

## DEVELOPMENT OF THE REGULATION INDEX IN THE BANKING MARKET

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**Abstract.** There is significant discussion in the academia and industry regarding over-regulation and under-regulation of the financial markets, in particular, banking markets. One of the key measures in such discussion is the intensity of the regulation. The aim of this paper is to contribute to the discussion with development of the overall Regulation Index by introducing the structure and parameters of such index. Authors review current approaches and perspectives of the assessment of the intensity of regulation and develop new Regulation Index. Index data are used from the World Bank's prepared Bank Regulation and Supervision Survey and the Index of Economic Freedom database. Research methods employed are literature analysis, induction and deduction methods, synthesis, and mathematical analysis. Literature analysis revealed seven key components (building blocks) for the Regulation Index and modelling results revealed the most appropriate set of parameters for those components. Authors set the hypothesis that the order of countries in their stringency of regulatory requirements will be as follows: Germany, UK, USA, Russia. The hypothesis was confirmed in one case and rejected in other cases.

**Keywords:** banking market, banking supervision, economic freedom, government regulation, regulation intensity.

**JEL Classification:** D60, G18.

### Introduction

There is significant discussion in the academia and industry regarding over-regulation and under-regulation of the financial markets, in particular, banking markets. Regulation potentially can have adverse effects on the competition thereby it is important to find the balance between the two. Dangers from overregulation have often been put in the spotlight by market participants (Michel, 2016; Reichwald, 2016), mostly addressing the issue with innovations when regulations scale up. Even some regulators have warned that too complex regulation poses risks for seeing the real risks building in the financial systems (Noonan, 2021). In separate interviews with the Financial Times, Norway and Denmark's financial supervision chiefs address the issue of too complex regulation requiring substantial resources to implement them and manage to see the big picture.

One of the key measures in such discussion is the intensity of the regulation. The aim of this paper is to contribute to the discussion with development of the overall Regulation Index.

Authors review approaches of other researchers, i.e., Kormendi and Meguire (1985), Ram (1986), Alexander (1994), Evans (1997), Kneller, Bleaney and Gemmill (1998), Djankov et al. (2002), Gorgens et al. (2003), Loayza et al. (2004), Djankov et al. (2006), Jalilian et al. (2007), Ciccone and Papaioannuou (2007), Jacobzone et al. (2010), Afonso and Jalles (2011), Agoraki et al. (2011), Delis and Kouretas (2011), Anginer et al. (2014) and Marchionne, Pisicoli, and Fratianni (2022) and develop the Regulation Index from seven key elements – business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, financial freedom and supervision depth. Index data are used from the World Bank's prepared Bank Regulation and Supervision Survey and the Index of Economic Freedom database.

Methodology's validation is performed for European countries, including the Russian Federation (Russia), and the United States of America (USA) as major economy outside of European region. Those countries have selected as they represent different approaches in the regulation of economy and subsequently financial market.

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Authors have set the hypothesis that the order of countries in the decreasing direction of their stringency of regulatory requirements will be as follows: Germany, UK, USA, Russia. The hypothesis is confirmed in the case when all weight of the Regulation Index is put on the World Bank's Bank Regulation and Supervision Survey. In other cases, the hypothesis is rejected.

## 1. Government intervention level measurement approaches

### 1.1. General approaches

Government intervention level depends on the role it has in the economy. Policy Lab of the United Kingdom has developed the framework to describe the roles of government depending on the deepness of intervention (Policy Lab, 2020) with following dimensions (observe the order):

1. Influence,
2. Engage,
3. Design,
4. Develop,
5. Resource,
6. Deliver,
7. Control.

In Figure 1 Policy Lab (2020) has described the types of intervention depending on the deepness of intervention: from stewardship to laws.

When it come to the quantification approaches of government intervention level:

- Mostly historically older research defines the level of intervention from the government spending perspective, e.g., Kormendi and Meguire (1985), Ram (1986), Alexander (1994), Evans (1997), Kneller, Bleaney, and Gemmell (1998), Afonso and Jalles (2011);
- Gorgens et al. (2003), Loayza et al. (2004), Djankov et al. (2006), Jalilian et al. (2007), Jacobzone et al. (2010) developed the regulatory indicator using the data from surveys to construct the indicator values. Some research uses other indicators, like Doing Business, Index of Economic Freedom etc.;
- Djankov et al. (2002) in the case with start-up companies used the number of official procedures to be completed and time taken to assess the regulatory

burden. Time perspective was in the focus of Ciccone and Papaioannou (2007) research when they assessed the time taken to obtain legal status to operate a firm in 1999 as a measure of regulatory burden.

