METHODOLOGY FOR THE ASSESSMENT OF REGULATION COSTS IN THE BANKING MARKET

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Abstract. *Purpose* – In the field of the economics' regulation researchers so far have built the conceptual framework showing how the deadweight loss of market failures decrease and costs of the government intervention increase with the increased level of the government intervention. In order to quantify relationships between the level of intervention, intervention costs and the deadweight loss with econometric models it is important to understand how to quantify the regulation costs as a part of intervention costs. The objective of the research presented in this paper is to find the appropriate methodology for the quantification of the regulation costs in the banking market.

Research methodology – literature review (regarding theories), mathematical methods for quantification and econometric methods for validation purposes.

Findings – research shows that in the assessment of regulation costs three main stakeholders should be included – microprudential regulator, macroprudential regulator and financial regulation's policy maker. Research presents their cost assessment methodology. Its validation shows that in general methodology works as expected, i.e., higher government intervention levels lead to higher regulation costs, however this general rule has exceptions, which in authors' view indicates that other factors have an impact on the cost levels.

Research limitations – research shows how to assess the costs of main stakeholders based on the publicly available information. More precise view could be obtained if in the cooperation with authorities more details on certain cost items are received.

Practical implications – research results will be used to assess all government intervention costs (other positions include compliance costs and other indirect costs) and finalize the quantification of the framework. Quantified framework could be used for more precise policy making regarding the regulation of the banking market.

Originality/Value – research shows how to quantify the regulation costs of the banking market as currently there are only conceptual ideas.

Keywords: banking market, deadweight loss, intervention costs, market regulation, regulation costs.

JEL Classification: D60, G18.

Conference topic: Contemporary Financial Management.

Introduction

When market failure was introduced in the economic science, it was defined as incomplete competition. Later other types of market failures appeared in the scientific discussions, e.g., information failure, externalities etc. Currently market failures are recognized as justification for the government to intervene in the economy. Early thoughts on this intervention did not specify any certain limitations for this intervention. Most recent ideas though recognize importance of assigning limits for the government intervention as it has certain costs. So far the conceptual model (framework) has been built in the science and authors are currently researching on the approaches to quantify this conceptual model.

Government intervention costs have been classified in three categories – regulation costs, compliance costs and indirect costs. In this research paper authors present their approach on quantifying regulation costs. This approach

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includes certain steps in which relevant data and algorithms should be used to arrive to the assessment of given country's regulation cost level. Then methodology's validation is presented combining authors' previously developed methodology for the intervention level assessment and current methodology for the assessment of regulation costs.

1. Government regulation costs: theoretical background

1.1. Market failures

The first author who structured the discussion about market failures was Bator (1958) introducing definitions and types of market failures. Prior to Bator it was more common to discuss each market failure separately, in particular, incomplete competition expressed as the monopoly, e.g., in the work of Harberger (1954). At the moment there are several approaches how to classify market failures. All of them in one or another way include incomplete competition, incomplete information, externalities and public goods. Recently some additions to this list have appeared.

Two types of market failures – externalities and public goods – are often viewed together, e.g., works of Mankiw (2009), Besanko and Braeutigam (2011), Rubinfeld and Pindyck (2013), New South Wales government (NSW, 2017) as they reflect nature of the good. As per Mankiw (2009) an externality arises when a person engages in an activity that influences the well-being of a by-stander and yet neither pays nor receives any compensation for that effect. Public goods are characterized by excludability (whether people can be prevented from using the good) and rivalry in consumption (does one person's use of the good reduce another person's ability to use it). Separately under the topic of market structure another market failure – incomplete competition – is viewed, e.g., works of Mankiw (2009), Besanko and Braeutigam (2011), Jehle and Reny (2011), Rubinfeld and Pindyck (2013), New South Wales government (NSW, 2017). Information asymmetry, which gained its significance with Akerlof's "market for "lemons"" (1970), Spence's "job market's signals" (1973) and Stiglitz's "theory of "screening"" (1975), in the textbooks of microeconomics has received less attention and often is reflected in terms of moral hazard and adverse selection (e.g. Besanko & Braeutigam, 2011; Jehle & Reny, 2011; Rubinfeld & Pindyck, 2013), while policy makers even add to the information asymmetry additional dimension of the information failure, e.g. New South Wales government (NSW, 2017). Rosengard and Stiglitz have named public goods as "incomplete markets" thereby more emphasizing the nature of market failure which has occurred there (Stiglitz, 2000; Rosengard & Stiglitz, 2015). And on top of that they introduced less common market failure "unemployment and other macroeconomic disturbances". Although economists often recognize unemployment as a problem in the economy it is not so common to classify it as a market failure. In authors' view it is related to the fact that market failures are often viewed under the framework of microeconomics however Rosengard and Stiglitz have taken additional macroeconomic perspective there (Stiglitz, 2000; Rosengard & Stiglitz, 2015).

