EQUILIBRIUM
Quarterly Journal of Economics and Economic Policy
2017 VOLUME 12 ISSUE 4, December
p-ISSN 1689-765X, e-ISSN 2353-3293
www.economic-policy.pl

ORIGINAL PAPER

Citation: Kotlebova, J., & Siranova, M. (2017). Stimulating economic recovery through euro area growth poles: call for more directed unconventional monetary policy measures? *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *12*(4), 633–653. doi: 10.24136/eq.v12i4.33

Contact to corresponding author: jana.kotlebova@euba.sk, University of Economics in Bratislava, Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
Received: 13 May 2017; Revised: 8 August 2017; Accepted: 29 August 2017

Jana Kotlebova
University of Economics in Bratislava, Slovakia

Maria Siranova
University of Economics in Bratislava
Slovak Academy of Sciences, Slovakia

Stimulating economic recovery through euro area growth poles: call for more directed unconventional monetary policy measures?

JEL Classification: *O42; E50*

Keywords: *growth pole; unconventional monetary policy; network analysis*

Abstract
Research background: Transfer of newly created money through unconventional monetary measures follows the official European Central Bank distribution key. Yet, it does not take into account the ability of individual countries to drive growth process in other economies. Money spent to boost domestic credit provisioning in growth pole-like economies is more likely to spill over to other adjoined economies and help them to recover, even in the presence of depressed domestic demand and/or overleveraged domestic banking sector.
Purpose of the article: This paper reports growth pole scores for 19 euro area countries, and compares it to the official distribution key used to transmit newly created source of funding.
Methods: We modify the procedure developed in World Bank (2011) for growth pole computation in order to account for strength of linkages connecting member states.
Findings & Value added: Our results suggest that the official distribution key might not be completely optimal once looking at the growth pole scores. Countries small in economic size (Baltic states, Slovakia and Slovenia) would benefit from a more differentiated distribution, as they strongly outperform their benchmark set by the official distribution key. On the

other hand, big euro area economies do not achieve the levels used in official distribution key, taking into account their growth pole potential for other euro area economies.

Introduction

Over the course of last years, the European Central Bank (ECB) has been trying to use conventional as well as unconventional tools to support credit provisioning and to lower long-term yields to ensure economic recovery. Yet, credit alongside quantitative easing seems to be far less effective regarding projected economic growth trajectory. As Gros (2012) argues, there is little a common monetary policy can do to affect directly the correction of existing macroeconomic imbalances built through the capital flows and their consequential sudden stop. Timbeau (2014) add that the trend towards uniformity in the transmission of monetary policy came to a halt with the crisis, because the expansionary monetary policy does not have the same consequences on core and peripheral countries.

Motivation of our research is based on several considerations:

- existing heterogeneity of 19 euro area member countries (EA19) limits homogeneous conduct of single monetary policy,
- the banking sector infrastructure is a proper, but only institutional precondition for spillover effects among member countries,
- homogeneously implemented single monetary policy has own limitations.

The primary objective of this paper is the following. We aim to identify potential growth pole economies and compare their growth potential to ECB's official distribution key used to distribute newly created funds. We extend the standard methodology of growth pole computation to account for (i) interdependencies among 19 euro area member states and (ii) characteristics of individual banking sectors. This comparison is consequently used to determine a more adequate geographical distribution of ECB funding based on growth pole characteristics.

The paper is structured as follows. In the first chapter, we discuss growth pole concept and its link to the credit growth nexus. Growth pole computation methodology is presented in the chapters two and three. Chapter four discusses key empirical findings, and the final chapter concludes.

Literature Review

The original growth pole approach, introduced by Perroux (1950), was based on the relationship between firms and industry, where growth of industry creates opportunities for higher income of firms interconnected on input and output sides of production process. Applied on the macro level, the growth pole is an entity benefiting the neighbours from the growth leadership of certain economy in some economic space, which will result into common stronger economic growth. This concept was applied in global scope (World Bank, 2011; Adams-Kane & Lim, 2011), but also in narrow regional context (Kotlebova & Siranova, 2014).

Each entity must be investigated along three dimensions (Kotlebova & Siranova, 2014): (1) existing propulsive industry as the core economic force shaping the growth pole, (2) strong spatial/geographical effects of growth pole existence, (3) strength of linkages connecting growth pole to its surroundings.

Empirically (Adams-Kane & Lim, 2011; World Bank, 2011; Kotlebova & Siranova, 2014), growth pole potential is estimated through the indicators of trade (export and import of goods and services) and migration (labour force and remittances), as well as financial (foreign direct and portfolio investments) channels.

In the light of the recent ECB's unconventional monetary policy steps and the role of banking sector in it, we opt to add a third element to the growth pole specification, namely banking sector interlinkages and its absorption capacity. The level of financial sector development is likely to have a positive effect on economic growth through its intermediary role serving as a conduit channelling financial resources into the most productive use (e.g. King & Levine, 1993; Levine, 2005). Yet, this link is definitely not linear by its nature (Beck *et al.*, 2014). Recent empirical evidence argues that there is a point after which additional deepening could even reduce growth (Arcand *et al.*, 2015). Reasons for that include crowding-out of more productive sectors as finance is channelled to less productive financial sector (Dabla-Norris *et al.*, 2015), lack of highly-qualified human capital in non-financial sectors (Cechetti & Kharroubi, 2015), or presence of sophisticated financial innovations (Gennaioli *et al.*, 2012).

Thus, we hypothesize that countries that have not yet surpassed the critical level of over-financialization are more likely to transform ECB funding into productive sectors of their economies thus serving as economic growth poles for an entire region.

Computation of composite growth pole indicators

The generalized computation of growth pole in Adams-Kane and Lim (2011), World Bank (2011) and Kotlebova and Siranova (2014) is based on a country's contribution to growth rate of entire region:

$$P_{it} = \frac{\Delta x_{i,t}}{\sum_{i=1}^{N} x_{i,t-1}} = \frac{x_{i,t} - x_{i,t-1}}{\sum_{i=1}^{N} x_{i,t-1}} \quad (1)$$

where P_{it} stands for index of polarity in time t for a country i and the x_{it} for any economic variable of interest.

