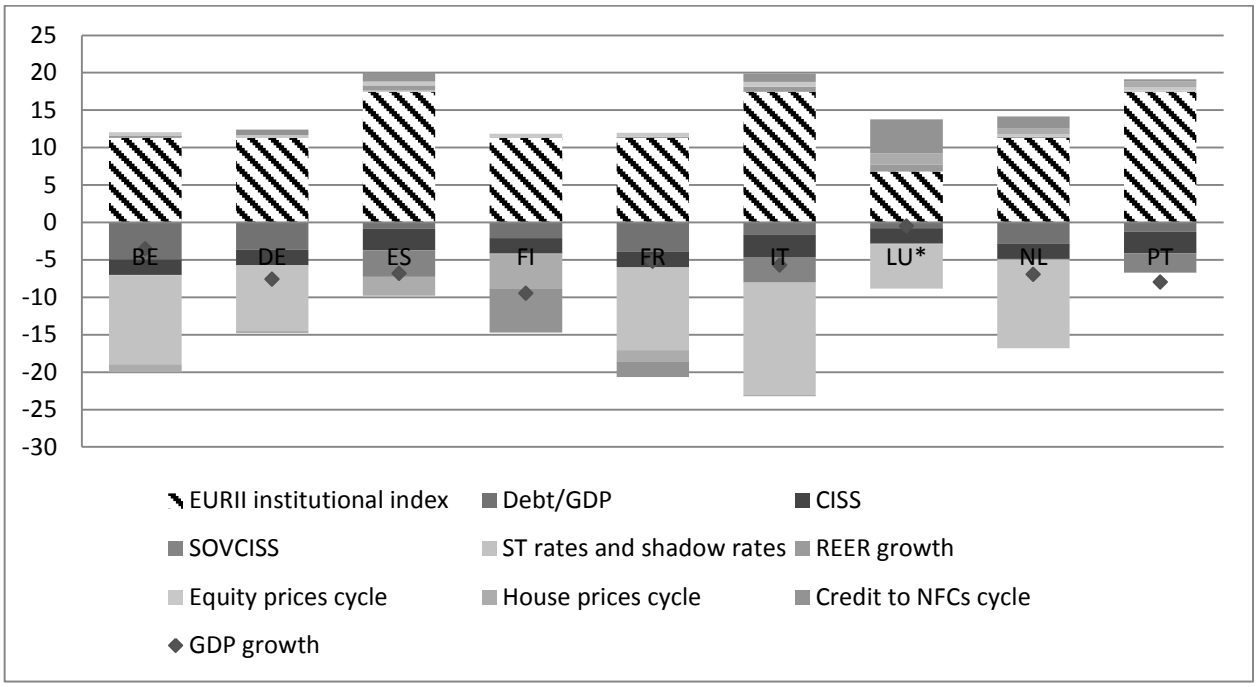
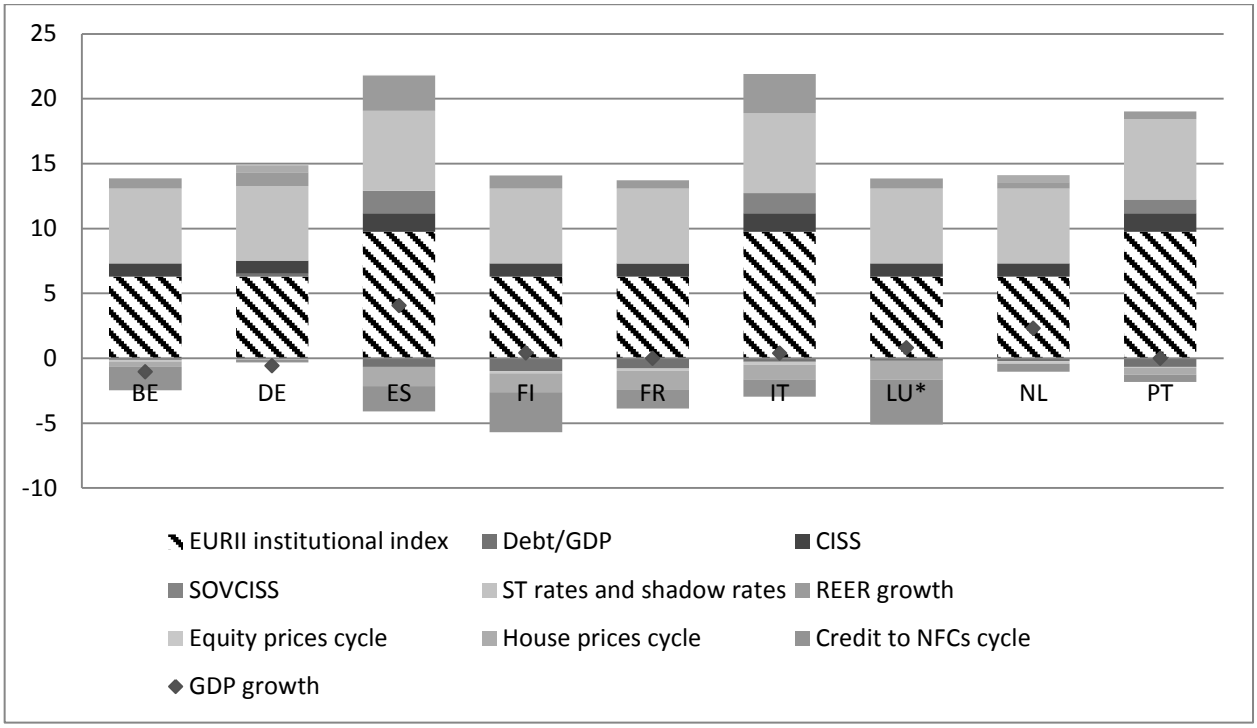


Figure 4: Factor analysis from 2010 to 2016



Note: The data for Luxembourg (LU*) are only from 1996Q1.