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Profitability of Business Entities Settled in Selected Countries of the Eurozone Periphery

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Abstract: *Greece, Ireland, Portugal and Spain can be defined as Eurozone periphery countries due to their specifics being rooted in policy systems and lagging behind in economic performance when compared with EU-15 countries. The objective of this paper is to provide an initial exploration of the similar and dissimilar business aspects´ development within observed Greek and Irish entities´ economic performance in different industries, using two-dimensional visualisation in the context of the recent world financial and economic crisis. This visualisation approach using classical correspondence analysis helps to reveal broader associations, which could influence the economic status of observed business units. Greek and Irish businesses which have been considered to be specifically, strongly and negatively influenced by the world economic downturn were observed. A sample of companies' corporate financial statements´ data were employed. The sample of entities was set up according to the criterion of profitability of the whole involved capital development, regardless of its nature during the time period of the years 2008 – 2010, i. e. according to either the continual increase or decrease of the aforementioned indicator. Consequently, there were explored other attributes of assorted businesses, namely economic size and industry classification as the components for cross-tabular data sets. Authors revealed associations among different industries and size categories of Greek and Irish businesses using classical correspondence analysis.*

Key words: Eurozone · Economic Crisis · Correspondence Analysis · Business Entities · Financial analysis

JEL Classification: M21 · G32

1 Introduction

The recent world financial and economic crisis unprecedentedly affected macroeconomic indicators in the EU and respective member countries. European enterprises have been strongly influenced by the recent economic crisis as well. Corporate financial statements provide clear evidence of the economic downturn´s impact on corporate finances.

The objective of these contributions is to explore similarities and dissimilarities, respectively, among the development of Greek and Irish corporations´ finance in different sectors using subjective mapping, namely classical correspondence analysis that uses cross tabular data sets. The correspondence analysis helps to reveal associations among observed factors, which could influence their corporate financial status. Authors selected Greece and Ireland, because they represent countries from the Eurozone periphery, which has been strongly and negatively influenced by the recent world economic and debt crisis (e. g. Lacina & Vavřina, 2013).

The paper is structured as follows: The first part provides an overview of the empirical literature evidence providing the arguments of the impact of the economic crisis on the business sector in the

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whole of the EU and also at the level of selected individual member countries. Then the descriptive statistics of Greek and Irish enterprises are provided. The main characteristics including the evolution of the number of business units according to the size of the company, number of employees, and share on added value, are described over the observed horizon. The second part then describes the employed searching strategy for obtaining the dataset. The description and the rationality behind the selection of observed variables are provided also in part two. The following section provides empirical results of the classical correspondence analysis method for the purpose of subjective mapping. Based on the results of the conducted analysis, authors provide associations among different industries according to the financial corporate data of the observed business entities settled in the two selected countries both in the case of observed businesses with a continuous increase and decrease of profitability of the respective capital involved.

2 Literature review and stylized facts

European business entities across many industries and economic sizes were strongly hit by the recent world financial and economic crisis. The evidence reveals higher sensitivity of small and medium-sized business (SME's) to demand shocks because of decreasing sales and solvency distress. Structural economic reforms are an attempt to improve the flexibility and encourage the increase of corporate factors of more efficient production. Nevertheless, to deliver the full impact of reforms, there is a need for well-functioning transmission mechanisms to be present. These transmission mechanisms should provide business entities an opportunity to enter the market, and the possibility of unimpeded growth. On the other hand, they should enable business activities to restructure or inefficient entities to exit the market without serious hurdles. So, the business environment plays a crucial role for healing national economies in the post-crisis period, but there are identified limitations in this effort due to lack of corporate data in some countries, among all especially in Greece (European Commission, 2014).

According to Canton (2014), investments necessary to start and expand a business are often financed by external funding. In normal times business start-ups and exit rates are positively related, but during an economic crisis a decrease in the rate of start-ups and an increase in the exit rate are observed. Such decoupling of entry and exit frustrates an efficient reallocation of resources, and thereby the process of economic recovery.

Let's look closely at two countries which were selected for the purpose of this article – Greece and Ireland.

Greece

In Greece, there is witnessed a stronger impact of the crisis on SMEs than on large enterprises, mainly caused by the lasting recession and austerity burden. Especially small and micro-sized enterprises, which constitute the vast majority of the Greek SME sector, are regarded to be the most affected entities. According to the 2013 SBA Fact Sheet on Greece (European Commission, 2013a), the SME sector in Greece is more dependent on micro enterprises than in other European countries in terms of their total number and contribution to employment and total value added. Greece belongs to a group of countries (together with Spain, Portugal and Italy) where SMEs account for a higher proportion of total employment than in the rest of Europe. For more details see Table 1 (European Commission, 2013a).

There are two sectors which were severely hit by the crisis in Greece – the construction and manufacturing sectors. In the construction sector, both SMEs and large enterprises (LEs) experienced a severe decline between 2008 and 2012.

Table 1 Enterprises in Greece – basic figures (2013)

	Number of enterprises			Employment			Value added		
	Greece		*EU27*	Greece		*EU27*	Greece		*EU27*
	Number	Share (in %)	*Share (in %)*	Number	Share (in %)	*Share (in %)*	Billion €	Share (in %)	*Share (in %)*
Micro	513780	96,7	92,3	916074	54,5	28,9	17	34,6	*21,1*
Small	14978	2,8	6,5	282808	16,8	20,2	9	18,1	*18,3*
Medium - sized	2301	1,8	1,1	227958	13,6	17,3	8	16,3	*18,3*
SMEs	**531059**	**99,9**	**99,8**	**1426840**	**84,8**	**66,4**	**34**	**69,0**	***57,6***
Large	378	0,1	0,2	255413	15,2	33,6	15	31,0	*42,4*
Total	531437	100	100	1682253	100	100	49	100	100

Source: European Commission 2013a - SBA Fact Sheet 2013 – Greece

Note: Estimates for 2013, based on 2008-2010 figures from the Structural Business Statistics Database (Eurostat). The estimates have been produced by Cambridge Econometrics. The data cover the 'business economy' which includes industry, construction, trade, and services (NACE Rev. 2 Sections B to J, L, M and N). The data does not cover the enterprises in agriculture, forestry, fishing or the largely nonmarket services such as education and health. The advantage of using Eurostat data is that the statistics are harmonised and comparable across countries. The disadvantage is that for some countries the data may be different from those published by national authorities.

Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

Table 2 Evolution of number of employees – Sector (construction); period 2008 – 2012

Country: Greece					
Sector: F: Construction					
Unit: number		Number of persons employed			
Year	2008	2009	2010	2011	2012
Micro	209605	171847	131447	132881	123066
Small	77135	48821	36706	28763	28763
Medium - sized	47678	53658	24858	26819	25823
Large	**16392**	**10783**	**8826**	**8769**	**8769**
Total	350809	285109	201837	197231	186420
SME	334417	274326	193011	188463	177651

Source: Eurostat, DIWecon, DIW, London Economics

Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

As compared with LEs in the sector, SMEs suffered a larger drop in the number of employees and the value added indicator. Mainly the public procurements´ cuts can be marked up as the reason for the economic downturn among SMEs, which were not able to compete with LEs in the changing focus market. SMEs serviced mainly the private market until the crisis, which collapsed after year 2009, as can be seen in Table 2 and Table 3 (European Commission, 2013a).

Table 3 Evolution of Gross Added Value – Sector (construction); period 2008 – 2012

Country: Greece					
Sector: F: Construction					
Unit: million €		Gross Added Value			
	2008	2009	2010	2011	2012
Micro	2109	2012	1481	1459	1344
Small	1428	1210	612	612	612
Medium - sized	943	513	520	562	549
Large	473	349	279	279	279
Total	**4952**	**4085**	**2892**	**2911**	**2783**
SME	4480	3736	2613	2632	2504

Source: Eurostat, DIWecon, DIW, London Economics

Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

Ireland

The insight into the Irish business sector provides very similar evidence to the Greek one, due to the fact that small and medium-sized enterprises are prevalent among Irish business entities. The evidence is provided through comparison with the EU average level (see Table 4). Only a half of the Irish private economic added value is formed by the SMEs. Nevertheless, nearly 70 % of the private sector labour force is employed by SMEs. The aforementioned fact provides obvious evidence for a lower productivity of labour in comparison with larger business entities.

One of the reasons for such a distribution can be identified within industrial policy in Ireland, which is focused to attract foreign direct investments. Large multinational enterprises subsequently have set up their subsidiaries in Ireland and this fact increases the overall share of large companies in the Irish economy.

Table 4 Enterprises in Ireland – basic figures (2013)

	Number of enterprises			Employment			Value added		
	Ireland		EU27	Ireland		EU27	Ireland		EU27
	Number	Share (in %)	Share (in %)	Number	Share (in %)	Share (in %)	Billion €	Share (in %)	Share (in %)
Micro	122643	87.7%	92.1	265628	24.8	28.7	10	13.1	21.1
Small	14249	10.2	6.6	263233	24.6	20.4	13	16.5	18.3
Medium – sized	2479	1.8	1.1	220960	20.6	17.3	16	20.4	18.3
SMEs – total	139370	99.7	99.8	149821	70.0	66.5	38	50.0	57.6
Large	447	0.3	0.2	321144	30.0	33.5	38	50.0	42.4
Total	139818	100	100	1070964	100	100	77	100	100

Source: European Commission 2013b - SBA Fact Sheet 2013 – Ireland

Note: Estimates for 2013, based on 2008-2010 figures from the Structural Business Statistics Database (Eurostat). The estimates have been produced by Cambridge Econometrics. The data cover the 'business economy' which includes industry, construction, trade, and services (NACE Rev. 2 Sections B to J, L, M and N). The data does not cover the enterprises in agriculture, forestry, fishing or the largely nonmarket services such as education and health. The advantage of using Eurostat data is that the statistics are harmonised and comparable across countries. The disadvantage is that for some countries the data may be different from those published by national authorities.

Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

It can be stated that there is an economic downturn of Irish business entities because of the recent economic crisis from its very beginning, i. e. since 2008. This circumstance has affected both large firms and SMEs, but more severely SMEs, with the evidence of a strong decrease of value added and employment levels in the time period of the years 2008 to 2012. Table 5 and Table 6 provide evidence of the position of large businesses concerning the indicators of value added and employment levels. Similarly to SMEs, the large companies are still lagging behind the aforementioned results of the year 2008. The reasons can be identified in their orientation to the domestic market, which was negatively influenced by, for instance loss of income both in the public and private sectors (Euroepan Commission, 2013b). Additional impulses from growing exports are small as only a few SMEs were involved in the export. Lastly, the problems of the banking sector exponentially increased the difficulties faced by local SMEs in accessing affordable finance (Lawless & McCann, 2012). Companies´ perceptions regarding access to finance are also studied, using results from the SAFE surveys. Not surprisingly, financial constraints for business entities during the crisis were most pressing in Greece, Ireland, Portugal, Slovenia and Spain (ECB, 2013). According to the latest SAFE survey, access to finance is the most pressing problem for about 15% of the companies in the EU. There are, however, substantial cross-country differences. For Ireland, Spain, and Portugal, this percentage is above 20%, and for Greece 37%.

Table 5 Evolution of Gross Added Value in Ireland according to the size of the enterprise (2008 – 2012)

Ireland					
Sector: All sectors (Nace R.2 B-J, L,M,N)					
Unit: million €		Gross Added Value			
	2008	2009	2010	2011	2012
Micro	13585	14005	10124	10041	10089
Small	17334	12493	12468	12840	12649
Medium - sized	19086	17661	15915	15851	15625
Large	41949	41140	42858	38916	38376
Total	91953	85299	81365	77648	76740
SME	50004	44159	38507	38732	38363

Source: Eurostat, DIWecon, DIW, London Economics
Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

Table 6 Evolution of number of persons employed in Ireland according size of the enterprise (2008 – 2012)

Ireland					
Sector: All sectors (Nace R.2 B-J, L,M,N)					
Unit: number		Number of Persons Employed			
	2008	2009	2010	2011	2012
Micro	285036	265957	273261	262883	265628
Small	326566	276067	255313	264867	263233
Medium - sized	289979	248405	221065	222924	220960
Large	360899	346626	329086	326111	321144
Total	**1262480**	**1137055**	**1078724**	**1076786**	**1070964**
SME	901581	790429	749638	750675	749821

Source: Eurostat, DIWecon, DIW, London Economics
Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

On the other hand, despite the economic crisis, a business sector could be identified which was able to most efficiently overcome the downturn of the national economy. It is the information and communication industry (ICT), as Ireland can be considered to be an important producer and exporter of computer and IT services. This industry attracts foreign direct investments and through the export of IT products and services, positively affects value added creation and growth.