In the financial market a great attention to the theory of market failures has been received after 2008's economic and financial crisis, e.g., in the works of Besley (2010), Allen and Carletti (2013), Grochulski and Morrison (2014). Special attention received necessity for the macroprudential regulation as systemic risks were identified on top of financial risks faced by individual companies (Allen & Carletti, 2013; Grochulski & Morrison, 2014).

1.2. Government regulation

Starting from Keynes (1936) government's role in the regulation of economics has been discussed. In those discussions government's intervention in the economy is justified by market failures that have been occurred (Arrow, 1970, 1985; Shubik, 1970; Ajefu & Barde, 2015). Often normative approach is followed (Rosengard & Stiglitz, 2015), when market failures prescribe what government should do in order to achieve Pareto efficiency in the market. The practical guidance often is provided in various policy documents (see Bjornstad & Brown, 2004; NSW, 2017).

Initially no costs arising from the regulation were considered, however later this perspective appeared. Hertog (2010) in the analysis of previous research revealed three types of costs arising from the regulation (calling them as "intervention costs"): regulatory costs, compliance costs and indirect costs. These costs then were put into the context of welfare loss arising from market failures and the concept of the optimal level of welfare loss control were introduced (see Figure 1).

This concept shows how (a) the deadweight (welfare) loss of market failures decrease and (b) costs of the government intervention increase with the increased level of the government intervention. And in this vizualization it is
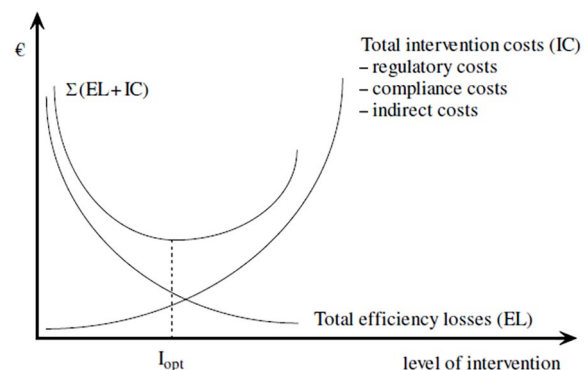

Figure 1. Optimal level of welfare loss control
(source: Hertog, 2010)

clearly shown that it is efficient to mitigate market failure till the point were costs arising from regulations are lower than the deadweight (welfare) loss. Hertog (2010) this point defines as "trade-off" between resources allocated to increasing levels of regulatory intervention and decreasing levels of inefficient firm behaviour.

1.3. Government regulation costs

Hertog (2010) as examples of government regulation costs mentions (a) information gathering costs for decision making on efficient price level for the firm, (b) monitoring costs of firm's behaviour and (c) enforcement of regulation costs. Meanwhile OECD for policy makers developed regulatory cost assessment guidance, which includes taxonomy of regulation costs (see Figure 2).

