• F I N A N S E I P R A W O F I N A N S O W E •
• Journal of Finance and Financial Law •

Numer specjalny/Special Issue 2/2023: 57–79

SYSTEMICALLY IMPORTANT BANKS – RISK TRANSFER IN THE EURO AREA

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https://doi.org/10.18778/2391-6478.S2.2023.03

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ABSTRACT

The purpose of the article/hypothesis. The main aim of this article is to assess the direction and scale of risk transfer via systemically important banks in the euro area. This paper also critically analyses and proposes practical applications of supervisory and complex measures of SIBs identification.

Methodology. The impact of systemic risk transfer via O-SIBs on the home and host countries was examined using the supervisory measure of an individual bank's contribution in the national systemic risk. Additionally, the SRISK model was used.

Results of the research. The conducted research has shown that the nature of risk transfer is potentially unidirectional, i.e., from the 'old EU' countries to the other countries in the same group or to the 'new EU' states. Also, three other SIBs have been found to pose a greater threat to the national banking system than their parent entities do in their home countries. Moreover, it has been demonstrated that in three countries, the aggregate risk contribution of the local O-SIBs – being subsidiaries of O-SIBs from other Eurozone countries – exceeds 25%.

Keywords: systemically important banks, systemic risk, the euro area, SRISK, risk transfer.

JEL Class: G01, G21, G28.

INTRODUCTION

Observation of the last global financial crisis has proved the key importance of a systemic perspective. The crisis in the banking sector, which involved government financial aid, led to an increase of sovereign credit risk, which in turn weakened the banking sector due to a poorer quality of government guarantees and

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a lower value of Treasury Bonds. As the systemic perspective was not adopted, in the initial phase of the crisis some safety network institutions responded to the problems of individual banks in a standard way, e.g., they let them declare insolvency or allowed for their acquisition by other entities [Koleśnik 2019]. Additionally, the 'Too big to fail' (TBTF) doctrine which was applied in many countries to the banks which – due to their size and interconnectedness – could not declare bankruptcy as this would trigger the domino effect, resulted in nationalisation being the only form of aid to such entities. Owing to these developments, not only did the safety network institutions adopt a systemic perspective in their activity but also established and started to apply the SIBs identification criteria. Additionally, resolution mechanisms and instruments were introduced. This was to help solve the problems of even the biggest and systemically important banks, without recourse to taxpayers' funds [Zaleska 2019]. The remarkable progress in the approach to the problems of SIBs which has been made in over a decade, has not only offered solutions to many issues but also helped identify several challenges. One of them is the possibility of transferring systemic risk from the home country via the SIBs and their subsidiaries, which themselves are systemically important banks in the host countries. This problem is likely to occur especially in the euro area countries. Despite the banks being subject to the Single Supervisory Mechanism, in these countries – due to the EU principle of free movement of capital – it is possible to run business operations whose importance may generate systemic risk and the contagion effect.

The main aim of this article, which will make a contribution to the literature on the subject, is to assess the direction and scale of risk transfer via systemically important banks in the euro area. This paper also critically analyses and proposes practical applications of supervisory and complex measures of SIBs identification. The analysis covers the period from 2016 to 2021, when it was possible to obtain the results of O-SIBs identification performed by the national banking supervisory authorities in the euro area countries. The Eurozone countries and their banks identified as systemically important were chosen due to the fact that all these countries are full members of the banking union, where not only uniform rules of SIBs identification are applied but also the Single Supervisory Mechanism is operating. So far, the literature has been dominated by studies on the transfer of systemic risk within individual countries, e.g., China [Yan et al. 2023; Li et al. 2023] or India [Narayan et al. 2023], while studies on euro area countries were few and did not address the issue of risk transfer through systemically important banks [Foglia et al. 2023].

These objectives have determined the structure of the article and the choice of research methods. In the first part, SIBs identification measures implemented by the FSB and EBA were analysed. Additionally, theoretical and practical aspects of the methods used to measure the impact of individual banks on systemic

risk were presented (including the application of the SRISK model). In the second part, the impact of systemic risk transfer via O-SIBs on the home and host countries was examined using the supervisory measure of an individual bank's contribution in the national systemic risk. In this part, the direction of risk transfer in the euro area countries was identified. Also, the systemic risk contribution of all the O-SIBs being parent entities or subsidiaries of other O-SIBs in the euro area was analysed. In the final part, the study was summarized in view of the main objective of this paper as well as its contribution to the literature on the subject, practical implications and areas of further study were presented.

1. SYSTEMICALLY IMPORTANT BANKS IN THE EURO AREA – THEORY AND PRACTICE OF THEIR IDENTIFICATION

1.1. Identification by supervisory authorities

The experience of the global financial crisis triggered in 2008 by the failure of the American bank Lehman Brothers clearly showed that the earlier theoretical work as well as the attempts to reduce moral hazard, i.e., a situation where one entity avoids the negative impact of its own behaviour at the expense of others – proved inadequate. The fact that bank clients were becoming increasingly aware of such safety network elements as deposit guarantee schemes not only exacerbated moral hazard but also turned it into a significant problem in the case of SIBs [Mishkin 2001]. According to the well-known doctrines of 'Too big to fail' or 'Too important to fail', such banks enjoyed special protection of the banking supervisory authorities, which were inclined to prevent their insolvency as their problems could undermine the entire banking system, or would have exceptionally negative effects on large groups in society. These doctrines, however, proved to be wrong. In consequence, new tools were created and implemented in order to prevent a systemic crisis triggered by a failure of one bank; they were both in preventive (division of bigger banks) [Liikanen 2012] and reactive (resolution tools and procedures) in nature [Lombardi and Moschella 2016; Górnicka and Zoican 2016]. Nonetheless, regardless of the methods applied to counteract a systemic crisis caused by a failure of one or more banks, it was crucial to identify systemically important banks which should be continually monitored not only by the banking supervisory authorities but also by other safety net institutions, i.e., the central bank, deposit guarantee scheme and a resolution entity. Identification of systematically important banks for supervisory purposes cannot therefore be based on the size of bank's assets alone but must also take into account its other parameters, which may indicate its importance for the banking sector and for the entire financial system in the country [Koleśnik and Dąbkowska 2021].