Table 7 provides evidence that the value added produced by large companies in the ICT sector grew by 13%, but SMEs managed to increase their value added even more, reaching a growth rate of 23% (European Commission, 2013b).

Table 7 Evolution of Gross Value Added – Sector information and communication; period 2008 – 2014 (million €)

Ireland					
Sector: J: Information and communication					
Unit: million €		Gross Value Added			
	2008	2009	2010	2011	2012
0-9	580	556	653	631	660
10-49	1024	853	807	952	999
50-249	1653	1306	2171	2268	2334
250+	6886	6736	7362	7451	7802
Total	10143	9452	10993	11303	11795
SME	3257	2716	3631	3852	3993

Source: Eurostat, DIWecon, DIW, London Economics
Note: Micro (0-9 employees), Small (10-49), Medium - sized (50-249), Large (250+).

Prevailingly, the economic studies upon the effects and consequences of the recent world economic crisis make use of macroeconomic data. Nevertheless these consequences and effects can be found using microeconomic data as well. This article is aimed at corporate financial data to provide the principle evidence of their business activities. The scope of these data strengthens the need for an appropriate, but rigorous outlook over the different industries, despite differences of national accountancy systems. Authors consider correspondence analysis to be a suitable approach to overcome aforementioned contraints using frequencies of observed financial data in contingency tables about the theoretical basis and its applied cases.

3 Materials and Methods

The main objective of this contribution is to reveal similarities and dissimilarities focusing on the development of Greek and Irish corporations´ performances in different business sectors during the years of the strong world economic crisis, employing classical correspondence analysis for revealing associations between categorical data of business activities and economic size of businesses. The established partial goal is intended to provide a broader outlook at the development of Greek and Irish businesses in the period of world economic/financial crisis.

The Amadeus of Bureau van Dijk database has been utilised as the information source of Greek and Irish corporate financial data, which are involved in the empirical part of the paper. The sample consists of companies with continuous year-on-year increase/decrease of profitability within the period of the years 2008 - 2010, measured by the Return on Capital Employed (ROCE) indicator.

The chosen ROCE criterion that is employed in the search strategy for the business entities sample provides insight into the profitability of the overall volume of invested capital regardless of

the resources´ nature. So, this indicator measures profitability without considering the financial structure of the business entity (e.g. Besley & Brigham, 2011).

The sample of business entities fulfilling the search strategy in the Amadeus database consists of 476 Irish and 2,620 Greek entities with a continuous negative development of profitability, and 96 Irish and 101 Greek entities with a continuous positive development of profitability. The industry peer groups employed in the search strategy in the case of Greece counts for more than 27,000 companies and in the case of Ireland, for more than 122,000 companies.

Complementarily, authors use data concerning the general performance of SMEs, which are provided via the Small Business Act for Europe and its annual reports (European Commission, 2013a, 2013b). The data and respective partial results of analysis are completed with topical empirical studies of the European Commission or the European Central Bank.

The explorative analysis of the samples´ corporate financial data and its visualisation is done via classic correspondence analysis. The classic correspondence analysis takes into account contingency tables of two dimensions. So, this approach allows us to provide the visualisation of possible association among observations at a category level (Beh, 2004). The cross-tabular data involving numerical frequencies and results of the correspondence analysis provide very suitable interpretation, understanding and communication of the observed data (e. g. Greenacre, 2007; Whitlark & Smith, 2001).

Classic correspondence analysis uses row and column coordinates. The NACE rev. 2 classification is setup to be the criterion for enumeration of the row profiles coordinates. The economic size of company is chosen to be the criterion for enumeration of the column profiles and its classification according to the Operating Revenue (OR), Total Assets (TA) and staff headcount (SH) indicators as follows:

- very large companies: OR exceeding 100 mill. EUR, TA exceeding 200 million EUR; SH exceeding 1,000;
- large companies: OR exceeding 10 million EUR; TA exceeding 20 million EUR; SH exceeding 150;
- medium sized companies: OR exceeding 1 million EUR; TA exceeding 2 million EUR; SH exceeding 15;
- small companies – other entities.

The procedure of single coordinates´ enumeration involves decomposition of cross-tabular data representing respective relative frequencies. The utilised enumeration procedure is inbuilt in the Software Statistica 10 as follows:

$$P = A\, D_u\, B'$$

$$A\ inverse\ (D_r)A = B' inverse(D_c)B = I$$

where:

A is the matrix of the left-side generalized singular vectors,
B is the matrix of the right-side generalized singular vectors,
D_u is a diagonal matrix with the diagonal elements equal to the generalized singular values,
I is a diagonal matrix with 1's in the diagonal.

Row coordinates are computed based on the row profile matrix *R*.

$$R = inverse\ (D_r)P$$

where:

D_r is a diagonal matrix, the diagonal elements of D_r are equal to the row totals of relative frequencies (P).

Specifically, the (principal) row coordinates are computed as:

$$F = inverse\ (D_r)AD_u$$

Column coordinates based on the row profile matrix R are enumerated:

$$G = inverse\ (D_c)B$$

where:

D_c is a diagonal matrix, and the diagonal elements of D_c are equal to the column totals of P
Column coordinates are computed based on the column profile matrix R.
Specifically, the (principal) column coordinates are computed as:

$$F = inverse(D_c)BD_u$$

and the standard row coordinates are computed as:

$$G = inverse(D_r)A$$

4 Empirical results

Similarities and dissimilarities of the corporate economic performance development within observed Greek and Irish enterprises and respective industries of their business activities were identified by the subjective mapping technique. The visualisation in two-dimensional space was employed to reveal possible associations between the economic size and branch of business activities among observed business entities both with negative and positive development of their economic performance.