The equation [1] can be further decomposed in the following way:

$$P_{it} = s_{i,t-1}.g_{i,t} \quad (2)$$

where $s_{i,t-1}$ stands for share of economy i in time $t-1$ and $g_{i,t}$ for growth rate of economic variable of interest in country i at time t.

The global growth pole is simply defined as the size-adjusted growth rate of economic variable of interest for a single economy. Since the equation in (2) does not take into account interdependence and network linkages among countries, we reformulate the (2) in order to reflect the system of existing real and financial links. In this setup, not the pure size of an economy, but rather the country's role as a central network node will determine growth pole feature.

In line with the network theory application (e.g. Siranova, 2015), the set of interactions among countries in our sample can be visualized by a graph consisting of a list of nodes $\{1,2,..,N\}$ and directed arrows connecting any two nodes. From the mathematical point of view, the graph is represented by NxN adjacency matrix **W,** where the node i (i.e. country) is linked to other node j via connection whose strength is defined by the weight associated with this link, $w_{ij} \neq 0$, if the link exists, and $w_{ij} = 0$, otherwise. The matrix **W** has zeros on its diagonal, as self-interactions are not economically plausible in this setting.

This ability to transmit growth to its neighbours is exemplified by the dominant position of a growth pole in terms of its share on total export, emigrants, financial inflows and liabilities or other economic variables of an adjunctive country. The matrix **W** will reflect this key feature having

obtained weights w_{ij} measuring the total export of goods or flow of emigrants from country i to country j, or the total value of remittances, financial inflows or other relevant economic quantities from a country j to country i.

From the directed network theory, the growth pole indicator is therefore based on a measure of *in-strength degree* of a node j calculated from the matrix **W.** Since the growth pole economy is expected to be a sustainably high growing economy, the calculation of the growth pole based on a network spatial interconnectedness must include economic growth dimension. Hence, the growth pole indicator calculation is based on the growth-adjusted in-strength degree measure:

$$s_j = g_j \sum_i^I \left(\frac{w_{ij}}{\sum_n^N w_{in}} \right) \tag{3i}$$

$$s_j = g_j \sum_i^I \left(\frac{w_{ij}}{\sum_n^N w_{in} g_n} \right) \tag{3ii}$$

where s_j stands for growth pole indicator of country j, g_j for growth rate of economic variable of interest in country j and w_{ij} strength of a link between country i and j.

The simpler form in (3i) uses the growth adjustment only on the aggregate level, the expression in (3ii) assumes that the growth rate affects even the underlying distribution of node weights.

The countries are ranked based on their growth pole scores from highest to the lowest ones. The higher the value of the indicator, the more significant the position of a country in the entire network given the number and strength of links directed towards the growth pole country and growth potential of a particular economy.

Given the availability of data for bilateral exposure in the network of EA19 economies, we specify separate channels for real economy-related transactions (external trade, labour movement, flow of remittances) and financial transactions (FDI, portfolio investments, cross-border bank sector exposure).

The external trade channel derives weights from the value of export of goods flowing from country i to j. Labor movement channel observes the flow of migrants from country i to country j. Closely related to both channels is the amount of remittances received by country i from country j. Regarding the financial interconnectedness, we measure the exposure of country i against country j in terms of both the net foreign direct investments (FDI) liabilities and gross FDI debt liabilities, portfolio investments

liabilities of country i against country j and the volume of cross-border assets of country i against country j.

Additionally, we use two measures to assess potential of economic growth, namely a change in the gross domestic product (GDP) p.c. and domestic absorption. While the GDP p.c. growth rate is used as a standard, we complement this indicator by the growth of domestic demand due to the following reasons. Firstly, in the standard economic theory, the amount of export from country i to country j is a function of real effective exchange rate and domestic demand, rather than of domestic income. Secondly, change in domestic demand embodies strength of growth potential that might be transmitted through export channel to adjoined economies.

In order to extract commonality shared by separate growth pole indicators, we rely on the principal component analysis (PCA) procedure due to its statistical clarity and interpretability. Since we distinguish two layers of a growth pole structure, the real economy-based and the financial flows-related ones, we calculate two multidimensional measures (composite indicators). In both cases, the PCA procedure delivers exactly one principal component.

As the proxy for growth potential g_j we calculate the purchasing power parity (PPP) based GDP per capita annual growth rate and growth rate of domestic demand defined as the sum of consumption, investments and government expenditures in constant prices. Both growth rates take change between years 2014 and 2013 as in (2).

We rescale the principal components using the global min-max procedure (Sahay *et al*., 2015) in the following way:

$$s_j^r = \frac{s_j - \min_n s_n}{\max_n s_n - \min_n s_n} \tag{4}$$

The rescaled indicators are transformed into shares by the following formula:

$$w_j^r = \frac{s_j}{\sum_n s_n} \tag{5}$$

For variables where the data on bilateral exposure are either not available or not economically plausible, we stick to the traditional growth pole definition as in the (2). In our case, the composite growth pole measure capturing the banking sector absorption capacity is derived using the formula in (2).

Data sources and adjustments

PPP-based GDP per capita, domestic consumption, investments and government spending, deflators, wage and salaries and total compensation of employees are gathered from the Eurostat on a yearly basis and expressed in real terms. The bilateral data on trade with goods are taken from the Direction of Trade Statistics. World Bank provides database on stocks of migrants on bilateral basis. The information on credit to households and non-financial corporations is provided by the ECB statistics, credit default rate is gathered from the World Bank database.

The Coordinated Portfolio Investment Survey (CPIS) and Coordinated Direct Investment Survey (CDIS) by International Monetary Fund are used to derive the value of liabilities of country *i* against country *j*. Both inward and outward foreign direct investments have their assets- and liabilities-related sides. We add the value of liabilities recorded under inward FDI to the value of liabilities recorded as part of outward FDI. This allows us to control also the backward flow of capital from the daughter company located in country *j* to the mother company located in country *i*.

The cross-border banking statistics from the Bank for International Settlements database complements the dataset. Asset positions of 12 countries against the EA19 member states are used to derive exposure of domestic banking sector against the set of the 12 reporting countries.