OECD define regulatory costs as all of the costs attributable to the adoption of a regulatory requirement, whether direct or indirect in nature and whether borne by business, consumers, government and its respective authorities (i.e., taxpayers) or other groups (OECD, 2014). As part of regulatory costs are regulation costs, i.e., costs borne by government. In the Figure 2 it corresponds to the label "Administration & enforcement costs". OECD considers them into the category of compliance costs since they are directly related to the achievement of the underlying regulatory objective and are an unavoidable part of the cost of regulation. In OECD's view relevant cost items here are (a) the costs of publicising the existence of the new regulations, (b) developing and implementing new licensing or registration systems, (c) assessing and approving applications and processing renewals, (d) devising and implementing inspection and/or auditing systems and (e) developing and implementing systems of regulatory sanctions to respond to non-compliance. In recent years OECD has not published any updates regarding abovementioned methodology.
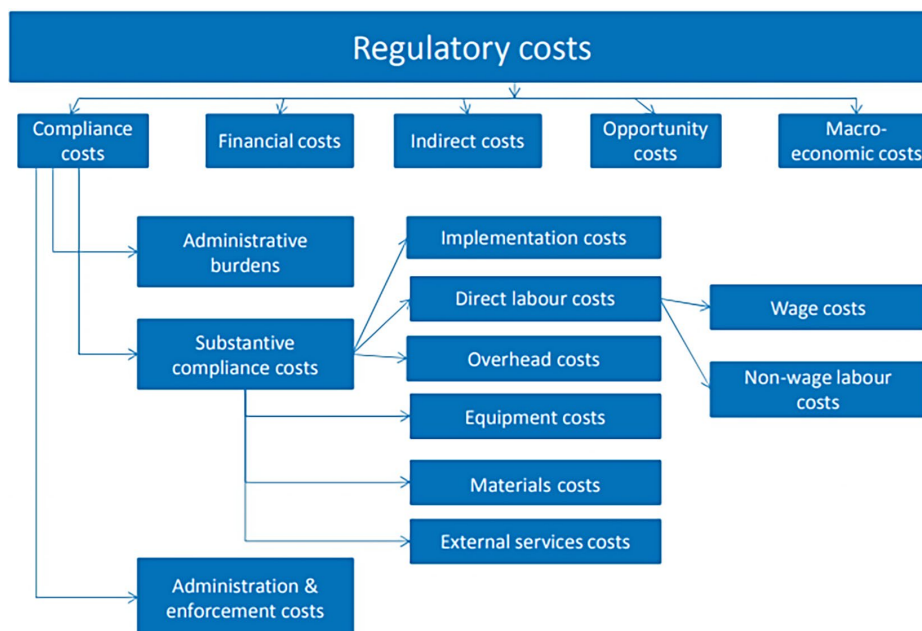

Figure 2. Taxonomy of regulation costs (source: OECD, 2014)

When it comes to the measurement of regulation costs Calomiris, Mamaysky, and Yang (2020) proposed the approach using natural language processing methods to measure the flow of regulation on the basis of the regulation's importance. In authors' view this approach is hard to apply to express the regulation depth in terms of currency.

Other authors have not paid much attention to the topic of government regulation costs. Both in the scientific literature and policy making discussions more focus has been put on the compliance cost assessment for individual firms, e.g., in the analysis done by Simkovic and Zhang (2019) quantification of regulation is done by tallying up the number of employees whose work has to do with regulatory compliance.

2. Regulation costs' assessment in the banking market

2.1. Costs' assessment methodology

Based on the input from previous research described above authors have developed the following regulation costs' assessment process (see Figure 3):
(a) Source Identification phase
    a. Relevant authorities: currently in many countries there have been authorities appointed for microprudential

regulation (firm level financial stability supervision) and macroprudential regulation (industry and economy level financial stability supervision), and authority appointed for policy making in the banking market (usually this authority is responsible for all financial market).

    b. Relevant report: authorities prepare annual budget and/or annual financial report. As a data source annual financial report is preferred as it contains cost numbers referring to the costs actually occurred. For policy makers other approach is developed as publicly is not available information about budget numbers of certain departments within Ministry of Finance.

(b) Cost Selection phase

    a. Relevant cost categories: (a) costs related to labour, including professional development (b) technology costs, (c) professional consultations, (d) public relations and (e) facilities related costs. There could be reasons requiring to exclude some items due to their irrelevance for the purpose of this assessment.

    b. GDP for the year to be researched: this number will be used for further calculations described in the next phase.