The suitability of information coverage via visualisation of cross-tabular data in two-dimensional space was proved for Greek companies with a continuous profitability downturn by the enumeration of eigenvalues and inertia[2] values. The cumulative percentage value of inertia, namely 78 %, provides suitable status to visualise associations between the economic size and industry classification of observed Greek businesses within a continuous negative development of profitability in the time period of the years 2008 – 2010.

There is a visualised column profile in Figure 1, the left graph, for observed Greek companies, which takes into account the economic size of Greek business entities with a continuous negative development of profitability. The two dimensional plane plot on the left graph provides evidence of Greek business entities´ determination, according to their economic size, that takes into account the results of the respective column profile analysis (see Table 8 for details). Dimension 1 defines small and medium-sized enterprises along the horizontal axes, while other types of companies according to their size are not well shown within this dimension. Dimension 2 regarding Greek companies defines large and very large companies against small and medium sized ones despite the fact that small and medium sized enterprises are not well shown regarding the cosine-square indicator results.

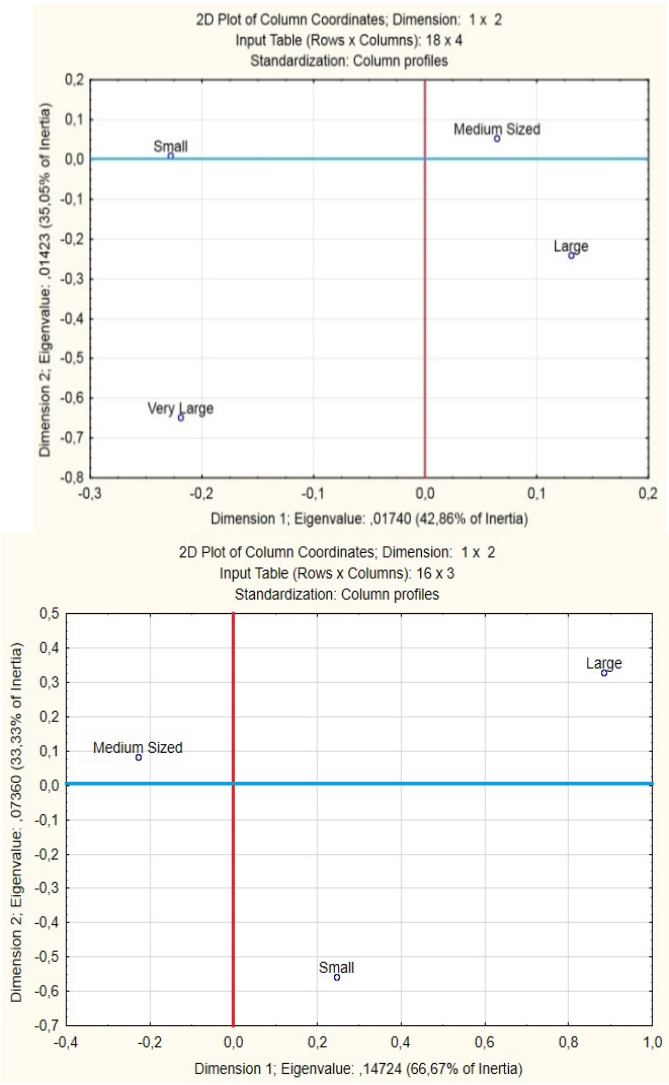
[2] Eigenvalues represents the relative importance of the respective dimension that can be visualised. Inertia values describe the amount of significant information in a two-dimensional plane.

Table 8 Greece Contributions to inertia regarding continuous negative development of profitability of observed businesses in the time period of the years 2008 – 2010 using their economic size (column profile)

Economic size of company	Mass	Quality	Relative Inertia	Inertia Dim.1	Cosine-sq Dim.1	Inertia Dim.2	Cosine-sq Dim.2
Very Large	0.01374	0.568931	0.278275	0.037833	0.058268	0.405432	0.510662
Large	0.114885	0.757063	0.279277	0.113233	0.173769	0.464765	0.583294
Medium Sized	0.638168	0.859759	0.128173	0.152337	0.509381	0.128128	0.350377
Small	0.233206	0.951833	0.314275	0.696597	0.949966	0.001675	0.001868

Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

Figure 1 Greece visualisation of size categories of samples of observed companies, with a negative (left graph) and positive (right graph) development of profitability



Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 softwar

The visualised column profile in Figure 1, right graph, concerning Greek business entities with continuous positive development of profitability takes also into account the economic size of obser-

ved companies according to the results of the respective column profile analysis (see Table 9 for details). There is no loss of information using the 2 dimensional plane plot, because of the fact that the cumulative percentage of the explained intertia is 100 % for the 2 dimensional plane. Dimension 1 defines large against medium sized companies. Consequently dimension 2 defines small companies against the other size categories. Please note that there is not included the size category of very large companies in Figure 1, right graph, because there were no observations regarding continuous positive development of very large Greek companies in years 2008 – 2010.

Table 9 Greece Contributions to inertia regarding continuous positive development of profitability of observed businesses in the time period of the years 2008 – 2010 using their economic size (column profile)

Economic size of company	Mass	Quality	Relative Inertia	Inertia Dim.1	Cosine-sq Dim.1	Inertia Dim.2	Cosine-sq Dim.2
Large	0,128713	1	0,518324	0,683598	0,879319	0,187689	0,120681
Medium Sized	0,693069	1	0,183448	0,24338	0,884546	0,063551	0,115454
Small	0,178218	1	0,298228	0,073022	0,16325	0,74876	0,83675

Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

It was identified, using eigenvalues and inertia in the case of observed Irish companies, that the total information coverage of two employed dimensions is at nearly 93% and it provides good visualisation of row and column profiles. Evidence is provided in Table 10 for two dimensional plane visualisation of associations within observed Irish corporations with a continuous negative development of profitability in the time period of the years 2008 – 2010 using their economic size and NACE classification of economic activities.