With these premises in mind, the European Banking Authority (EBA) developed and implemented a single method of identification of the systemically important banks in the European Union. These banks were called Other Systemically Important Banks (O-SIBs) to differentiate them from the Global Systemically Important Banks (G-SIBs), which are identified by the Financial Stability Board (FSB). However, certain differences in the criteria of bank identification at the EU and global level should be noted as – from the point of view of further analysis – it is crucial which banks in the euro area countries are systemically important both on the European and global scale. Since 2011, in order to identify G-SIBs, the FSB has been following the guidelines developed and regularly revised by the Basel Committee on Banking Supervision [Basel Committee on Banking Supervision 2018]. These require that 13 parameters of each bank, divided into five categories of equal weight are tested. The categories include: cross-jurisdictional activity, size, interconnectedness, substitutability/financial institution infrastructure and complexity. Having examined these parameters, the FSB divides the identified systematically important banks into five groups (baskets), depending on the risk they generate. Thus, this division clearly defines the real importance of a bank, considering not only its size (25% weight) but also other key factors (75% weight). The EBA identified O-SIBs for the first time in 2015, using their own guidelines, which included obligatory and facultative categories and parameters. Ten obligatory parameters were divided into four categories: size, importance (including substitutability/financial system infrastructure), complexity/ cross-border activity and interconnectedness. As in the methodology adopted by the FSB, weight was attributed to each parameter. However, it should be emphasised that the above uniform method of identification of systemically important banks in the European Union, prepared by the EBA, is used by each Member State individually, i.e., O-SIBs are identified by the national banking supervisory authority, not the EBA. Other systemically important banks, identified in individual EU countries, obtain an additional capital buffer ranging from 0% to 2% (which is a multiple of 0.25%) of the aggregate risk exposure amount, which means that they are divided into nine risk baskets [Koleśnik 2019]. The division of O-SIBs into a nearly twice bigger number of baskets than that of G-SIBs and the possibility of the national banking supervisory authority using also facultative indicators for O-SIBs identification are not the only important differences between the methodologies adopted by the FSB and EBA. Globally, only 6.67% of the final result depends on the size of bank's assets, while on the EU scale, this weight is as much as 25% [Basel Committee on Banking Supervision 2018; European Banking Authority 2014].

For further analysis of risk transfer via the systemically important banks within the euro area, it is key that the EBA's methodology of assessment of banks' systemic importance, adopted by the national supervisory authorities, makes it possible to determine individual bank's systemic risk contribution in the national

banking sector. This is due to the fact that national entities, when calculating the score of each bank:

- divide the indicator value of each individual relevant entity by the aggregate amount of the respective indicator values summed across all institutions in the Member State (the 'denominators');
- multiply the resulting percentages by 10 000 to express the indicator scores in terms of basis points;
- calculate the category score for each relevant entity by taking a simple average of the indicator scores in that category;
- calculate the overall score for each relevant entity by taking a simple average of its four category scores.

The banks whose score, calculated according to the above rules, is equal or higher than 350 basis points are identified as O-SIBs. Relevant entities may raise this threshold up to a maximum level of 425 basis points or reduce it to the minimum level of 275 basis points to allow for the specific character of the banking sector of a given Member State and for the resulting statistical distribution of scores [European Banking Authority 2014].

In the period of 2016–2021, covered by this study, banks identified by the FSB as G-SIBs had their headquarters only in five euro area (EA) countries, France being the only state where four such banks were present. Six of them were included in the first basket all the time while only in the case of two banks, their global risk contribution qualified them for the 2nd or 3rd basket (Table 1).

Table 1. Banks from the EA countries identified by the FSB as G-SIBs and their respective baskets

Home country	Bank	Basket					
		2016	2017	2018	2019	2020	2021
DE	Deutsche Bank AG	3	3	3	3	2	2
ES	Banco Santander S.A.	1	1	1	1	1	1
FR	BNP PARIBAS	3	2	2	2	2	3
	Groupe BPCE	1	–	1	1	1	1
	Groupe Crédit Agricole	1	1	1	1	1	1
	SOCIETE GENERALE	1	1	1	1	1	1
IT	Unicredit Group	1	1	1	1	1	1
NL	ING Bank N.V.	1	1	1	1	1	1

Source: Own study based on the FSB data.

All the banks from the euro area identified by the FSB as G-SIBs were also identified as O-SIBs in their home countries. However, due to the differences in the weight of individual categories (including size of the banks in particular), the analysis of the scores attributed to these banks by the national supervisory authorities in the process of O-SIBs identification (Table 2) not only indicates much

bigger differences in their systemic risk contribution but also shows that Deutsche Bank AG and BNP PARIBAS pose a greater threat to the global financial system than to their home banking systems (i.e., German and French), while for Banco Santander S.A. and ING Bank N.V. it is opposite (i.e., they pose a lesser threat to the global financial system than to their own home banking systems: Spanish and Dutch, respectively). Since, due to the COVID-19 pandemic, most of the national banking supervisory authorities did not present, or did not change the basis points attributed for the year 2019, an arithmetic mean of the points for 2018 and 2020 was adopted as the number of basis points for 2019, where necessary.