Growth pole countries and banking sector absorption capacity

The highly uneven distribution of growth scores puts Germany on top in both specifications, either taking into account their overall economic performance or controlling for strength of domestic demand (table 1 and figure 1). In the latter case, the overall German dominance is less pronounced locating it under the 45-degree line representing the benchmark distribution based on the official ECB capital shares which are, in turn, derived from the respective country's share in the total population and gross domestic product of the European Union. It is worth noting that while the GDP-based growth rule rewards Germany for its remarkable GDP growth rate predominantly due to its export performance, repressed domestic demand lowers down the score for almost 20 points.

Sizeable negative differences between benchmark and underlying growth pole distribution occur, especially in the case of major EA economies such as France, Italy and, to a lesser extent, the Netherlands. Contrary, Belgium, Ireland and Luxembourg benefit from their very strong economic

growth, being central hub for international trade (Belgium) or source of secondary income for migrating labour force (Ireland and Luxembourg), therefore positioning themselves highly above their benchmark position.

On the left side of the distribution, we find the EA newcomers, among which Latvia, Lithuania, Estonia, Slovakia and Slovenia stand out. Spain's, Greece's, Finland's and Austria's growth pole potential scores are almost identical to their role in the EA, neglecting small discrepancies. In general, countries small in economic size strongly outperform their benchmark once focusing on interconnectedness and growth potential. The 6th place for Greece in GDP-based growth pole indicator and 10th place in domestic demand-based rule might come as a surprise given the ongoing domestic debt crisis. However, as Greece serves as an important growth pole for Cyprus, and partially Malta, its growth-pole role for this two countries should not be left unnoticed.

To some extent, a similar picture might be drawn from the distribution of growth pole indicator scores based on various measures of financial system interconnectedness (table 2 and figure 1). With Germany on top, France and Italy strongly underperforming and Baltic states, showing a very promising growth potential, overall distribution of growth pole potential puts the commonly used ECB capital key into question. Economies heavily oriented on their financial system (Luxembourg, Ireland and partially the Netherlands) might be expected to serve as important transmitters of any financial flows, either originating in the real sector, or created just for speculative purposes. While Luxembourg and the Netherlands clearly specialize in a wide variety of financial business services with the FDI-business playing the primer, Ireland and France score comparably high acting as a source of financial capital transferred into other economies in form of portfolio investments. Germany with its deep and world-wide networked banking system dominates individual growth pole indicators measuring domestic exposure against portfolio investment flows and foreign banking sector liabilities.

As already discussed, subdued domestic demand puts Germany at the fourth place, shoulder to shoulder with Ireland, the Netherlands and Belgium in the second model specification. As in the previous case, countries smaller in size are put at a disadvantage by the official distribution key that does not account for the level of their interconnectedness. Spain, France and Italy belong to the group of countries that take advantage of their economic size rather than their role played as transmitters of growth for other EA economies.

Assuming that the level of internal saturation assessed by the credit-to-GDP-like characteristics along with risk profile of domestic banking sector

limits the scope of monetary policy, we now turn our attention to analysis of the level of development of the domestic banking sector. Indicators relevant to our analysis are chosen in line with research done in Cihak et al. (2012). We add two more indicators to the measures of financial institutions depth, notional amount outstanding of credit to households over total amount of wages and salaries paid and total compensation of employees, to compare the level of indebtedness in the private household sector stemming from bank loans with its capacity to repay this debt via traditional sources of income (table 3 and table 4).

Top places in the list countries with the deepest banking sector are occupied by countries, majority of which have actively participated in the recent EA debt and banking crisis, namely Cyprus, Spain, Portugal, Greece and Ireland. Since credit expansion has a positive effect on economic growth only up to a certain threshold, a point stressed out recently in Beck *et al.* (2014), this observation comes as a no surprise. Newly accessed economies are traditionally listed on the left side of the distribution, scoring low in all six measure of financial institutions depth (Lithuania, Latvia, Slovenia, Slovakia, and Estonia).

The second banking sector composite indicator assesses the efficiency of banking business using three individual measures. The list of most countries with most efficient banking sector strongly coincides with the outcomes of the previous composite indicator. In other words, increase in efficiency is usually associated with the size of this sector, pushing the financial institutions to overcome their limits in order to survive in a highly competitive environment. Squeezing of the net interest margin is likely to be compensated for by higher levels of noninterest income and lower overhead costs. Luxembourg, Ireland, Spain and the Netherlands may serve as primary examples. Cyprus and Portugal do stand out of this pattern, being countries with one of the biggest, but least efficient banking sectors. Newly accessed countries are relatively evenly spread along the left side of distribution of scores with Lithuania, Slovakia and Latvia occupying the middle part, and Slovenia and Estonia at its bottom.

The final composite indicator integrates three dimensions: financial institutions depth, efficiency, and risk profile approximated by the share of nonperforming loans. The least efficient, most risky and debt overburdened economies are located at the bottom of the final list (table 4). Taking into account the scores in all three composite indicators, the group of five new EA members (Latvia, Lithuania, Estonia, Slovakia, and Slovenia) outperforms even Germany or Luxembourg, if looking at the GDP p.c. based growth pole indicator.

For the domestic demand based indicators, their dominance is less pronounced, but three of them (except Slovenia and Latvia) still occupy top places after Luxembourg, Ireland and Malta. Most of them benefit from better risk profile (i.e. lower default rate), lower levels of indebtedness and relatively efficient financial institutions. Looking at the overall distribution of scores depicted in the figure 2, countries smaller in economic size tend to achieve even better growth pole profiles than the biggest EA economies. Additionally, overall distribution of scores is more evenly scaled than the official distribution key.