Table 10 Ireland: Contributions to inertia regarding continuous negative development of the ROCE indicator for observed corporations in the time period of the years 2008 – 2010 using their economic size (column profile)

Economic size of company	Mass	Quality	Relative Inertia	Inertia Dim.1	Cosine-sq Dim.1	Inertia Dim.2	Cosine-sq Dim.2
Very Large	0.052521	0.846549	0.169649	0.037722	0.158958	0.546529	0.687591
Large	0.205882	0.66119	0.119841	0.061142	0.364736	0.166453	0.296454
Medium Sized	0.563025	0.960747	0.128043	0.089176	0.49789	0.277673	0.462857
Small	0.178571	0.999985	0.582468	0.81196	0.996561	0.009345	0.003424

Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

Table 11 Ireland: Contributions to inertia regarding the continuous positive development of the ROCE indicator of observed corporations in the time period of the years 2008 – 2010 using their economic size (column profile)

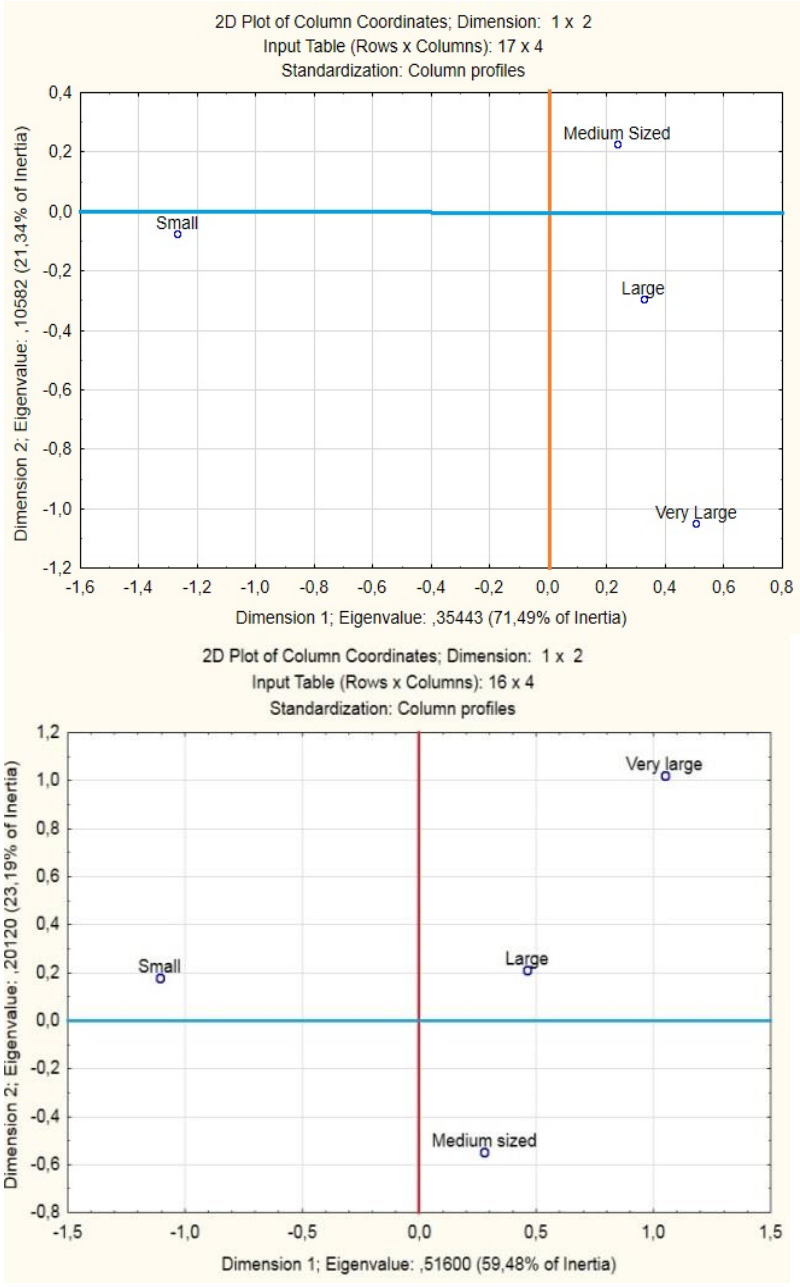
Economic size of company	Mass	Quality	Relative Inertia	Inertia Dim.1	Cosine-sq Dim.1	Inertia Dim.2	Cosine-sq Dim.2
Very large	0.072917	0.725549	0.248328	0.155394	0.37221	0.378314	0.353339
Large	0.302083	0.505377	0.177428	0.124785	0.418329	0.066591	0.087048
Medium sized	0.34375	0.901821	0.165373	0.051436	0.185005	0.511101	0.716817
Small	0.28125	0.9973	0.40887	0.668385	0.972344	0.043994	0.024956

Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

Evidence is provided in Table 11 for a two dimensional plane visualisation of associations within observed Irish businesses with a positive development of profitability in the time period of the years 2008 – 2010 using their economic size and classification of economic activities. The cumulative

percentage value of explained inertia at 87% provides acceptable visualisation of the respective row and column profiles in a 2 dimensional plane. The visualised column profile analysis' results of observed Irish business entities with continuous negative (left graph) and positive development of profitability on figure 2 takes into account also their economic size.

Figure 2 Ireland: visualisation of size categories of samples of observed companies with a negative (left graph) and positive (right graph) development of profitability