Table 2. Banks from the EA countries identified by the FSB as G-SIBs and basis points attributed to them by the national supervisory authorities identifying them as O-SIBs

Home country	Bank	Basis points					
		2016	2017	2018	2019	2020	2021
DE	Deutsche Bank AG	2853	2765	2648	2554	2459	2274
ES	Banco Santander S.A.	3887	4118	4385	4461	4537	4358
FR	BNP PARIBAS	2474	2454	2479	2533	2586	2732
	Groupe BPCE	1445	1473	1477	1468	1458	1384
	Groupe Crédit Agricole	1767	1700	1741	1797	1853	1898
	SOCIETE GENERALE	1948	1960	1877	1828	1778	1696
IT	Unicredit Group	3844	3454	3429	3314	3199	3199
NL	ING Bank N.V.	3825	3970	3991	4009	4027	3949

Source: Own study based on the EBA data.

One should remember, however, that apart from the banks identified both as G-SIBs and O-SIBs, also those which are not G-SIBs but are identified as O-SIBs play a key role in the Eurozone. Moreover, banks identified as O-SIBs may be divided into the ones which are not parent institutions of other O-SIBs, those which are parent institutions of other O-SIBs and those which are subsidiaries of other O-SIBs. In view of the research purpose of this article, further analysis will focus on the banks which are parent entities of other O-SIBs and those which are subsidiaries of O-SIBs. Therefore, two French banks were not included in this group: Groupe BPCE and Groupe Crédit Agricole. Banks identified as O-SIBs which are not parent entities of other O-SIBs will not be analysed as systemic risk is not transferred via these banks to other euro area countries. Considering the above, eight O-SIBs, which are not G-SIBs but are parent entities of other O-SIBs in the euro area countries were identified. These banks come from six countries and the basis points attributed to them by the national supervisory authorities are shown in Table 3.

Table 3. O-SIBs from the EA countries not identified as G-SIBs, being parent entities of other O-SIBs in the EA countries

Home country	Bank	Basis points					
		2016	2017	2018	2019	2020	2021
AT	Erste Group Bank AG	1827	2231	2412	2459	2505	2512
	Raiffeisen Bank International AG	1134	1795	1740	1785	1829	1835
BE	KBC Groep	2260	2431	2445	2366	2286	2414
ES	CaixaBank S.A.	796	713	807	776	744	1249
GR	Alpha Bank S.A.	bd	2189	2309	2363	2417	2250
	Eurobank Holdings S.A.	bd	2248	2761	2828	2894	2755
IT	Gruppo Intesa Sanpaolo	2215	2518	2631	2594	2557	2776
LV	"Swedbank" AS	n/d	n/d	n/d	n/d	2029	2395

Source: Own study based on the EBA data.

Analysis of the number of basis points attributed by the national authorities supervising O-SIBs from the euro area which are not identified as G-SIBs, but are parent entities of other O-SIBs in the Eurozone countries, shows that such banks as Gruppo Intesa Sanpaolo or Eurobank Holdings S.A. have a greater risk contribution in their respective home countries than the national systemic risk contribution of Deutsche Bank AG or SOCIETE GENERALE, which are identified as G-SIBs. It should be reiterated that this is due to the difference in the weight attributed to the size of a bank in G-SIBs and O-SIBs identification methods.

1.2. Identification based on complex measures

Whether on a global scale (by FSB) or at a local level (by national supervisory authorities in the euro area countries), identification of systemically important banks includes (with different weights) only the extent of cross-border activity, size, interconnectedness, substitutability/financial institution infrastructure and complexity of a bank and is perceived as one of the weaknesses of this mechanism. Advanced systemic risk analysis models offer not only much bigger possibilities of assessment of the current level of systemic risk but also the analysis of its sources and the ability to generate warnings. Not all the models, however, allow us to determine the systemic risk contribution of a specific bank. The aggregate systemic risk measure CATFIN can serve as an example. It measures an aggregate systemic risk level across the entire financial sector (instead of risk exposure of an individual bank) and is calculated on the basis of a cross-sectional analysis of return on

capital of American, European and Asian financial institutions. Alternative methods involve measurement of the impact of individual banks on the systemic risk. Examples of such models are SRISK, CoVaR and DIP. The SRISK model measures the systemic capital shortfall, defined as a 40% decline of aggregate capitalization of the banking system over six months [Brownlees and Engle 2012]. This model was developed by Brownlees and Engle (2017) and can be applied both to American and European banks, although it needs to be modified due to the differences between the American and European banking accounting standards. Importantly, there is also a variation of this model, known as SRISK% that indicates which part of the systemic capital shortfall is generated by a given bank. The CoVaR (Conditional Value at Risk) model determines the VaR for the entire financial system in a crisis situation [Tobias and Brunnermeier 2016]. Additionally, this model allows us to determine ΔCoVaR, which defines individual banks' risk contribution in the entire sector on the basis of the difference between CoVaR of a given bank during the crisis in respect of the CoVaR in a non-crisis situation. The third DIP (Distress Insurance Premium) model is based on the insurance premium calculated for bank's losses exceeding a certain amount of their liabilities in a crisis situation. This model is based on the degree of probability of individual banks' default by means of market CDS values. It also takes into account the correlation between the value of individual assets. The overall systemic risk level equals the sum of systemic risk generated by individual banks [Huang, Zhou and Zhu 2009] (Table 4).