Figure 3 summarizes our findings by comparing scores from composite growth pole indicators calculated for three categories — real economy and financial sector interconnectedness, and banking sector absorption capacity with official distribution key based on the size of population and GDP shares. Both figures deliver a comparably similar picture. Most of the bigger EA economies do not outperform their benchmark in any of the composite growth indicator. Even Germany scores high only in the real economy based indicator with all others significantly below its 25 percent benchmark. Belgium and Ireland are the first two countries which would benefit from a more differentiated distribution of ECB funding, as their score in all growth pole dimensions strongly outperforms their official share set by ECB' capital share. Luxembourg steps out as a very intriguing case, due to its role as a financial centre, accompanied by thick net of cross-country trade links. The right side of the distribution is occupied by small countries which have a sufficient level of domestic banking sector free absorption capacity along with a sustained risk profile that could accommodate even higher inflow of capital from the ECB. Their role as a growth pole for other member states materializes in much higher scores in trade and migration channel than those allocated by the official distribution. More extensive support for all those countries (Slovakia, Lithuania, Slovenia, Latvia, Estonia, and Malta) might in the longer term benefit other economies linked to them through downward real and financial linkages.

Conclusions

The ECB's unconventional monetary policy measures aim at repairing the distorted credit channel of monetary transmission mechanism that should result in improvement in credit provisioning and, subsequently, economic growth. However, the official distribution key is taken into question as the underlying heterogeneity of the EA member states strongly opposes uniform approach. This paper approaches this issue by firstly identifying the

growth pole countries in the EA19 region based on their real and financial trade linkages and banking sector characteristics, and comparing it with the official distribution.

Our results suggest that the official distribution key might not be completely optimal. Countries small in economic size (Baltic states, Slovakia and Slovenia) would benefit from a more differentiated distribution key, as they strongly outperform their benchmark set by the official distribution key. On the other hand, big EA economies underperform their benchmark taking into account their growth pole potential for other EA economies, given their interconnectedness to other economies.

References

Adams-Kane, J., & Lim, J. J. (2011). Global growth poles in a multipolar world economy. *World Bank Policy Research Working Paper, 5712*.

Arcand, J. L., Berkes, E., & Panizza, U. (2015). Too much finance? *Journal of Economic Growth*, *20*(2). doi: 10.1007/s10887-015-9115-2.

Beck, R., Georgiadis, G., & Straub, R. (2014). The finance and growth nexus revisited. *Economic Letters*, *124*(3). doi: 10.1016/j.econlet.2014.06.024.

Cecchetti, S. G., & Kharroubi, E. (2015). Why does financial sector growth crowd out real economic growth? *BIS Working Paper 490*.

Dabla-Noris, E., Guo, S. Haksar, V., Kim, M., Kochhar, K., Wiseman, K., & Zdzienicka, A. (2015). The new normal: a sector-level perspective on growth and productivity trends in advanced economies. *IMF Staff Discussion Note*.

Gennaioli, N., Shleifer, A., & Vishny, R. (2012). Neglected risks, financial innovation, and financial fragility. *Journal of Financial Economics*, *104*(3). doi: 10.1016/j.jfineco.2011.05.005.

Gros, D. (2012). Macroeconomic imbalances in the Euro area: symptom or cause of the crisis? *CEPS Policy Brief, 266*.

King, R., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, *108*(3). doi: 10.2307/2118406.

Kotlebova, J., & Siranova, M. (2014). Structure of the EU28 plus Ukraine economic region from the growth pole theory perspective. *Region Direct*, *7*(1). doi: 10.2478/regd-2014-0002.

Levine, R. (2005). Finance and growth: theory and evidence. In P. Aghion & S. Durlauf (Eds.). *Handbook of Economic Growth*. New York: Elsevier.

Perroux, F. (1950). Economic space: theory and applications. *Quarterly Journal of Economics*, *64*(1). doi: 10.2307/1881960.

Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydzenka, K., & Yousefi, S. R. (2015). Rethinking financial deepening: stability and growth in emerging markets. *IMF Staff Discussion Note, SDN/15/08*.

Siranova, M. (2015). European banking network in light of the single supervisory mechanism from the network analysis perspective. *Financial Assets and Investing*, *1*. doi: 10.5817/FAI2015-1-2.

Timbeau, X. (2014). Independent annual growth survey 2015: Third Report. iAGS. December. Retrieved from http://www.iags-project.org/documents/iags_report 2015.pdf

World Bank (2011). *Global development horizons 2011*. *Multipolarity: the new global economy*. Washington: World Bank (IBRD).

Acknowledgments

This contribution was supported by VEGA 1/0326/15 “Accelerating the Process of Economic Recovery from the Perspective of the Financial Sector - a Common Approach versus Individual Solutions” and APVV-15-0666 “Capital Flight and its Impact on the Slovak Economy”.

Annex

Table 1. Real growth pole (GP) indicator for euro area 19 countries in 2013, by GDP PPP p.c. (left) growth rate and by domestic absorption (DA) growth rate (right)