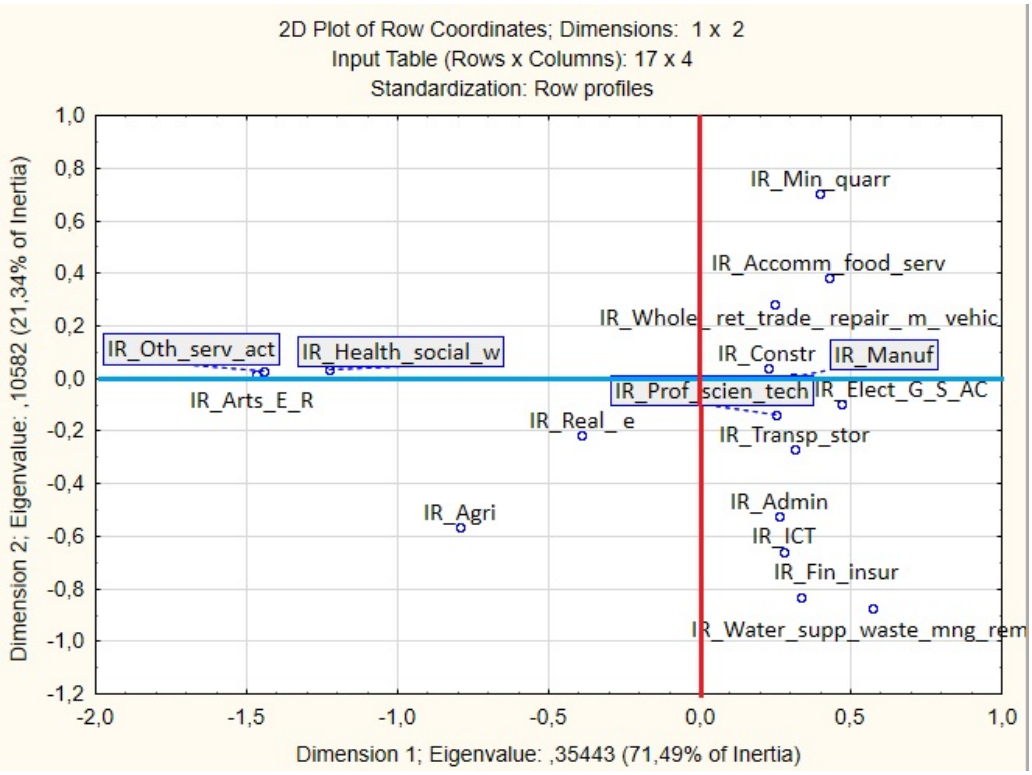


Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

In the case of the visualisation of Irish companies´ profitability according to their economic size classification. the dimension 1 within a negative development of profitability strongly determines small business entities compared to others despite the fact there is low quality of visualisation within this dimension and other size types of corporations. On the other hand. dimension 2 obviously determines very large companies compared to the others. Additionally. very large and large Irish companies with a trend of continuous negative development of profitability were observed as least frequent in the time period of the years 2008 – 2010. The visualisation according to size categories is provided in Fig. 2 for observed Irish companies with a positive development of profitability also. In this case dimension 1 determines small companies compared to other size categories of companies. Subsequently. dimension 2 defines medium sized companies against the other size categories.

There is visualised in figure 3. a row profile of cross-tabular profitability data of observed Irish companies according to their classification of economic activities within entities with a continuous decrease of their profitability in the time period of the years 2008 – 2010.

Figure 3 Ireland: 2D plot of row coordinates within continuous negative development of the ROCE indicator of observed corporations in the time period of the years 2008 – 2010 according to the NACE classification of economic activities.

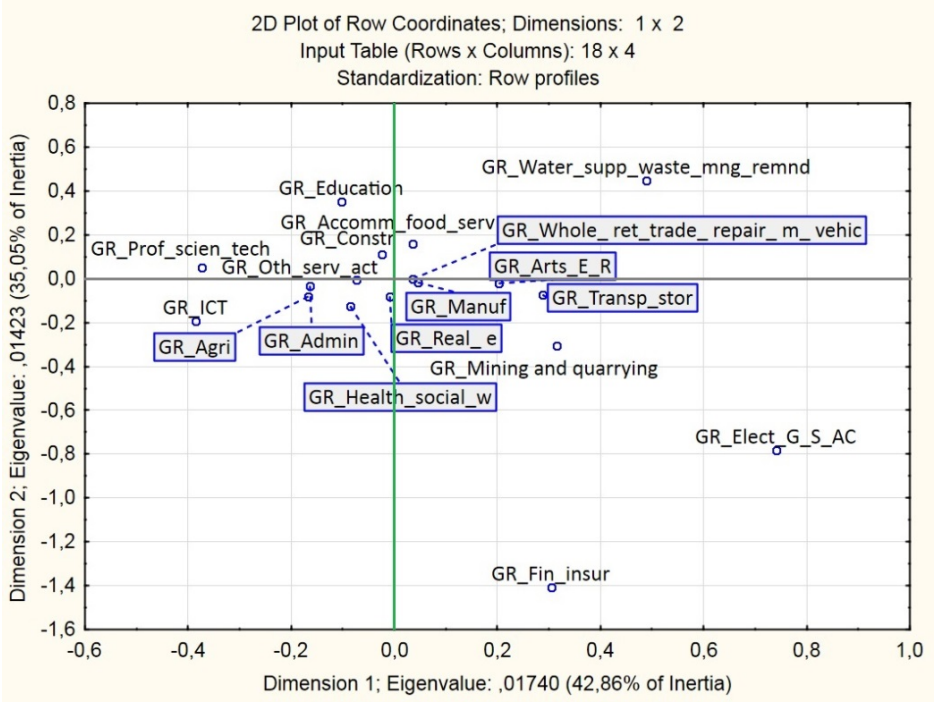


Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

The following representative industries within dimesnion 1 are well shown. namely: Accommodation and food service activities. Agriculture. forestry and fishing. Construction. Arts. entertainment and recreation. Electricity. gas. steam and air conditioning supply. Human health and social work activities. Manufacturing. Other service activities. Professional. scientific and technical activities. Real estate activities. Transportation and storage. The determination of dissimilarities within the profile models and their visualisation according to enumerated distances provides the following overview on the horizontal axis in Fig. 3. Businesses with activities in industries such as

Arts. entertainment and recreation. Human health and social work activities and Other service activities industries are visualised as determined against other observed entities and their respective industry specializations. which are closer to the intersection point. Observed entities within the aforementioned industry sectors are prevailingly observations of small and medium sized entities however. representing only inconsiderable amounts of the total companies´ sample count. A specific industry can be marked according to the two-dimensional plane visualisation. In he Agriculture. forestry and fishing sector. there were identified the smallest count of businesses with a continuous negative trend of profitability. A suitable presentation of row coordinates within dimension 2 as the mapping of Irish entities with a continuous profitability downturn in the time period 2008 – 2010 is provided for the following industries (see figure 3): Administrative and support service activities. Financial and insurance activities. Information and communication. Mining and quarrying. Water supply; sewerage. waste management and remediation activities. Wholesale and retail trade; repair of motor vehicles and motorcycles. The presentation of dimension 2 according to the coordinates´ distances. demarcate observations of businesses and respective industries with their location at the top and bottom against the other observations visualised closer to the dimensions‘ intersection point. These observations are. according to industry classification business entities. from the Mining and quarrying industry. as it is the sector with minimum observations according to the count of businesses identified as those with a continuous downturn of profitability. Additionally. only medium sized companies were observed in the Mining and quarrying industry with decreasing profitability. In contrast. business entities with a downturn in profitability which were from industries such as Financial and insurance activities or Water supply; sewerage. waste management and remediation activities. were solely large and very large entities.