Table 4. Selected systemic risk measurement models determining the total systemic risk contribution of individual banks

Model	Systemic risk measurement principle	Method of determining total systemic risk contribution of individual banks
SRISK	measurement of systemic capital shortfall, defined as a 40% shortfall of overall banking system capitalization over six months	by determining SRISK%
CoVaR (Conditional Value at Risk)	determination of VaR for the entire financial system in a crisis situation	by determining ΔCoVaR
DIP (Distress Insurance Premium)	determination of probability of default by individual banks using market CDS values	total systemic risk equals the sum of systemic risk generated by individual banks

Source: Own study based on [Cai et al. 2018].

The SRISK model will be used for further research due to the applied measurement method, which allows us to define the systemic capital shortfall (without

recourse to own funds to meet the regulatory minimum) if a 40% shortfall of overall banking system capitalization occurs during the subsequent six months, and therefore allows for an intuitive interpretation of the score also in the context of the country's GDP, as well as the possibility of individual banks participating in this shortfall. Table 5 presents an overall national systemic risk contribution by the euro area banks identified as O-SIBs (including G-SIBs), being parent entities of other O-SIBs, based on the SRISK model. The list does not include the Latvian "Swedbank" AS, which is a subsidiary of the Swedish Swedbank AB.

Table 5. National systemic risk contribution by the euro area banks identified as O-SIBs (including G-SIBs), being parent entities of other O-SIBs, based on the SRISK model

Home country	Bank	SRISK%					
		2016	2017	2018	2019	2020	2021
AT	Erste Group Bank AG	47.8	41.6	49.9	54.2	53.8	47.4
	Raiffeisen Bank International AG	40.7	50.5	43.8	42.6	37.9	47.2
	total	88.5	92.1	93.7	96.8	91.7	94.6
BE	KBC Groep	5.9	0.0	24.5	100.0	97.5	100.0
DE	Deutsche Bank AG	67.0	74.3	69.3	70.0	59.5	61.2
ES	Banco Santander S.A.	46.1	56.7	47.7	48.3	47.6	48.7
	CaixaBank S.A.	11.3	12.9	11.7	12.8	12.9	21.9
	total	57.4	69.6	59.4	61.1	60.5	70.6
FR	BNP PARIBAS	29.8	31.8	33.6	30.1	33.6	35.7
	SOCIETE GENERALE	21.2	22.6	21.0	22.7	20.8	22.7
	total	51.0	54.4	54.6	52.8	54.4	58.4
GR	Alpha Bank S.A.	17.5	18.3	20.3	19.5	23.3	23.1
	Eurobank Holdings S.A.	23.0	25.2	22.7	20.9	21.7	19.2
	total	40.5	43.5	43.0	40.4	45.0	42.3
IT	Gruppo Intesa Sanpaolo	17.5	20.3	22.6	23.3	28.9	29.7
	Unicredit Group	36.5	26.7	32.9	32.2	31.5	30.7
	total	54.0	47.0	55.5	55.5	60.4	60.4
NL	ING Bank N.V.	37.2	29.1	54.0	43.8	50.1	43.7

Source: Own study based on NYU Stern's Volatility Laboratory https://vlab.stern.nyu.edu.

As shown earlier, due to the fact that the SRISK model measures the systemic capital shortfall, it is possible and reasonable to refer the individual (for each O-SIB) and aggregate value of this shortfall generated by all the O-SIBs in individual banking systems to the GDP of the home country. This will help us predict the potential scale of threat to the financial system stability in a given country (Table 6).

Table 6. Capital shortfall in the EA banks identified as O-SIBs (incl. G-SIBs), being parent entities of other O-SIBs in the EA, in respect of the GDP of the home country

Home country	Bank	SRISK/GDP (%)					
		2016	2017	2018	2019	2020	2021
AT	Erste Group Bank AG	1.5	1.0	1.8	1.9	3.3	2.0
	Raiffeisen Bank International AG	1.3	1.2	1.6	1.5	2.3	2.0
	total	2.8	2.2	3.3	3.3	5.6	4.0
BE	KBC Groep	0.2	0.0	0.8	0.0	2.1	0.5
DE	Deutsche Bank AG	3.1	2.9	2.6	2.6	2.8	2.2
ES	Banco Santander S.A.	4.1	4.4	4.3	5.1	8.4	6.3
	CaixaBank S.A.	1.0	1.0	1.0	1.4	2.3	2.8
	total	5.1	5.3	5.3	6.5	10.7	9.2
FR	BNP PARIBAS	4.4	4.7	5.1	4.2	7.4	5.7
	SOCIETE GENERALE	3.1	3.4	3.2	3.2	4.6	3.6
	total	7.5	8.1	8.3	7.4	11.9	9.3
GR	Alpha Bank S.A.	1.4	1.2	1.4	1.0	2.4	1.7
	Eurobank Holdings S.A.	1.8	1.6	1.6	1.1	2.2	1.4
	total	3.3	2.8	3.1	2.0	4.7	3.1
IT	Gruppo Intesa Sanpaolo	1.4	1.3	1.6	1.5	3.0	2.4
	Unicredit Group	2.9	1.7	2.3	2.1	3.3	2.5
	total	4.2	2.9	3.9	3.6	6.3	4.9
NL	ING Bank N.V.	2.6	1.3	4.2	3.7	6.5	4.1

Source: Own study based on NYU Stern's Volatility Laboratory https://vlab.stern.nyu.edu and on the Eurostat data.