GDP PPP p.c. growth rate	Official distribution key	GP indicator rescaled	GP indicator	Export	Migrants	Remittances	DA growth rate	Official distribution key	GP indicator transformed	GP indicator	Export	Migrants	Remittances
Germany	***25.567***	***37.470***	3.976	8.097	8.410	8.475	Germany	***25.567***	***17.811***	***2.858***	5.023	5.030	5.055
Spain	***12.560***	***9.698***	0.547	1.548	2.211	2.236	Spain	***12.560***	***11.978***	***1.530***	2.912	3.284	3.241
France	***20.143***	***7.256***	0.246	1.231	1.552	1.562	Ireland	***1.649***	***10.788***	***1.259***	1.050	3.494	3.484
Belgium	***3.520***	***5.423***	0.020	1.105	1.004	1.005	Belgium	***3.520***	***10.300***	***1.148***	2.912	2.503	2.498
Ireland	***1.649***	***5.338***	0.009	0.265	1.364	1.367	Luxembourg	***0.288***	***6.999***	***0.395***	0.566	1.933	2.001
Netherlands	***5.687***	***3.668***	-0.197	0.927	0.504	0.501	France	***20.143***	***4.302***	***-0.219***	0.672	0.702	0.695
Latvia	***0.401***	***3.538***	-0.213	1.012	0.411	0.429	Netherlands	***5.687***	***3.882***	***-0.315***	0.920	0.405	0.406
Italy	***17.489***	***3.432***	-0.226	0.672	0.539	0.544	Estonia	***0.274***	***3.723***	***-0.351***	1.256	0.197	0.193
Greece	***2.888***	***3.131***	-0.263	0.497	0.518	0.527	Portugal	***2.477***	***3.683***	***-0.360***	0.600	0.449	0.444
Portugal	***2.477***	***3.098***	-0.267	0.507	0.504	0.510	Greece	***2.888***	***3.641***	***-0.370***	0.507	0.470	0.463
Austria	***2.789***	***3.018***	-0.277	0.454	0.506	0.504	Lithuania	***0.587***	***3.566***	***-0.387***	0.992	0.236	0.228
Lithuania	***0.587***	***2.989***	-0.281	0.881	0.292	0.303	Slovakia	***1.097***	***3.510***	***-0.399***	1.110	0.160	0.157
Luxembourg	***0.288***	***2.831***	-0.300	0.130	0.604	0.581	Latvia	***0.401***	***3.326***	***-0.441***	0.758	0.224	0.215
Estonia	***0.274***	***2.327***	-0.362	0.719	0.150	0.154	Italy	***17.489***	***3.234***	***-0.462***	0.533	0.272	0.269
Slovakia	***1.097***	***1.885***	-0.417	0.536	0.089	0.090	Slovenia	***0.491***	***2.489***	***-0.632***	0.186	0.076	0.075
Slovenia	***0.491***	***1.826***	-0.424	0.331	0.164	0.166	Malta	***0.092***	***2.445***	***-0.642***	0.213	0.044	0.044
Finland	***1.785***	***1.312***	-0.488	0.073	0.114	0.113	Austria	***2.789***	***2.254***	***-0.686***	0.030	0.033	0.033
Malta	***0.092***	***1.015***	-0.524	0.063	0.019	0.019	Finland	***1.785***	***1.667***	***-0.819***	-0.124	-0.170	-0.171
Cyprus	***0.215***	***0.746***	-0.558	-0.047	-0.020	-0.020	Cyprus	***0.215***	***0.404***	***-1.107***	-1.117	-0.342	-0.328

Note: The official distribution key is based on European Central Bank capital shares. The individual growth pole indicators (GP indicator) are calculated by formula (3i) and expressed as shares (GP indicator rescaled) by transformation in (4) and (5).

Table 2. Financial growth pole (GP) indicator for euro area 19 countries in 2013, by GDP PPP p.c. (top) growth rate and by domestic absorption (DA) growth rate (bottom)

GDP PPP p.c. growth rate	Official distribution key	GP indicator rescaled	GP indicator	CDIS net inward FDI	CDIS net inward FDI*	CDIS sum of liabilities	CPIS liabilities	BIS liabilities
Germany	***25.567***	***21.831***	2.539	3.634	4.333	3.616	6.507	2.405
Luxembourg	***0.288***	***21.658***	2.512	5.765	4.298	3.837	4.728	0.004
Netherlands	***5.687***	***13.566***	1.272	3.239	4.271	3.086	0.937	1.248
Ireland	***1.649***	***6.241***	0.150	1.002	0.417	1.233	2.151	0.487
France	***20.143***	***5.060***	-0.031	0.703	0.725	0.632	1.379	1.863
Belgium	***3.520***	***4.857***	-0.062	0.578	0.546	2.280	0.566	0.399
Austria	***2.789***	***4.553***	-0.109	1.399	0.841	0.731	0.473	0.218
Spain	***12.560***	***3.730***	-0.235	0.830	0.805	0.498	0.369	1.130
Estonia	***0.274***	***3.403***	-0.285	0.491	0.965	1.004	0.129	0.002
Lithuania	***0.587***	***2.939***	-0.356	0.427	0.613	0.641	0.284	0.602
Italy	***17.489***	***2.778***	-0.381	0.422	0.541	0.287	0.411	0.980
Latvia	***0.401***	***2.059***	-0.491	0.197	0.281	0.630	0.219	0.003
Portugal	***2.477***	***1.494***	-0.578	0.084	0.128	0.052	0.365	0.368
Finland	***1.785***	***1.214***	-0.621	0.141	0.193	0.091	0.058	0.081
Slovakia	***1.097***	***1.128***	-0.634	0.015	0.016	0.089	0.262	0.106
Slovenia	***0.491***	***1.058***	-0.644	0.002	0.007	0.161	0.116	0.394
Malta	***0.092***	***1.032***	-0.648	0.178	0.000	0.148	0.013	0.062
Greece	***2.888***	***0.799***	-0.684	0.011	0.023	0.032	0.050	0.050
Cyprus	***0.215***	***0.601***	-0.714	-0.117	-0.002	-0.050	-0.016	0.599

Table 2. Continued

DA growth rate	Official distribution key	GP indicator rescaled	GP indicator	CDIS net inward FDI	CDIS net inward FDI*	CDIS sum of liabilities	CPIS liabilities	BIS liabilities
Luxembourg	***0.288***	***28.407***	3.858	10.962	8.004	7.602	9.568	0.004
Ireland	***1.649***	***8.605***	0.557	1.688	0.771	2.134	3.977	0.487
Netherlands	***5.687***	***7.772***	0.418	2.437	3.116	1.592	0.509	1.248
Germany	***25.567***	***7.157***	0.316	1.291	1.961	1.249	2.244	2.405
Belgium	***3.520***	***6.625***	0.227	0.917	1.142	3.246	1.005	0.399
Estonia	***0.274***	***4.946***	-0.053	0.827	1.509	1.220	0.165	0.002
Spain	***12.560***	***4.473***	-0.132	1.120	0.845	0.491	0.347	1.130
Lithuania	***0.587***	***4.052***	-0.202	0.492	1.104	0.616	0.176	0.602
France	***20.143***	***3.142***	-0.354	0.186	0.235	0.185	0.393	1.863
Italy	***17.489***	***3.137***	-0.354	0.368	0.318	0.099	0.162	0.980
Latvia	***0.401***	***3.065***	-0.366	0.135	0.279	0.448	0.069	0.003
Malta	***0.092***	***2.948***	-0.386	0.356	0.000	0.284	0.022	0.062
Slovakia	***1.097***	***2.750***	-0.419	0.019	0.033	0.133	0.236	0.106
Portugal	***2.477***	***2.728***	-0.423	0.037	0.076	0.021	0.244	0.368
Austria	***2.789***	***2.676***	-0.431	0.168	0.066	0.037	0.018	0.218
Slovenia	***0.491***	***2.532***	-0.455	0.001	0.002	0.087	0.032	0.394
Greece	***2.888***	***2.522***	-0.457	0.005	0.010	0.043	0.035	0.050
Finland	***1.785***	***1.911***	-0.559	-0.204	-0.459	-0.099	-0.043	0.081
Cyprus	***0.215***	***0.552***	-0.785	-1.806	-0.013	-0.388	-0.160	0.599