(c) Calculation phase

    a. Cost items from reports of microprudential and macroprudential regulators are summed up,

    b. For policy maker the following approach has been developed: total staff costs are multiplied by 1% as on average financial market policy department is one of the 10 policy making departments within the Ministry of Finance and Ministry of Finance is one of the 10 ministries in the government.

    a. Sum of costs are divided by GDP to have possibility to compare countries with different scale. Result is expressed in basis points due to the small number.
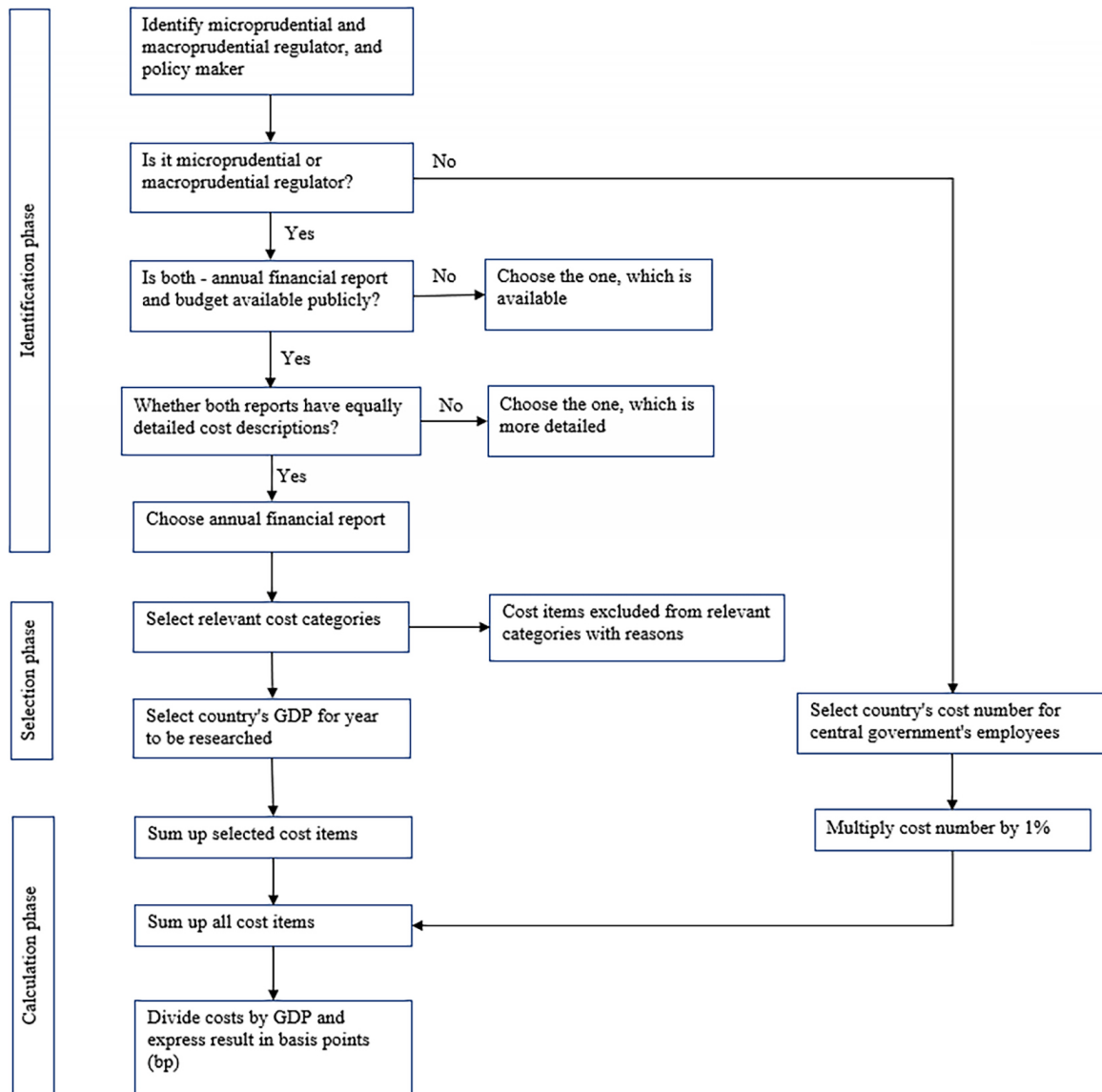