Calculations shown in Table 6 indicate that the greatest challenge to the home country was posed by the problems of Banco Santander S.A. (for Spain) and BNP PARIBAS (for France) as the potential shortfall of own funds of these banks in a crisis situation would exceed 5% of the home country's GDP. Moreover, in both countries (i.e., in Spain and France) the overall shortage of O-SIBs' own funds in a crisis situation would amount to nearly 10% of the home country's GDP. Unfortunately, since the last global financial crisis, the correlation between SRISK to the GDP of the home countries has decreased only temporarily, now nearing the pre-crisis levels. The only material difference between the current situation and the pre-crisis period is the resolution system introduced in the banking union. Its role is to prevent situations where solutions to the problems of EU banks – even the G-SIBs – would require the engagement of public funds. Nonetheless, the effectiveness of the resolution process is often questioned [Kozińska 2018].

2. RISK TRANSFER – CONSEQUENCES FOR HOME AND HOST COUNTRIES

2.1. Risk transfer trends

A thorough analysis of risk transfer within the euro area via systemically important banks further in this article requires that we identify all the banks having their headquarters in the Eurozone, considered as O-SIBs, which at the same time are parent entities or subsidiaries of other banks in a euro area country, considered as O-SIBs (the analysis in section 1 referred only to these O-SIBs which were not subsidiaries of other banks from the Eurozone, considered as O-SIBs). Thus, 14 O-SIBs were identified. They are at the same time parent entities of another 22 O-SIBs. Table 7 shows the geographical structure of this group of 36 banks.

Table 7. O-SIBs being parent entities or subsidiaries of another O-SIB (in the EA)

O-SIB being a parent entity of another O-SIB		O-SIB being a subsidiary of another O-SIB	
Home country	Number of O-SIBs	Home country	Number of O-SIBs
AT	2	SK	2
BE	1	SK	1
DE	1	LU	1
ES	2	PT	2
FR	2	BE	1
		LU	2
		SI	1
GR	2	CY	2
IT	2	SI	2
		SK	1
		AT	1
		DE	1
		IE	1
LV	1	EE	1
		LT	1
NL	1	BE	1
		DE	1

Source: Own study based on the EBA data.

Table 7 indicates that 14 O-SIBs being parent entities of another O-SIB have their headquarters in nine euro area countries, all of which – except Latvia – are 'old EU' countries. On the other hand, in the case of the O-SIBs which are subsidiaries of other O-SIBs, 22 banks have their headquarters in 11 euro area countries, six of which are 'old EU' countries. However, considering the overall number of banks, the discrepancies between the entities from the 'old' and 'new' EU

countries are more profound. Only one bank (out of 14) from a 'new EU' country is a parent entity of another O-SIB, while as many as 11 banks (out of 22) from a 'new EU' country are subsidiaries of other O-SIBs (Table 8).

Table 8. O-SIBs being a parent entity or a subsidiary of another O-SIB at the same time (in 'old' and 'new EU' countries)

O-SIB	Number	EA countries	
		of the 'old EU'	of the 'new EU'
being a parent entity of another O-SIB	of countries	8	1
	of banks	13	1
being a subsidiary of another O-SIB	of countries	6	5
	of banks	11	11

Source: Own study based on the EBA data.

For the purposes of further analysis, the countries indicated in Table 9 as O-SIBs' home countries, being parent entities of another O-SIB, will be called risk exporters while the home countries of the O-SIBs being subsidiaries of another O-SIB will be labelled as risk importers. Hence, Austria, Belgium, Germany, Spain, France, Greece, Italy, Latvia and the Netherlands were included in the first group while Austria, Belgium, Cyprus, Estonia, Ireland, Lithuania, Luxembourg, Germany, Portugal, Slovakia and Slovenia were placed in the second group. Thus, Austria, Belgium and Germany belong to both groups (Table 9).

Table 9. Countries per risk transfer direction

Risk exporting countries	Risk importing countries	Countries exporting and importing risk at the same time
ES, FR, GR, IT, LV, NL	CY, EE, IE, LT, LU, PT, SI, SK	AT, BE, DE

Source: Own study.

2.2. Risk exporting countries

Analysing the systemic risk contribution by the O-SIBs from the euro area countries, which are at the same time parent entities of other O-SIBs in this group of states, we should reiterate that all of them (except for the Latvian "Swedbank" AS) come from the 'old EU' countries although their subsidiaries are located in equal numbers in both 'old' and 'new EU' countries. Therefore, potentially, the risk transfer occurs in one direction: from the 'old EU' countries from the same group to the 'new EU' countries, although it is crucial to verify whether such a transfer actually takes place.

According to the division set out in point 2.1 above, we will first analyse the countries which are exclusive risk exporters, i.e. Spain (Table 10), France (Table 11), Greece (Table 12), Italy (Table 13), Latvia (Table 14) and the Netherlands (Table 15).

Table 10. Spanish O-SIBs which are parent entities of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
Banco Santander S.A.	–	–	3887	4118	4385	4461	4537	4358
	PT	Santander Totta SGPS	1276	1176	1318	1344	1370	1322
CaixaBank S.A.	–	–	796	713	807	776	744	1249
	PT	Banco BPI	857	703	729	738	747	794

Source: Own study based on the EBA data.