### 1.2. Specific approaches in the financial market

Before 2000s debate about the intervention level in the financial market was more theoretical. In early 2000s the theoretical debate moved into the empirical field thanks to the World Bank's release of Bank Regulation and Supervision Survey data (World Bank, 2001, 2003, 2007, 2011, 2019, 2021). Based on those data and insights Agoraki et al. (2011), Anginer et al. (2014), Delis and Kouretas (2011) observed and evaluated the regulatory environment and developed several indices, which show different angles of the regulatory environment. Below are listed the indices and the main logic of questions from questionnaires or assessment logic relevant for the certain index regarding:

- Capital requirements – here the level of conservatism in the approach of calculating regulatory capital for the purpose of capital adequacy assessment, what is allowed as a capital injection, is assessed;
- Supervisory power – here the ability of supervisor to influence organizational structure, decisions related to capital and insolvency, rights to approach auditors, are assessed;
- Activity restrictions – here the evaluation of bank's restrictions to participate in securities, insurance activities, real estate activities and the ability to own non-financial firms are assessed;
- Market discipline – here the requirements of banks in relation to public disclosures, the consequences for misleading the public etc. are assessed;
- Diversification – here the availability of the explicit, verifiable, and quantifiable guidelines on the asset diversification in the certain jurisdiction and the existence of permission for the banks to issue loans abroad are assessed.

Agoraki et al. (2011), Anginer et al. (2014), Delis & Kouretas (2011) approaches are similar to some extent, however when viewed together the more comprehensive view can be achieved. Marchionne, Pisicoli, and Fraianni (2022) are investigating the banking market and as well are using the approach with indices. They define the Regulation Index as 100 – Financial Freedom Index (Index of Economic Freedom, 2022).

Literature reveals insights into the legal environment banks operate and several dimensions of regulation to be considered in the overarching Regulation Index, e.g., supervisory power, capital requirements.

## 2. Development of the Regulation Index

Reviewing the previous research and research done by authors themselves, the following conclusions have been made by authors:

- The World Bank's Bank Regulation and Supervision Survey gives deep insights into the legal



Figure 1. Types of intervention (source: Policy Lab, 2020)

environment banks operate however other aspects of regulatory realities (specific cultural behaviour of market participants, consumer preferences, everyday interaction with authorities etc.) fall outside of the scope.

- Previous research by authors of development of the categorical scale to assess the government intervention in the financial market is fully based on the World Bank's Bank Regulation and Supervision Survey data thereby there is insufficient coverage of the nuances of regulatory environment (Freimanis & Šenfelde, 2020, 2021). Details about the final questionnaire used in the scale categorization are reflected in the paper of Freimanis and Šenfelde (2021, Appendix Table 1).
- Data from the Index of Economic Freedom (2022) database are useful contributions to the more precise Regulation Index.
- The Regulation Index with values in the range [0; 100] is easier to apply in econometric models as such values are easy to adjust with different scales (real numbers, percentages etc.). This is like the approach of Marchionne, Pisicoli, and Fratianni (2022).

Based on the abovementioned conclusions, the calculation methodology of the Regulation Index has been developed. The Index should include results from the World Bank's Bank Regulation and Supervision Survey and data from the Index of Economic Freedom (2022) database.

In authors' view optimal Regulation Index should include  $n$  components, one of which would be related to the World Bank's Bank Regulation and Supervision Survey and other – to subindices from the Index of Economic Freedom (2022) database, i.e.,

$$RI = a_1 I_1 + \dots + a_n I_n, \quad (1)$$

where:  $RI$  – Regulation Index with values in the range [0; 100],  $a$  – parameter in the range [0; 1];  $I$  – Regulation Index' component.

Parameters  $a_1, \dots, a_n$  are treated as weights which weigh importance for each of the component.

The first component of Regulation Index will be assigned to the World Bank's Bank Regulation and Supervision Survey and thereby could be calculated as follows,

$$I_1 = \frac{m}{23} \cdot 100, \quad (2)$$

where:  $I_1$  – component as expressed in Formula (1),  $m$  – result of categorical scale as per Freimanis and Šenfelde (2020, 2021). Number "23" means total number of questions included in the questionnaire.