Figure 3. Regulation costs' assessment process flow chart (source: authors made)

2.2. Data for methodology validation

In order to validate the methodology authors combined the concept described in Figure 1 and the process described in Figure 3. Based on previously developed methodology (Freimanis & Šenfelde, 2020) authors have assessed the government intervention level in the countries of the European Union, the United Kingdom, the United States, Canada and Russia (see Table 1). This assessment has been combined with regulation cost assessment to test the function IC in the Figure 1. For this test the following countries were chosen to evaluate different levels of the government intervention: Lithuania (16), Estonia (18), Poland (14), Finland (20), Czech Republic (20), Denmark (12), Croatia (19), France (17). Choice of countries was based on several arguments to capture representative selection:
  (a) countries with different levels of intervention,
  (b) countries with different level of economic development,
  (c) countries with different geographical location,
  (d) for the highest level of intervention two countries were selected as they reported unexpectedly low regulation cost level (see Appendix, Table A1) so it was double-check on the relationship here.

Table 1. Intervention level of selected countries
(authors' made based on the developed methodology and source: World Bank, 2019)

Country	Intervention level, points	Country	Intervention level, points
Austria	18	Belgium	18
Bulgaria	17	**Czech Republic**	**20**
Denmark	**12**	**France**	**17**
Greece	16	**Croatia**	**19**
Estonia	**18**	Ireland	17
Italy	18	Cyprus	16
Latvia	19	**Lithuania**	**16**
Luxembourg	18	Malta	14
Netherlands	17	**Poland**	**14**
Portugal	19	Romania	18
Slovakia	17	Slovenia	19
Finland	**20**	Spain	16
Hungary	18	Germany	19
Sweden	18	United Kingdom	16
United States	16	Canada	14
Russia	16		

Data for methodology validation (process in Figure 3) purposes has been retrieved from:
  (a) relevant Financial Supervisory Authorities home pages (Finanšu un kapitāla tirgus komisija, n.d.; Finantsinspektsioon, n.d.; Komisja Nadzoru Finansowego, n.d.; FIN-FSA, n.d.; Financial Supervision Commission, n.d.; Danish Financial Supervisory Authority, n.d.; Autorité de contrôle prudentiel et de résolution, n.d.),
  (b) central banks home pages (Latvijas Banka, n.d.; Lietuvos Bankas, n.d.; Eesti Pank, n.d.; Narodowy Bank Polski, n.d.; Suomen Pankki, n.d.; Bulgarian National Bank, n.d.; Danmarks Nationalbank, n.d.; Czech National Bank, n.d.; Croatian National Bank, n.d.; Banque de France, n.d.) and
  (c) Eurostat (n.d.-a, n.d.-b) for the financial market policy making authority cost assessment and for GDP data tables in current prices.
In the Selection phase several cost items were excluded from relevant categories due to the following reasons:
  (a) other period cost recharge with no details on reasons (1 case),
  (b) one-off costs not related to business-as-usual (1 case).
Full table with results is enclosed in the Appendix Table A1.