For Spanish O-SIBs, it should be noted that although they are parent entities only of two Portuguese O-SIBs, their systemic risk contribution in the home country is substantially bigger than that of other subsidiaries in the systemic risk in Portugal. Therefore, we cannot conclude that there is a systemic risk transfer from Spain to Portugal via the Spanish O-SIBs.

Table 11. French O-SIBs which are parent entities of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
BNP PARIBAS	–	–	2474	2454	2479	2533	2586	2732
	BE	BNP Paribas Fortis SA/NV	2600	2507	2597	2722	2847	2671
	LU	BGL BNP Paribas	n/d	n/d	634	637	640	631
SOCIETE GENERALE	–	–	1948	1960	1877	1828	1778	1696
	LU	Société Générale Luxembourg	n/d	n/d	1474	1496	1517	583
	SI	SKB	n/d	600	630	616	602	575

Source: Own study based on the EBA data.

French O-SIBs are parent entities of four O-SIBs in three smaller euro area countries. Nevertheless, systemic risk contribution of the French O-SIBs in their home country is considerably bigger than the systemic risk contribution via their subsidiaries in Luxembourg and Slovenia. Only in the case of BNP Paribas Fortis SA/NV, which is a Belgian O-SIB and a subsidiary of French BNP PARIBAS, its systemic risk contribution in Belgium is similar to that of its parent entity in France. This means that, from the point of view of national banking supervisory authorities, BNP PARIBAS is equally important in France as it is in Belgium.

Table 12. Greek O-SIBs which are parent entities of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
Alpha Bank S.A.	–	–	n/d	2189	2309	2363	2417	2250
	CY	Alpha Bank Cyprus Ltd	n/d	n/d	569	484	399	342
Eurobank Holdings S.A.	–	–	n/d	2248	2761	2828	2894	2755
	CY	Eurobank Cyprus Ltd	n/d	n/d	1077	1275	1472	1473

Source: Own study based on the EBA data.

In the case of Greek O-SIBs, it should be noted that although they are parent entities of only two Cypriot O-SIBs, their systemic risk contribution in the home country is considerably bigger than that of their subsidiaries in Cyprus. This means that there is no systemic risk transfer from Greece to Cyprus via the Greek O-SIBs.

Table 13. Italian O-SIBs which are parent entities of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
Gruppo Intesa Sanpaolo	–	–	2215	2518	2631	2594	2557	2776
	SI	Intesa Sanpaolo d.d.	n/d	n/d	n/d	n/d	563	535
	SK	Všeobecná úverová banka a.s.	n/d	2155	2067	2344	2214	2275

Unicredit Group	–	–	3844	3454	3429	3314	3199	3199
	AT	UniCredit Bank Austria AG	1985	1223	1181	1147	1112	1172
	DE	Unicredit Bank AG	475	468	469	458	447	447
	IE	UniCredit Bank Ireland plc	510	446	414	n/d	n/d	n/d
	SI	UniCredit	n/d	710	611	596	581	524

Source: Own study based on the EBA data.

Italian O-SIBs, especially Unicredit Group, are much more active on the markets in the other euro area countries than the Spanish or French banks. Two Italian O-SIBs jointly are parent entities of 6 O-SIBs in the other euro area states. However, only in the case of the Sloval Všeobecná úverová banka a.s., its systemic risk contribution in the Italian banking sector is comparable to that of its parent entity (Gruppo Intesa Sanpaolo).

Table 14. Latvian O-SIB which is a parent entity of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
"Swedbank" AS	–	–	n/d	n/d	n/d	n/d	2029	2395
	EE	Swedbank AS	3040	3941	3919	3035	2150	3592
	LT	AB Swedbank	n/d	1894	1965	2094	2222	3188

Source: Own study based on the EBA data.

In the case of the only O-SIB from the 'new EU' country analysed here, i.e., the Latvian "Swedbank" AS, we have to note that the systemic risk contribution via its subsidiaries in other countries (Estonia and Lithuania) is much greater than that of the parent entity in the systemic risk in Latvia. This means that the systemic importance of the subsidiaries in their respective countries is higher than the systemic risk of the parent entity in the home country. Additionally, the fact that the Latvian "Swedbank" AS alone is a subsidiary of the Swedish Swedbank AB means that the banking supervisory authority from outside the Eurozone (Sweden), in terms of systemic risk, has the key impact on O-SIBs from Latvia, Estonia and Lithuania.

Table 15. Dutch O-SIB which is a parent entity of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
ING Bank N.V.	–	–	3825	3970	3991	4009	4027	3949
	BE	ING België NV	1440	1365	1468	1468	1467	1410
	DE	ING DiBa AG	111	143	147	168	189	375

Source: Own study based on the EBA data.

The only Dutch O-SIB, whose subsidiaries are O-SIBs in their own countries, is ING Bank N.V. However, the systemic risk contribution of its subsidiaries in Belgium and in Germany is lower than 40% of the systemic risk contribution of ING Bank N.V. in the Netherlands.

The second group of countries which are risk exporters includes Austria (Table 16), Belgium (Table 17) and Germany (Table 18). However, these countries are also risk importers.

Table 16. Austrian O-SIBs which are parent entities of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
Erste Group Bank AG	–	–	1827	2231	2412	2459	2505	2512
	SK	Slovenská sporiteľňa a.s.	n/d	1702	1798	1778	1623	1769
Raiffeisen Bank International AG	–	–	1134	1795	1740	1785	1829	1835
	SK	Tatra banka a.s.	n/d	1359	1388	1339	1394	1406

Source: Own study based on the EBA data.