Other components  $I_2, \dots, I_n$  subsequently are chosen from the Index of Economic Freedom (2022) database. There are 12 subindices in total in the Index of Economic Freedom covering four areas of economy as follows:

- Rule of Law:
  - Property Rights,
  - Government Integrity,
  - Judicial Effectiveness,

- Government Size:
  - Tax Burden,
  - Government Spending,
  - Fiscal Health,
- Regulatory Efficiency:
  - Business Freedom,
  - Labour Freedom,
  - Monetary Freedom,
- Open Markets:
  - Trade Freedom,
  - Investment Freedom,
  - Financial Freedom.

The area "Rule of Law" in the Regulation Index covering banking market is already fully covered by the World Bank's Bank Regulation and Supervision Survey, which explores the legal environment in every detail. The area "Government Size" is more attributed to the general government and not so directly related to the banking market activities. Meanwhile the areas "Regulatory Efficiency" and "Open Markets" would contribute to the Regulation Index with indicators for specific cultural behaviour of market participants, consumer preferences, everyday interaction with authorities and other aspects falling outside of the scope of the World Bank's Bank Regulation and Supervision Survey. Then Formula (1) would look like this,

$$RI = a_1 I_1 + \dots + a_7 I_7, \quad (3)$$

where:  $I_1$  is as of Formula (2) and

$$I_2 = 100 - \text{Business Freedom}; \quad (4)$$

$$I_3 = 100 - \text{Labour Freedom}; \quad (5)$$

$$I_4 = 100 - \text{Monetary Freedom}; \quad (6)$$

$$I_5 = 100 - \text{Trade Freedom}; \quad (7)$$

$$I_6 = 100 - \text{Investment Freedom}; \quad (8)$$

$$I_7 = 100 - \text{Financial Freedom}, \quad (9)$$

where: *Business Freedom, ..., Financial Freedom* – subindices from the Index of Economic Freedom (2022) database, values in the range [0; 100].

### 3. Validation of the Regulation Index

Methodology's validation is performed for European countries, including the Russian Federation (Russia), and the United States of America (USA) as major economy outside of European region. Further in the tables below selected countries are presented due to space limitations: Germany, the United Kingdom (UK), USA and Russia. The selected countries are chosen as much differing from each other as possible. Other countries are presented in the appendices. Selected countries represent different approaches in the regulation of the economy and subsequently the financial market. From the four selected countries it is expected that the most stringent regulatory requirements will be in Germany, followed by UK, USA and finally the less stringent requirements will be in Russia. Authors have set the hypothesis that the order of

countries in the decreasing direction of their stringency of regulatory requirements will be as follows: Germany, UK, USA, Russia.

The economic basis for the hypothesis is that Germany and USA use different approaches of regulating the economy. Germany has followed the concept of “social capitalism”, which in the economic literature is characterized as the approach where government is very actively regulating the economy. USA vice-versa has followed a more liberal approach. The UK has stayed somewhere in the middle between the two abovementioned countries. Russia however has been less developed in the context of financial markets and their regulation and subsequently it is expected to have less regulatory requirements and associated costs imposed to the banks.

For data validation the results from the latest World Bank's Bank Regulation and Supervision Survey are used (year 2019) and subsequently data corresponding to year 2019 from the Index of Economic Freedom database are matched. Results of the Regulation Index components are presented in Table 1 and results for other European countries are presented in Appendix 1.

Table 1. Regulation Index components for selected countries (source: authors'made based on World Bank, 2019; Index of Economic Freedom, 2022)

Component	Germany	UK	USA	Russia
$I_1$	82.6	69.6	69.6	69.6
$I_2$	16.7	7.1	16.2	21.6
$I_3$	47.2	26.5	10.6	47.5
$I_4$	22.1	18.8	23.4	34.9
$I_5$	14.0	14.0	13.4	22.2
$I_6$	20.0	10.0	15.0	70.0
$I_7$	30.0	20.0	20.0	70.0

Results show that the result from the latest World Bank's Bank Regulation and Supervision Survey ( $I_1$ ) is similar for the UK, USA, and Russia. This underlines the main issue with this survey – it shows that from the legal point of view Russia is on the same level as the UK and USA. This issue then is corrected with relevant economic freedom indices – all of them show higher values for Russia.