Figure 4 Greece: 2D plot of row coordinates within continuous negative development of the ROCE indicator of observed corporations in the time period of the years 2008 – 2010 according to NACE classification of economic activities.



Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

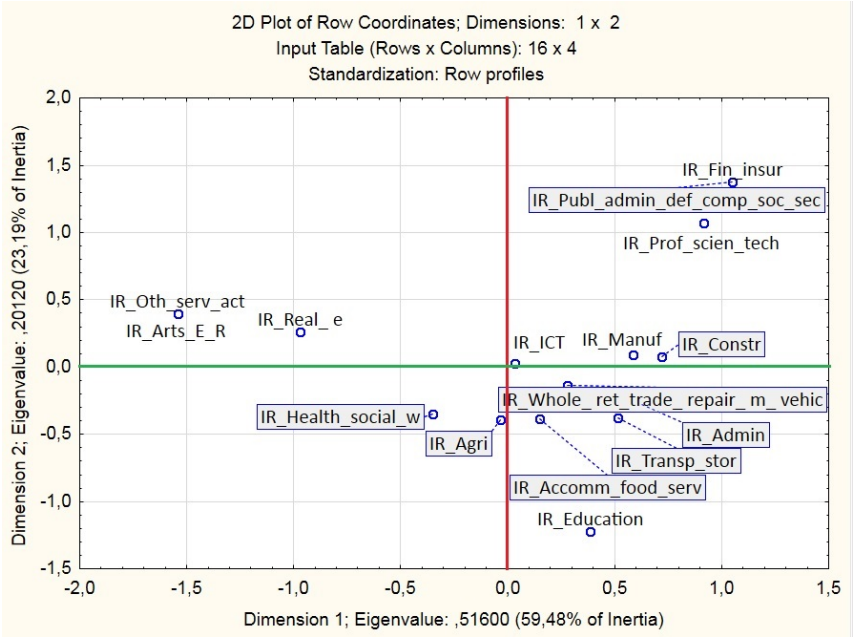
The row profiles´ visualisation of industry classification among observed Greek companies with a continuous decrease of their profitability in the time period of the years 2008 – 2010 is shown in Figure 4. The following industries are well visualised within dimension 1 according to the values of the cosine square indicator. namely: Agriculture. forestry and fishing. Arts. entertainment and recreation. Information and communication. Manufacturing. Mining and quarrying. Professional. scientific and technical activities. Repair of motor vehicles and motorcycles. Transportation and storage. Waste management and remediation activities. Water supply; sewerage. Wholesale and retail trade. Dissimilarities in the profile models regarding dimension 1 can be encountered via using their enumerated and visualised distances. Water supply; sewerage. waste management and the remediation activities industry is obviously determined within dimension 1 against industries which are well fitted to dimension 1 and are located near the centroid. In other words. there were observed only a small amount of business entities with a continuous negative profitability and these are solely medium sized companies. namely within Water supply; sewerage. waste management and the remediation activities industry. In contrast. the Manufacturing and Wholesale and retail trade; the repair of motor vehicles and the motorcycles industry being visualised near the intersection point of the two dimensions consists of the largest count of companies identified as those with a continuous negative profitability trend during the years 2008 – 2010. i.e. more than 60 % of all observed companies. It can be stated as additional information that observations among samples of businesses being active in the Manufacturing and Wholesale and retail trade; the repair of motor vehicles and motorcycles industry consist of all of the defined economic size categories of business entities. The visualised industries far from the intersection of dimensions on the left. namely the Information and communication industry and Professional. scientific and technical activities are also covered by the whole range of defined economic size categories of business. The differing aspects regarding respective profile models of dimension 2 reveal a strong determination of the Electricity. gas. steam and air conditioning supply industry and Financial and insurance activities against the rest of observed industries visualised near the dimensions´ intersection alongside dimension 2 (see Figure 4). Nevertheless. the observed businesses active in the Electricity. gas. steam and air conditioning supply industry and Financial and insurance activities represent an inconsiderable count out of the total amount of observed Irish companies with a continuous negative development of the profitability indicator.

Figure 5 provides visualisation of a row profile taking into account the classification of economic activities within observed Irish companies with the continuous increase of their profitability in the time period of the years 2008 – 2010. Dimension 1 well visualises the following industries. according to the value of the Cosine square indicator: Arts. entertainment and recreation. Administrative and support service activities. Construction. Human health and social work activities. Other service activities. Real estate activities. Transportation and storage. Wholesale and retail trade; repair of motor vehicles and motorcycles. Analysis of dissimilarities of respective profile models using distances between observations reveals that representative industries left of the centroid alongside the horizontal axis are prevailingly small companies. Industries located closer to the centroid and right of the centroid alongside dimension 1 are prevailingly represented by medium sized businesses.

Well visualised industries alongside dimension 2 using the cosine-square indicators from the row profile enumeration are as follows: Agriculture. forestry and fishing. Accommodation and food service activities. Financial and insurance activities. Education. Professional. scientific and technical activities. Public administration and defence; compulsory social security. Dissimilarities in the profile models regarding dimension 2 according the positive profitability's development of Irish corporates in the time period 2008 – 2010 using the distances among observations are as follows. There is obviously determined Financial and insurance activities industry against Education in-

dustry. Financial and insurance activities industry is represented only by large and very large companies. Education industry is represented only by medium sized companies. Consequently. the amount of observation among the aforementioned industry is very small (mass = 1 %. 2 % respectively). The industries closer to the centroid are prevailingly medium sized and large companies.