Austrian O-SIBs are parent entities solely of O-SIBs from Slovakia although their systemic risk contribution in Slovakia is lower than that of their parent entities in Austria. Nonetheless, it is a substantial risk contribution.

Table 17. Belgian O-SIB which is a parent entity of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
KBC Groep	–	–	2260	2431	2445	2366	2286	2414
	SK	Československá obchodná banka a.s.	n/d	1173	1203	1292	1344	1207

Source: Own study based on the EBA data.

The only Belgian O-SIB, which is a parent entity to another O-SIB from the euro area, is KBC Groep. However, the systemic risk contribution in Slovakia, via its subsidiary Československá obchodná banka a.s., is currently twice smaller than that of KBC Groep in Belgium.

Table 18. German O-SIB which is a parent entity of other O-SIBs in the EA

O-SIB which is a parent entity	O-SIB which is a subsidiary		Basis points					
	Country	Bank	2016	2017	2018	2019	2020	2021
Deutsche Bank AG	–	–	2853	2765	2648	2554	2459	2274
	LU	Deutsche Bank Luxembourg S.A.	n/d	n/d	352	–	–	–

Source: Own study based on the EBA data.

The only German O-SIB being a parent entity of another O-SIB in the euro area was Deutsche Bank AG. However, it should be noted that its Luxembourger subsidiary, Deutsche Bank Luxembourg S.A. was identified as O-SIB only in 2017, while its local systemic risk contribution at that time was seven times lower than that of Deutsche Bank AG in Germany.

2.3. Risk importing countries

As risk transfer has a bilateral character, it has to be assessed also from the point of view of the countries where O-SIBs being subsidiaries of O-SIBs from other euro area countries, have considerable systemic risk contribution. On the basis of the data shown in Tables 11–19, we should identify the O-SIBs being subsidiaries, whose systemic risk contribution constitutes over 50% of the systemic risk contribution of their parent entities in the parent entity's home country. However, due to the changes in the systemic risk contribution of individual O-SIBs in the period under analysis, an arithmetic mean of the basis points for the years 2016–2021 was the point of reference (Table 19).

Table 19. O-SIBs being subsidiaries, whose systemic risk contribution constitutes over 50% of the systemic risk contribution of their parent entities in the parent entity's home country

O-SIB which is a parent entity			O-SIB which is a subsidiary			
Country	Bank	Basis points (mean value)	Country	Bank	Basis points (mean value)	Basis points as % of basis points of parent entity
LV	"Swedbank" AS	2212	EE	"Swedbank" AS	3217	145.4
FR	BNP PARIBAS	2543	BE	BNP Paribas Fortis SA/NV	2657	104.5
LV	"Swedbank" AS	2212	LT	AB Swedbank	2273	102.7
ES	CaixaBank S.A.	847	PT	Banco BPI	761	89.8
IT	Gruppo Intesa Sanpaolo	2549	SK	Všeobecná úverová banka a.s.	2211	86.8
AT	Raiffeisen Bank International AG	1686		Tatra banka a.s.	1377	81.7
	Erste Group Bank AG	2324		Slovenská sporiteľňa a.s.	1734	74.6
FR	SOCIETE GENERALE	1848	LU	Société Générale Luxembourg	1267	68.6
BE	KBC Groep	2367	SK	Československá obchodná banka a.s.	1244	52.5

Source: Own study based on the EBA data.

Analysing the O-SIBs being subsidiaries, whose systemic risk contribution constitutes over 50% of the systemic risk contribution of their parent entities in the parent entity's home country, we should note that in the case of three O-SIBs (Swedbank AS, BNP Paribas Fortis SA/NV and AB Swedbank) it exceeds 100%. This means that these entities pose a greater threat to the national banking system (in Estonia, Belgium and Lithuania, respectively) than their parent entities do in their home countries (in Latvia, France and Latvia, respectively). Moreover, it should be noted that in the case of three countries (Slovakia, Belgium and Estonia), the aggregate risk contribution of the local O-SIBs being subsidiaries of O-SIBs from other euro area countries exceeds 25% (Table 20). In Slovakia, it reaches almost 66%, which means that the key decisions having a direct impact on the level of national systemic risk are taken by the parent entities of the Slovakian O-SIBs from other euro area countries.

Table 20. EA countries per systemic risk contribution via the O-SIBs being subsidiaries of O-SIBs from other EA countries

Country	Aggregate systemic risk contribution of O-SIBs being subsidiaries of O-SIBs from other EA countries (%)
SK	65.7
BE	40.9
EE	32.5
LT	22.7
LU	22.5
PT	20.6
CY	17.7
SI	17.6
AT	11.9
DE	6.5
IE	4.4

Source: Own study based on the EBA data.

It has to be noted, however, that the above O-SIBs, due to the fact that all the euro area countries have to be members of the banking union, are subject to the same Single Supervisory Mechanism. On the other hand, since the work on pillar III of the banking union, i.e., the single deposit guarantee scheme, has not been completed, all these banks are still subject to the national deposit guarantee schemes.