When it comes to comparison between Germany, the UK and USA, in almost all cases Germany has higher values, which corresponds to the expectations. The UK and USA have mixed results between them – in some cases the UK has higher values, in other – USA.

For parameter assessment authors compare results with different values of  $a_1$ , when  $a_2$  to  $a_7$  are equivalent. The logic of this approach is that parameters  $a_2$  to  $a_7$  correspond to the economic indices, which have the same weight on the regulatory environment, however the parameter  $a_1$  represents the weight of the World Bank's Bank Regulation and Supervision Survey. Results of this comparison are presented in Table 2 and results for other

European countries are presented in Appendix 2. In essence, this table shows the results from Table 1 in six dimensions – what would happen if parameter values are changed. Of course, there are other combinations possible as well, meanwhile it gives a glimpse of direction where those various combinations lead. If Germany is taken as an example, the following result will be obtained,

$$\begin{aligned}
 RI &= a_1 I_1 + \dots + a_7 I_7 = \\
 &0\% \cdot 82.6 + 17\% \cdot 16.7 + 17\% \cdot 47.2 + \\
 &17\% \cdot 22.1 + 17\% \cdot 14.0 + 17\% \cdot 20.0 + \\
 &17\% \cdot 30.0 = 25.0.
 \end{aligned}
 \tag{10}$$

The same calculation as in Formula (10) is then repeated 180 times with other parameters and other countries. And results are reflected in Table 2 and Appendix 2.

Table 2. Regulation Index for selected countries (source: authors'made based on World Bank, 2019; Index of Economic Freedom, 2022)

Values of $a_1 / a_2 \dots a_7$	Germany	UK	USA	Russia
0% / 17%	25.0	16.1	16.4	44.4
14% / 14%	33.1	23.6	23.9	47.9
25% / 13%	39.4	29.5	29.7	50.7
50% / 8%	53.8	42.8	43.0	57.0
75% / 4%	68.2	56.2	56.3	63.3
100% / 0%	82.6	69.6	69.6	69.6

Results of comparison show that the more important is the result of the World Bank's Bank Regulation and Supervision Survey the more stringent in regulatory requirements becomes Germany. This draws a conclusion that in other aspects of regulation Germany is comparatively less regulated.

The opposite result can be concluded from the data of Russia: other economic indices indicate more restrictions than the World Bank's Bank Regulation and Supervision Survey. The more weight is put on economic indices, the higher the value of the Regulation Index.

The results of the UK and USA in all cases show similarly low regulation level. For these countries economic indices indicate a significantly higher level of freedom.

The hypothesis is confirmed in the case when all weight of Regulation Index is put on the World Bank's Bank Regulation and Supervision Survey. In other cases, the hypothesis is rejected. This result highlights the importance of including the economic indices in the calculation of the Regulation Index.

In authors' view the most appropriate set of parameters for the Regulation Index would be  $\{a_1 = 25\%; a_2 = 13\%; a_3 = 13\%; a_4 = 13\%; a_5 = 13\%; a_6 = 13\%, a_7 = 13\%\}$ . This option would give significant weight to the World Bank's Bank Regulation and Supervision Survey and at the same time seriously consider other economic freedom indices.

## Conclusions

The World Bank's Bank Regulation and Supervision Survey gives deep insights into the legal environment banks operate however other aspects of regulatory realities (specific cultural behaviour of market participants, consumer preferences, everyday interaction with authorities etc.) fall outside of the scope. Data from the Index of Economic Freedom (2022) database are useful contributions to the more precise Regulation Index.

Authors have set the hypothesis that the order of countries in their stringency of regulatory requirements will be as follows: Germany, UK, USA, Russia. The hypothesis is confirmed in the case when all weight of the Regulation Index is put on the World Bank's Bank Regulation and Supervision Survey. In other cases, the hypothesis is rejected. This result highlights the importance of including the economic indices in the calculation of the Regulation Index.

Choice of the parameters is important to get the most appropriate results. In authors' view the most appropriate set of parameters for the Regulation Index would be  $\{a_1 = 25\%; a_2 = 13\%; a_3 = 13\%; a_4 = 13\%; a_5 = 13\%; a_6 = 13\%, a_7 = 13\%\}$ . This option would give significant weight to the World Bank's Bank Regulation and Supervision Survey and at the same time seriously consider other economic freedom indices.