Note: The official distribution key is based on European Central Bank capital shares. The individual growth pole indicators (GP indicator) are calculated by formula (3i) and expressed as shares (GP indicator rescaled) by transformation in (4) and (5).

Table 3a. Banking sector characteristics for euro area 19 countries in 2013

Financial Institutions Depth	*Composite score 1*	Bank deposits/GDP	Deposits money banks' assets/GDP	Domestic private credit/GDP	Credit/(Wage and Salaries)	Credit/ Compensations	Credit/GDP	Score 1	Score 2	Score 3	Score 4	Score 5	Score 6
Cyprus	***3.069***	229.81	349.99	300.60	354.17	283.52	260.90	0.654	1.000	1.000	1.000	1.000	1.000
Luxembourg	***0.838***	331.90	169.60	162.42	132.28	113.31	160.48	1.000	0.361	0.457	0.257	0.278	0.544
Spain	***0.764***	143.53	217.77	171.97	191.71	151.25	125.01	0.362	0.532	0.494	0.456	0.439	0.383
Portugal	***0.713***	120.95	195.74	169.78	207.97	161.44	121.60	0.285	0.454	0.486	0.510	0.482	0.368
Netherlands	***0.626***	135.42	212.64	177.99	168.75	130.45	125.78	0.334	0.514	0.518	0.379	0.351	0.386
Greece	***0.535***	91.58	138.19	122.59	254.27	189.62	116.36	0.186	0.250	0.300	0.665	0.602	0.344
Ireland	***0.293***	100.65	187.64	168.03	149.31	137.03	88.97	0.217	0.425	0.479	0.314	0.379	0.219
Malta	***0.178***	147.91	148.32	119.32	139.65	127.01	120.07	0.377	0.286	0.287	0.282	0.336	0.361
Italy	***-0.151***	95.67	164.85	117.03	127.71	93.32	87.54	0.200	0.345	0.278	0.242	0.194	0.213
France	***-0.225***	89.59	133.23	111.35	133.04	97.00	92.92	0.179	0.233	0.256	0.259	0.209	0.237
Finland	***-0.295***	64.84	107.68	98.14	144.61	117.27	92.34	0.095	0.142	0.204	0.298	0.295	0.235
Austria	***-0.316***	93.89	131.22	112.12	107.97	88.90	91.49	0.194	0.226	0.259	0.175	0.175	0.231
Germany	***-0.338***	111.15	118.31	93.13	122.46	100.01	81.42	0.252	0.180	0.184	0.224	0.222	0.185
Belgium	***-0.629***	111.07	114.03	89.39	91.68	66.00	60.76	0.252	0.165	0.170	0.121	0.078	0.091
Estonia	***-0.813***	54.16	78.08	73.70	102.05	75.95	67.93	0.059	0.037	0.108	0.156	0.120	0.124
Slovakia	***-0.956***	57.40	67.49	47.13	105.02	80.73	51.27	0.070	0.000	0.004	0.166	0.140	0.048
Latvia	***-1.027***	36.72	103.65	60.70	67.30	57.06	52.43	0.000	0.128	0.057	0.039	0.040	0.053
Slovenia	***-1.030***	56.50	96.42	70.79	55.57	47.67	53.83	0.067	0.102	0.097	0.000	0.000	0.060
Lithuania	***-1.237***	37.04	69.49	46.22	64.73	50.89	40.65	0.001	0.007	0.000	0.031	0.014	0.000

Note: The Score 1 is associated with Bank deposit-to-GDP indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. The Score 2 is associated with Deposits money banks' assets-to-GDP indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. The Score 3 is associated with Domestic private credit-to-GDP indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. The Score 4 is associated with Credit/(Wage and Salaries) indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. The Score 5 is associated with Credit-to-Compensations indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. The Score 6 is associated with Credit-to-GDP indicator and represents linear transformation of given indicator assigning 1 to country with highest value and 0 with lowest value in the sample. Composite score 1 reports values associated with first principal indicator derived by principal component analysis performed on Scores 1-6.

Table 3b. Banking sector characteristics for euro area 19 countries in 2013

Financial Institutions Efficiency	*Composite score 2*	Bank net interest margin	Bank noninterest income/total income	Bank overhead costs/total assets	Score 1	Score 2	Score 3
Luxembourg	***1.397***	0.68	50.46	0.60	1.000	0.410	1.000
Ireland	***1.370***	1.19	74.55	1.47	0.926	0.000	0.759
Spain	***0.636***	1.36	37.19	1.17	0.903	0.636	0.841
Netherlands	***0.590***	1.35	27.13	0.80	0.903	0.808	0.943
Austria	***0.373***	1.50	56.07	2.52	0.883	0.315	0.469
Germany	***0.335***	1.62	35.76	1.57	0.865	0.661	0.729
France	***0.307***	1.76	42.03	1.84	0.845	0.554	0.655
Lithuania	***0.289***	1.67	34.06	1.57	0.858	0.690	0.732
Italy	***0.192***	2.06	39.68	1.79	0.801	0.594	0.669
Greece	***0.151***	1.90	30.45	1.55	0.825	0.751	0.736
Belgium	***0.140***	1.91	21.38	1.14	0.824	0.906	0.848
Slovakia	***0.010***	1.79	23.85	1.60	0.841	0.864	0.722
Latvia	***-0.017***	2.75	41.07	1.88	0.701	0.570	0.645
Malta	***-0.017***	1.99	33.06	1.97	0.812	0.707	0.620
Slovenia	***-0.043***	2.00	31.37	1.94	0.811	0.736	0.629
Finland	***-0.122***	2.75	37.87	1.95	0.702	0.625	0.624
Portugal	***-0.903***	3.61	25.78	2.51	0.578	0.831	0.470
Cyprus	***-1.605***	5.53	27.60	2.92	0.302	0.800	0.358
Estonia	***-3.082***	7.62	15.84	4.21	0.000	1.000	0.000