Figure 5 Ireland: 2D Plot of Row coordinates regarding continuous positive development of the ROCE indicator of observed corporations in the time period of the years 2008 – 2010 according to NACE classification of economic activities

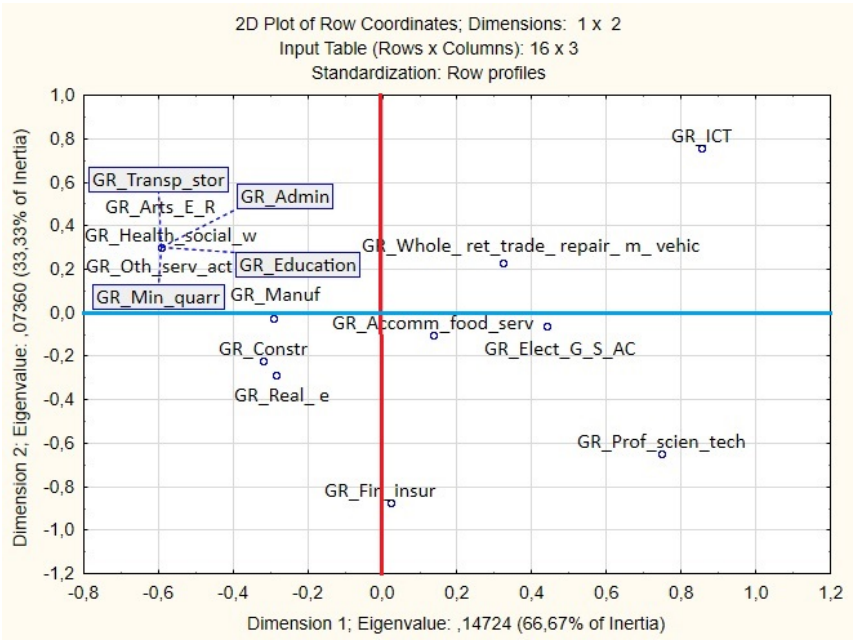


Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

Visualisation of the row profile in Figure 6 is based on the classification of economic activities within observed Greek companies with a continuous increase of their profitability in the time period of the years 2008 – 2010. Dimension 1 well visualises all observed representative industries except for Real estate activities and Financial and insurance activities. which are according to the values of the Cosine square indicator. better visualised within dimension 2. Dissimilarities in the profile models regarding dimension 1 can be revealed using respective distances. Obviously. Information and communication and Professional. scientific and technical activities industries are defined against the others. These industries are those with prevailing large and medium sized enterprises against small ones. On the other hand. industries which are closer to the centroid and left from the centroid. are those with prevailing small and medium sized enterprises against large ones.

Dissimilarities in the profile models regarding dimension 2 regarding positive profitability's development of Greek corporates in the time period 2008 – 2010 according the distances are as follows. The observed well visualised industry representatives are Financial and insurance activities and Real estate activities. which are prevailingly medium sized companies. There are no observations of large Greek companies with continuous positive profitability development within the dimension 2.

Figure 6 Greece: 2D Plot of Row coordinates regarding continuous positive development of i the ROCE indicator of observed corporations in the time period of the years 2008 – 2010 according to NACE classification of economic activities



Source: Own work using outputs of the correspondence analysis´ procedures inbuilt in Statistica 10 software

5 Conclusion

The biggest negative impact of the world financial crisis on European businesses is witnessed according to the macroeconomic evidence over the time period of the years 2008 – 2010. The observed EU member countries in this study were Ireland and Greece as states from the eurozone periphery. The results of subjective mapping of profitability development of observed businesses considering their economic size and industry classification are as follows. In Greece there are small and medium-sized enterprises determined against economically larger entities in the context of the data sample represented by business. which declared permanent profitability downturns in the time period of the years 2008 - 2010. Industries which were analysed. according to their corporate profitability data. as those with a surplus in the number of economically larger entities are. Financial and insurance activities. The Water supply and waste management industries were identified as the sectors within the data sample in which only medium sized companies declared a continuous burst of profitability. In samples of Irish companies.entities with negative profitability trends during the years 2008 – 2010 can be characterised by determination of large against small businesses. Nevertheless. the negative consequences of the economic crisis on the profitability of business entities were identified in the whole range of the businesses sampled. The correspondence analysis which was employed revealed that industries able to gain an increasing trend of profitability despite the economic crisis were Arts. entertainment and recreation. Human health and social work activities and Other service activities industries represented by smaller entities. Contrarily. the observed large Irish companies. which suffered from decreasing profitability were identified in industries as follows Financial and insurance activities. Water supply; sewerage. waste management and remediation activities or industries. The results of the subjective mapping approach using the corporate data of Irish companies complies with the Small Business Act (European Commission. 2013). The Information and communication industry is regarded as the outstanding one in the period of economic crisis.

The position of Ireland as the major producer and exporter of computer and IT services can be marked up as the reason for the aforementioned statement. Consequently. such leadership is encouraged and formed by developing an open economy system. a competitive corporate tax environment and a skilled and creative workforce and is bounded with an inflow of foreign direct investments.

Sustainable businesses´ profitability despite the world economic and financial crisis was identified also in Greece regarding respective sectors. There were determined on the one hand. Information and communication and Professional. scientific and technical activities industries; and on the other hand. Financial and insurance activities and Real estate activities. Small and medium enterprises were prevailingly determined against the small ones in the aforementioned industries. In general. representatives of most observed Greek industries with evidence of a continuous positive profitability trend even in the period of the economic and financial crisis were prevailingly small and medium sized enterprises. The situation among Irish corporations and the ability to sustain profitability in the time period of the years 2008-2010 were as follows. On one side. there was determined (by the subjective mapping approach) small against medium sized companies within industy sectors such as Other service activities. and Arts and entertainment against Construction or Administrative activities. On the other hand. there were determined medium sized companies against large and very large companies within industries such as Education against Financial and insurance activities. In general. the higher proportion of large and very large Irish companies. which were able to better sustain profitability against small and medium ones. makes observation in Ireland different in the years of the financial crisis than the observation among Greek businesses.

This contribution presents an initial authors´ insight on the subjective mapping approach for revealing similarities/dissimilarities among financial data at the corporate level. The results are intended to be verified and broadened to provide more spill over regarding further consequences and macroeconomic development in the observed countries.

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