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## Appendix 1

Regulation Index components for European countries (source: authors'made based on World Bank, 2019; Index of Economic Freedom, 2022)

Component/ Country	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$I_7$
Austria	78.3	25.1	31.3	18.5	14.0	10.0	30.0
Bulgaria	73.9	37.3	31.6	12.0	14.0	30.0	40.0
Denmark	52.2	9.3	13.6	15.9	14.0	10.0	20.0
Greece	69.6	25.9	47.5	20.9	19.0	45.0	50.0
Estonia	78.3	24.7	42.8	20.4	14.0	10.0	30.0
Italy	78.3	28.3	48.9	16.0	14.0	15.0	50.0
Latvia	82.6	22.5	26.7	18.9	14.0	15.0	40.0
Luxembourg	78.3	31.2	54.1	17.4	14.0	5.0	20.0
Netherlands	73.9	18.6	39.7	16.0	14.0	10.0	20.0
Portugal	82.6	20.3	55.7	17.0	14.0	30.0	40.0
Slovakia	73.9	38.7	46.6	21.4	14.0	25.0	30.0
Finland	87.0	10.6	49.7	15.2	14.0	15.0	20.0
Hungary	78.3	38.9	35.3	18.2	14.0	20.0	30.0
Sweden	78.3	12.0	46.1	18.0	14.0	15.0	20.0
Belgium	78.3	21.9	39.0	23.9	14.0	15.0	30.0
Czech Republic	87.0	27.6	21.9	18.5	14.0	20.0	20.0
France	73.9	18.8	54.8	20.9	19.0	25.0	30.0
Croatia	82.6	39.3	56.0	21.5	14.0	25.0	40.0
Ireland	73.9	16.9	24.7	13.0	14.0	10.0	30.0
Cyprus	69.6	23.1	40.5	16.0	14.0	25.0	40.0
Lithuania	69.6	24.8	36.4	15.4	14.0	20.0	30.0
Malta	60.9	32.9	38.7	21.8	14.0	15.0	40.0
Poland	60.9	34.6	36.1	17.9	14.0	20.0	30.0
Romania	78.3	36.9	35.5	17.3	14.0	30.0	50.0
Slovenia	82.6	20.7	38.8	16.4	14.0	30.0	50.0
Spain	69.6	33.2	42.2	12.5	14.0	15.0	30.0

## Appendix 2

Regulation Index for European countries (source: authors'made based on World Bank, 2019;  
Index of Economic Freedom, 2022)

Values of $a_1/ a_2...a_7/$ Country	0% / 17%	14% / 14%	25% / 13%	50% / 8%	75% / 4%	100% / 0%
Austria	21.5	29.4	35.7	49.9	64.1	78.3
Bulgaria	27.5	34.0	39.1	50.7	62.3	73.9
Denmark	13.8	19.2	23.4	33.0	42.6	52.2
Greece	34.7	39.6	43.4	52.1	60.9	69.6
Estonia	23.7	31.3	37.3	51.0	64.6	78.3
Italy	28.7	35.6	41.1	53.5	65.9	78.3
Latvia	22.9	31.2	37.8	52.7	67.7	82.6
Luxembourg	23.6	31.3	37.3	50.9	64.6	78.3
Netherlands	19.7	27.3	33.3	46.8	60.4	73.9
Portugal	29.5	36.9	42.8	56.1	69.3	82.6
Slovakia	29.3	35.5	40.4	51.6	62.8	73.9
Finland	20.8	30.0	37.3	53.9	70.4	87.0
Hungary	26.1	33.4	39.1	52.2	65.2	78.3
Sweden	20.9	28.9	35.2	49.6	63.9	78.3
Belgium	24.0	31.6	37.5	51.1	64.7	78.3
Czech Republic	20.3	29.7	37.0	53.6	70.3	87.0
France	28.1	34.5	39.5	51.0	62.5	73.9
Croatia	32.6	39.6	45.1	57.6	70.1	82.6
Ireland	18.1	25.9	32.1	46.0	60.0	73.9
Cyprus	26.4	32.5	37.2	48.0	58.8	69.6
Lithuania	23.4	29.9	35.0	46.5	58.0	69.6
Malta	27.1	31.8	35.5	44.0	52.4	60.9
Poland	25.4	30.4	34.3	43.2	52.0	60.9
Romania	30.6	37.3	42.5	54.4	66.3	78.3
Slovenia	28.3	35.9	41.9	55.5	69.0	82.6
Spain	24.5	30.8	35.8	47.0	58.3	69.6