CONCLUSIONS

The analysis and practical application of supervisory and complex measures of identification of systemically important banks, implemented by the FSB and EBA has shown that despite both systems using practically the same identification categories, the results they obtain are not always convergent. All the euro area banks identified by the FSB as G-SIBs have also been identified as O-SIBs in their home countries. However, the differences in the weight of individual categories (including a size of the bank in particular) cause that the analysis of the scores attributed to these banks by the national supervisory authorities in the process of O-SIBs identification indicates not only much bigger discrepancies between their systemic risk contributions but also allows us to conclude that Deutsche Bank AG and BNP PARIBAS pose a greater threat to the global financial system than to their own national (i.e., German and French) banking systems, while for Banco Santander S.A. and ING Bank N.V. this conclusion is opposite (i.e., they pose a lesser threat to the global financial system than to their own national (i.e., Spanish and Dutch) banking systems. Analysing the number of basis points attributed by the national supervisory authorities, the O-SIBs from the euro area countries not identified as G-SIBs, but being parent entities of other O-SIBs from Eurozone, it can be noticed that such banks as Gruppo Intesa Sanpaolo or Eurobank Holdings S.A. have a greater impact on the systemic risk contribution in their home countries than the systemic risk contribution by Deutsche Bank AG or SOCIETE GENERALE, which are identified as G-SIBs. Additionally, application of complex measures, i.e., SRISK, in the process of identification of systemically important banks and referring it for each bank to the level of their home country's GDP suggests that the greatest challenge for the home country would be posed by the problems of Banco Santander S.A. (in Spain) and BNP PARIBAS (in France) since a potential shortfall of their own funds in a crisis situation would exceed 5% of their home countries' GDP. Furthermore, in both countries (i.e., Spain and France), the aggregate shortfall of O-SIBs' own funds in a crisis situation would reach almost 10% of the home country's GDP.

When evaluating the direction and scale of risk transfer via systemically important banks in the euro area, we identified 14 O-SIBs, which are parent entities of other 22 O-SIBs at the same time. A detailed analysis has shown that 14 O-SIBs being parent entities of other O-SIBs have their headquarters in nine euro area countries, all of which – except Latvia – are 'old EU' countries. On the other hand, in the case of O-SIBs being subsidiaries of other O-SIBs, 22 banks from this group have their headquarters in 11 euro area countries, of which six are 'old EU' countries. However, considering the number of banks, discrepancies between the 'new' and 'old EU' countries are more profound. Only one bank (out of 14 in total) from a 'new EU' country is a parent entity of another O-SIB, while as many

as 11 banks (out of 22) from a 'new EU' country are subsidiaries of other O-SIBs. The study of the scale of risk transfer has found that three O-SIBs (Swedbank AS, BNP Paribas Fortis SA/NV and AB Swedbank) pose a greater threat to the national banking systems (in Estonia, Belgium and Lithuania, respectively) than their parent entities do in their home countries (in Latvia, France and Latvia, respectively). Moreover, in the case of three countries (Slovakia, Belgium and Estonia), the aggregate risk contribution by the local O-SIBs being subsidiaries of O-SIBs from other euro area countries exceeds 25%. In Slovakia, it reaches almost 66%, which causes that key decisions having a direct impact on the level of national systemic risk are taken by the parent entities of Slovakian O-SIBs from other euro area countries (only operational decisions are made at domestic level). Results of the above analyses indicate that the main direction of risk transfer via systemically important banks is from the 'old EU' countries to the 'new EU' countries while in the case of three states, the aggregate risk contribution by the local O-SIBs being subsidiaries of O-SIBs from other euro area countries exceeds 25%.

In conclusion, the results of the above analyses contribute to the literature on the subject by indicating the areas of further improvement of identification methods of systemically important banks and in considering their role of a channel of systemic risk between the euro area states. Further development of identification system of systemically important banks has to envisage a more accurate identification of interconnectedness between this type of entities within the euro area. We have to bear in mind, however, that a mere identification of systemically important banks is not sufficient and further research and studies are required to create mechanisms that will realistically limit the risk transfer and trigger the domino effect if one or more of such entities experience problems.

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BANKI SYSTEMOWO WAŻNE – TRANSFER RYZYKA W RAMACH STREFY EURO

STRESZCZENIE

Cel artykułu. Podstawowym celem artykułu jest ocena kierunków i skali transferu ryzyka w ramach strefy euro za pośrednictwem banków systemowo ważnych. W artykule dokonano także krytycznej analizy oraz praktycznego zastosowania nadzorczych i złożonych miar identyfikacji banków systemowo ważnych.

Metoda badawcza. Wpływ transferu ryzyka systemowego za pośrednictwem banków systemowo ważnych dla krajów macierzystych i goszczących zbadano za pomocą nadzorczej miary udziału pojedynczego banku w krajowym ryzyku systemowym. Dodatkowo wykorzystano także model SRISK.

Wyniki badań. Przeprowadzone badania wykazały, że transfer ryzyka potencjalnie ma charakter jednokierunkowy, tzn. z krajów tzw. starej unii do krajów w ramach tej grupy lub do krajów tzw. nowej unii. Zidentyfikowane zostały przy tym trzy banki systemowo ważne, które są większym zagrożeniem dla krajowego systemu bankowego, niż ich podmioty dominujące w swoich krajach. Dodatkowo wykazano, iż w przypadku trzech krajów łączny wkład do ryzyka lokalnych banków systemowo ważnych, będących podmiotami zależnymi banków systemowo ważnych z innych krajów strefy euro przekracza 25%.

Słowa kluczowe: banki systemowo ważne, ryzyko systemowe, strefa euro, SRISK, transfer ryzyka.

JEL codes: G01, G21, G28.