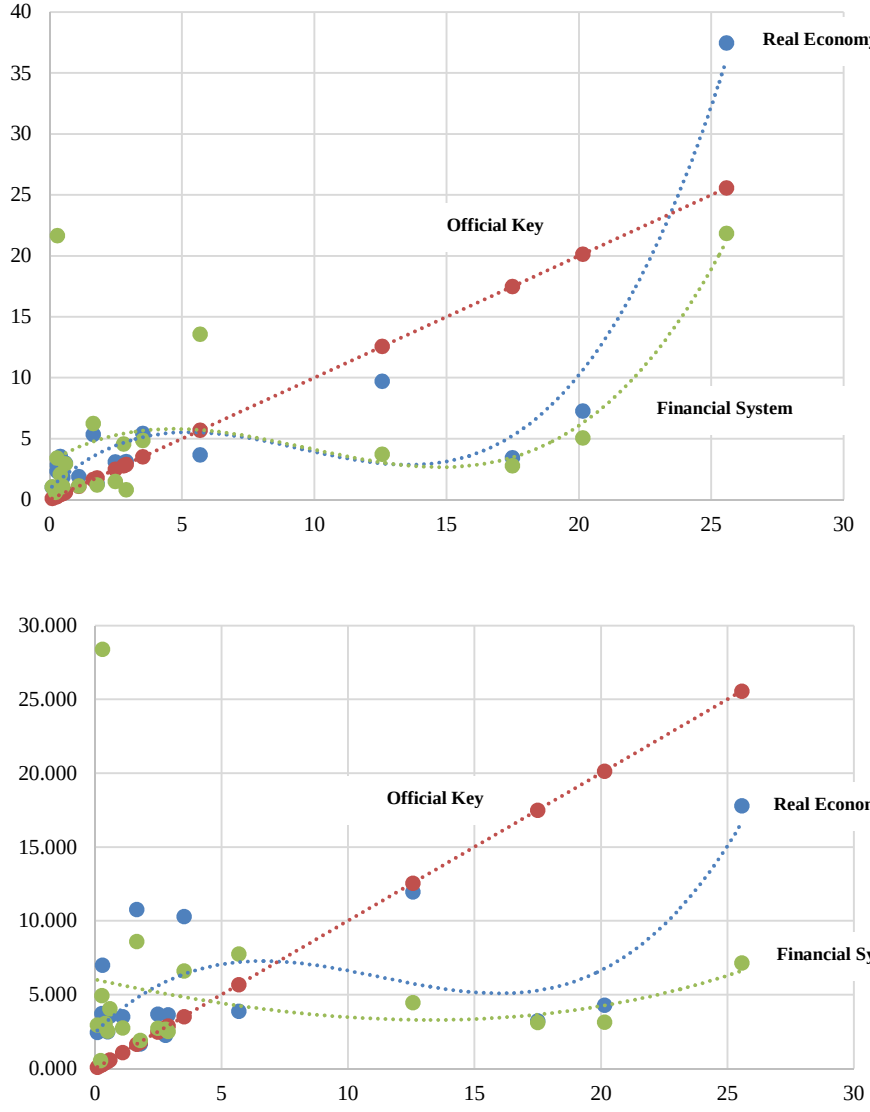
Note: The Score 1 is associated with Bank net interest margin indicator and represents linear transformation of given indicator assigning 1 to country with lowest value and 0 with highest value in the sample. The Score 2 is associated with Bank noninterest income-to-total income indicator and represents linear transformation of given indicator assigning 1 to country with lowest value and 0 with highest value in the sample. The Score 3 is associated with Bank overhead costs-to-total assets indicator and represents linear transformation of given indicator assigning 1 to country with lowest value and 0 with highest value in the sample. Composite score 2 reports values associated with first principal indicator derived by principal component analysis performed on Scores 1-3.

Table 4. Banking sector composite growth pole (GP) indicators for euro area 19 countries in 2013, by GDP PPP p.c. growth rate and by domestic absorption (DA) growth rate

	GP indicator rescaled, GDP PPP p.c.	*GP indicator rescaled, DA*	*Composite GP indicator*	*Composite score 1*	*Composite score 2*	*Default rate*
Latvia	11.463	4.966	0.648	-1.027	-0.017	0.064
Lithuania	9.909	7.204	0.354	-1.237	0.289	0.116
Estonia	9.853	11.566	0.774	-0.813	-3.082	0.015
Slovakia	9.610	10.550	0.718	-0.956	0.010	0.051
Slovenia	9.273	2.881	0.133	-1.030	-0.043	0.133
Germany	8.398	3.164	0.696	-0.338	0.335	0.027
Luxembourg	7.230	18.528	0.515	0.838	1.397	0.002
Portugal	5.964	4.079	-0.342	0.713	-0.903	0.106
Ireland	5.097	11.300	-1.163	0.293	1.370	0.253
Spain	4.699	5.606	-0.184	0.764	0.636	0.094
Malta	4.553	7.429	0.009	0.178	-0.017	0.092
Belgium	3.344	5.844	0.669	-0.629	0.140	0.043
Austria	3.067	0.744	0.677	-0.316	0.373	0.029
Netherlands	2.739	2.129	0.323	0.626	0.590	0.032
France	2.134	1.241	0.519	-0.225	0.307	0.045
Italy	1.165	1.039	-0.412	-0.151	0.192	0.165
Finland	0.762	0.044	0.819	-0.295	-0.122	0.005
Greece	0.709	1.044	-1.807	0.535	0.151	0.319
Cyprus	0.030	0.643	-2.947	3.069	-1.605	0.337