2.3. Function's IC test as methodology validation

Authors based on the table in the Appendix Table A1 run the econometric test on the function IC, which explains relationship between government intervention level and regulation costs. If used polynomial function with order 3, R-squared is exceeding 90% (see Figure 4 and more details in Appendix, Table A2).
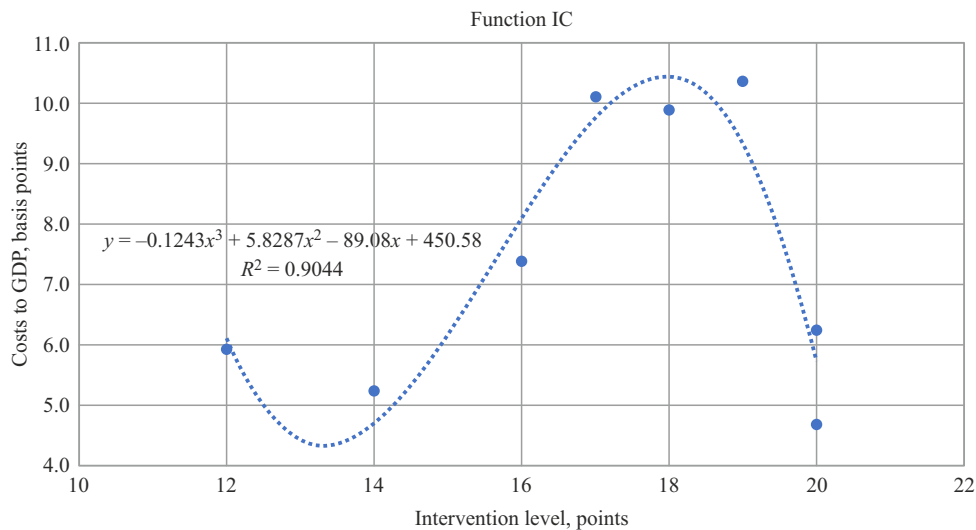
Figure 4. Correlation diagram (source: authors' made)

Function is as follows:

$$y = -0.1243x^3 + 5.8287x^2 - 89.08x + 450.58, \qquad (1)$$

where: y – regulation costs to GDP (basis points); x – government intervention level (points), range [12; 20].

R-squared for this function is 90.44%, all orders of variable x are statistically significant with probability 95% (see p-values in the Appendix Table A2).

Polynomial function with order 3 was suitable for function's assessment taking into account that countries with the highest level of government intervention (Finland, Czech Republic) reported comparably low intervention costs thereby functional relationship in the high-end changed which was not predicted by Hertog (2010). Polynomial function within specified range is the one able to capture such type of relationship.

Conclusions

Research shows that in general methodology works as expected, i.e., higher government intervention levels lead to higher regulation costs however an exception was captured: countries with the highest level of government intervention (Finland, Czech Republic) reported comparably low intervention costs thereby functional relationship in the high-end of government intervention scale changed which was not predicted by Hertog.

Current research has highlighted areas for further research:

(a) the general rule has exceptions, e.g., both Finland and Czech Republic reported unexpectedly low comparable costs of regulation despite high intervention level. In authors' view there are indications of other factors which have major impact on the result. One of them could be recently arising RegTech – technology solutions for more efficient regulator's activities,

(b) Many countries in the Table 1 report the same intervention level which indicates that methodology for intervention level assessment should be made more granular to distinguish countries and better assess function IC.

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APPENDIX

Table A1. Data for methodology validation (year 2019)

2019	Intervention level points	Microprudentional supervisor, mln. EUR	Macroprudentional supervisor, mln. EUR	Policy maker, mln. EUR	Total regulation costs, mln. EUR	GDP at current prices, mln. EUR	Total regulation costs, bp to GDP
Lithuania	16		33.9	2.2	36.1	48 797.4	7.4
Estonia	18	7.0	19.6	1.3	27.8	28 112.4	9.9
Poland	14	37.1	219.9	21.0	278.0	532 329.2	5.2
Finland	20	34.8	108.0	7.4	150.2	240 561.0	6.2
Czech Republic	20		96.9	7.8	104.7	223 950.3	4.7
Denmark	12	54.1	122.2	9.3	185.7	312 747.2	5.9
Croatia	19		53.1	3.0	56.2	54 237.9	10.4
France	17	187.6	2 154.0	107.8	2 449.4	2 425 708.0	10.1

Table A2. Function's IC test

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.951
R Square	0.904
Adjusted R Square	0.833
Standard Error	0.951
Observations	8

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	34.257	11.419	12.613	0.017
Residual	4	3.621	0.905		
Total	7	37.878			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	450.577	108.265	4.162	0.014	149.986	751.167
X Variable 1	–89.080	20.755	–4.292	0.013	–146.703	–31.456
X Variable 2	5.829	1.304	4.471	0.011	2.210	9.448
X Variable 3	–0.124	0.027	–4.628	0.010	–0.199	–0.050