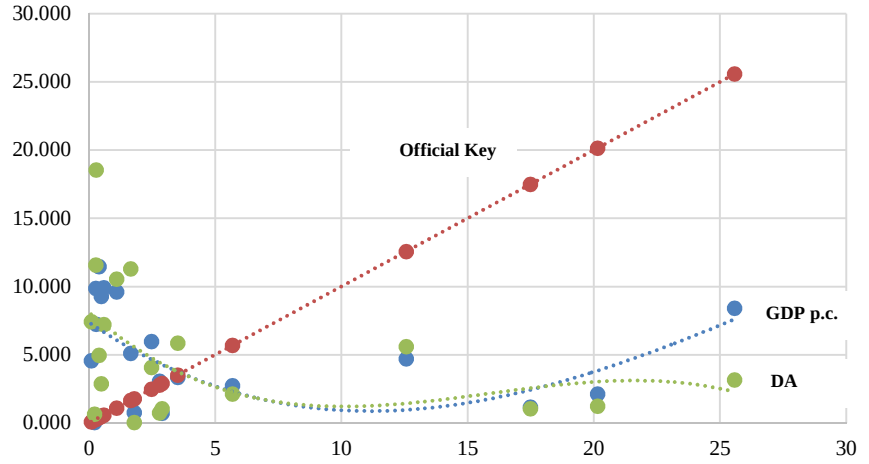
Note: The Composite score 1 integrates individual characteristics for financial institutions depth and is derived from values associated with first principal component by principal component analysis. The Composite score 2 integrates individual characteristics for financial institutions efficiency and is derived from values associated with first principal component by principal component analysis. Composite GP indicator reports values associated with first principal indicator derived by principal component analysis performed on Composite score 1, 2 and Default rate. The growth pole indicators are calculated by formula [2] and expressed as shares by transformation in (4) and (5).

Figure 1. Official distribution key and real and financial growth pole indicator for euro area 19 countries in 2013, by GDP PPP p.c. (top) growth rate and by domestic absorption (DA) growth rate (bottom)



Note: The official distribution key (official key) is based on European Central Bank capital shares. The individual growth pole indicators for real economy and financial system are calculated by formula [3i] and expressed as shares by transformation in (4) and (5).

Figure 2. Official distribution key and banking sector growth pole indicator for euro area 19 countries in 2013, by GDP PPP p.c. growth rate and by domestic absorption (DA) growth rate



Note: The official distribution key (official key) is based on European Central Bank capital shares. The individual growth pole indicators for banking sector are calculated by formula (2) and expressed as shares by transformation in (4) and (5).

Figure 3a. Comparison of official distribution key for euro area 19 countries in 2013 and composite growth pole indicators based on GDP p.c. growth rate

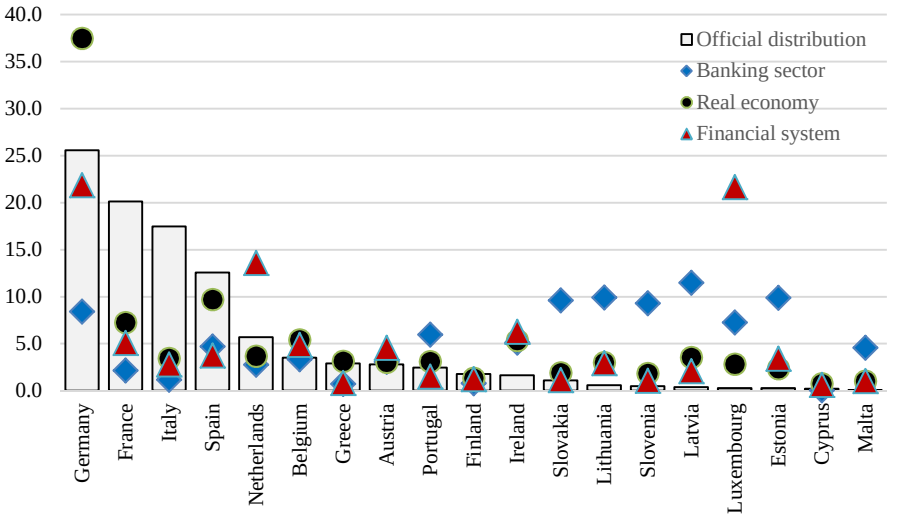
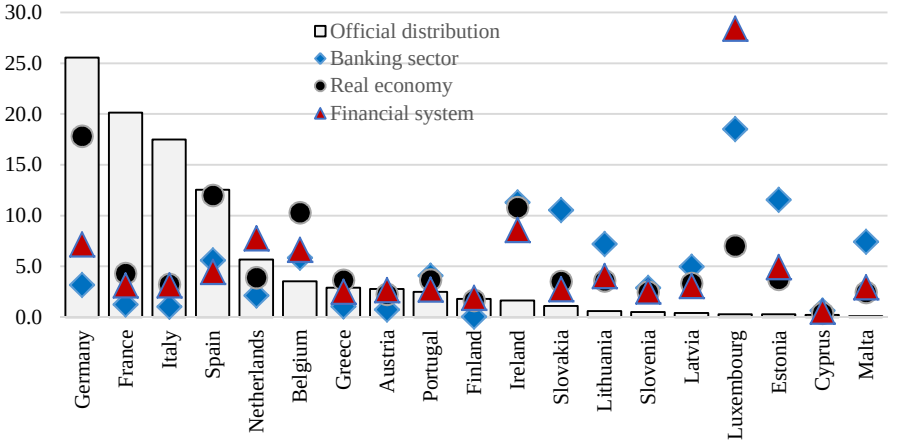


Figure 3b. Comparison of official distribution key for euro area 19 countries in 2013 and composite growth pole indicators based on domestic demand growth rate



Note: The official distribution key (Official distribution) is based on European Central Bank capital shares. The composite growth pole indicators for real economy (Real economy) and financial sector (Financial sector) are calculated by formula (3i) and expressed as shares by transformation in (4) and (5). The composite growth pole indicator for the banking sector (Banking sector) are calculated by formula (2) and expressed as shares by transformation in (4) and (5).