DOI 10.31558/2307-2318.2021.3.2

UDC 336.02
JEL: D60, G18

M. Šenfelde,
Dr. oec., Professor
Riga Technical University, Latvia
ORCID: 0000-0002-3423-3000
maija.senfelde@rtu.lv

K. Freimanis,
PhD student, Scientific Assistant,
Riga Technical University, Latvia
kristaps.freimanis_5@edu.rtu.lv

ASSESSMENT OF COMPLIANCE COSTS IN THE BANKING MARKET

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. 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 market participants' compliance 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 market participants' compliance costs in the banking market.

Research presents bank compliance cost assessment methodology, showing that main components there are operational costs and appropriate parameter representing fraction of operational costs. Methodology's validation shows that in general it works as expected, i.e., higher government intervention levels lead to higher bank compliance costs, at the same time this general rule has some adjustments: when the intervention becomes more intense the cost rise increases.

Research results will be used to assess all government intervention costs (other positions include regulation 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.

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

Figures - 4, tables - 2 and sources of reference - 35.

Formulation of the problem. 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 compliance costs. This approach includes certain steps in which relevant data and algorithms should be used to arrive to the assessment of given country's bank compliance 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 compliance costs.

Research limitations. When it comes to the research limitations, research validation depends on the data available in the Bloomberg database, which mainly covers listed companies. At the same time the Bloomberg database provides exceptional data standardization opportunities, which is important considering changes in the accounting standards over time.

Government regulation costs: analysis of research and publications.

Market failures. The first author who structured the discussion about market failures was Bator (1958) introducing definitions and types of market failures. Now 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 & Braeutigam (2011), Rubinfeld & 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 & Braeutigam (2011), Jehle & Reny (2011), Rubinfeld & Pindyck (2013), New South Wales government (NSW, 2017). Information asymmetry 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; Rosengrad, 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; Rosengrad, Stiglitz, 2015).

In the financial market a great attention to the theory of market failures has been received after 2008's eco-nomic and financial crisis, e.g., in the works of Besley (2010), Allen & Carletti (2013), Grochulski & 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).

Government regulation. Government's role in the regulation of economics has been discussed already from times of Keynes. 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 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).

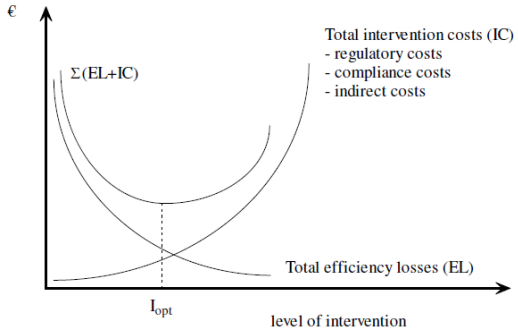

Figure 1. Optimal level of welfare loss control (source: Hertog, 2010)

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 visualization, it is clearly shown that it is efficient to mitigate market failure till the point where 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.

Compliance costs: review of current definitions. Hertog (2010) as examples of compliance costs mentions (a) firm's administration costs (time, effort, and resources) to organize compliance with rules set by government (regulator) and (b) productivity losses. At the same time Hertog points that firm ill behave strategically and conceal or disguise any relevant information for the regulator. Meanwhile OECD for policy makers developed regulatory cost assessment guidance, which includes taxonomy of compliance costs (see Figure 2). This guidance is made for specific regulation assessment however authors review ideas reflected there to reuse them if applicable for total regulation burden assessment.

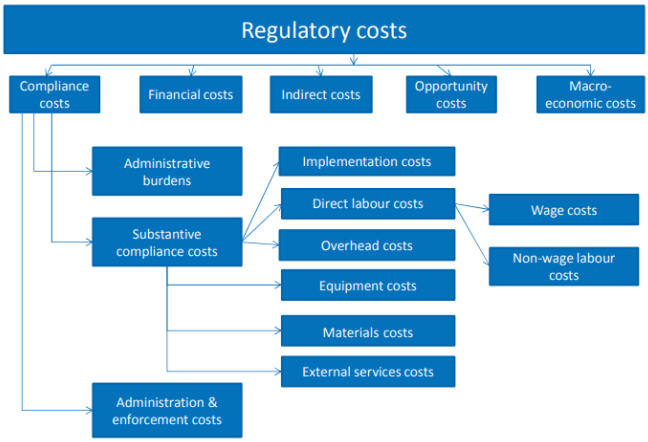

Figure 2. Taxonomy of compliance costs (source: OECD, 2014)

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 compliance costs, i.e., costs that are incurred by businesses or other parties at whom regulation may be targeted in undertaking actions necessary to comply with the regulatory requirements. In the Figure 2 it corresponds to the label "Compliance costs". In OECD's view relevant cost items here are:

(a) the costs of complying with information obligations stemming from government regulation. Information obligations can be defined as regulatory obligations to provide information and data to the public sector or third parties,
(b) implementation costs – the costs regulated entities incur in familiarising themselves with new or amended regulatory compliance obligations, developing compliance strategies and allocating responsibilities for completing compliance-related tasks,
(c) direct labour costs – the costs of staff time devoted to completing the activities required to achieve regulatory compliance. These costs include the cost of wages paid and non-wage labour costs, including pension contributions, sick leave, annual leave, payroll taxes, personal injury insurance,
(d) overheads – the costs of staff supervision/management, rent, office equipment, utilities, corporate overheads, and other inputs used by staff engaged in regulatory compliance activities,
(e) equipment costs – depreciation and amortization of capital equipment needed to comply with regulations, including machinery and software,
(f) materials costs – the incremental costs incurred in changing some of the material inputs used in the production process in order to ensure regulatory compliance and
(g) the costs of external services – the cash cost of payments made to external suppliers that are providing assistance in achieving regulatory compliance.

In recent years OECD has not published any updates regarding abovementioned methodology.

ICF (2019) based on the approach of Renda et al. (2013) developed the following taxonomy of compliance costs:

(a) direct costs:
    a. direct compliance costs, i.e., charges, compliance costs, administrative burdens, supervisory reporting costs,
    b. hassle costs, i.e., corruption, annoyance, waiting time.
(b) indirect costs:
    a. indirect compliance costs,
    b. substitution effects' costs,
    c. transaction costs,
    d. costs of reduced efficiency, competition, innovation.

This research has introduced the division of one-off and ongoing costs of compliance as well. One-off costs are familiarisation with regulation, staff recruitment costs, training of personnel, legal advice, consultancy fees, investment in or updating IT systems, infrastructure costs, development costs, project management and other costs. On-going costs are data collection, data processing and validation costs, information storage costs, ongoing IT costs (maintenance, support, training), infrastructure costs, training of personnel, audit fees and other costs.

Other authors have offered approaches focusing on the assessment of labour involvement in compliance, 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.

Compliance costs: review of current quantification approaches. OECD (2014) has offered following approaches of assessment the selected cost items:

(a) direct labour costs – wage costs are determined by the amount of time taken to complete the required compliance activities and the hourly wage rate of the relevant staff. This approach requires detailed data gathering from the regulated entities,
(b) overheads – 50% of the direct wage costs attributable to regulatory compliance,
(c) equipment costs – estimated the total cost of new equipment purchases prompted by the need to comply with the regulation and discounted by an appropriate percentage amount,
(d) materials costs – market prices for certain products multiplied by relevant quantity. In some cases adjusted market prices can be used in case the regulation causes shift in the product's demand-supply equilibrium,
(e) the costs of external services – the figure from accounting records.

Simkovic and Zhang (2019) quantification approach is to calculate the percentage of an industry's labour costs paid to perform regulation-related tasks.

Regulators assess compliance cost effects based on market surveys, e.g., European Banking Authority's launched questionnaires in 2020 (EBA, 2020) to assess reporting costs. Based on the financial market survey ICF (2019) has found that for banks and financial conglomerates one-off compliance costs are 2,89% of total operating costs and on-going compliance costs – 2.60% of total operating costs.

Compliance costs' assessment methodology in the banking market

Authors' definition. Authors considering approaches of other scientists in this research has chosen to use broader definition of compliance costs – certain fraction of one-off and ongoing operational costs. This approach would be more general and thereby would allow to compare results of different banking market participants.

Quantification approach. Following the definition, costs' assessment formula is set as follows:

$$y_n = (0.2 \cdot \alpha_n + \beta) \cdot x, \qquad n = 1, \ldots, 5 \qquad (1)$$

where y – bank's compliance costs, EUR; x – bank's operational costs, EUR; α – coefficient corresponding to one-off costs; β – coefficient corresponding to ongoing costs.

Parameters α, β should be assessed in each case individually. Coefficient for ongoing costs is expected to be above 0 in all financial reporting years. Coefficient for one-off costs is expected to be above 0 in years when significant regulation has been approved by the regulator:

(a) in the year set as significant,
(b) four following years after the significant year. Such approach is motivated by the fact that major part of one-off costs in the banking sector usually will be related to the IT development, which will be accounted as an asset with depreciation of five years.

Data for methodology validation. To validate the methodology authors combined the concept described in Figure 1 and the formula (1) described in the previous section. The methodology is tested by the largest banks in the Baltic States. Baltic banking market specifics is comparably high integrity level – many banks operate here on pan-Baltic level considering operational and legal models.

Based on previously developed methodology (Freimanis, Šenfelde, 2020) authors have assessed the government intervention level in the Baltic countries (see Table 1). The following adjustments were made to this methodology:

(a) Question No.6 was replaced by "Are the sources of funds to be used as capital verified by the regulatory/ supervisory authorities?" and values "Yes = 1/ No = 0" set,
(b) Question No.7 was replaced by "Can the initial or subsequent injections of capital be done with assets other than cash or government securities?" and values "Yes = 0/ No = 1" set,
(c) Question No.12 was replaced by "Can the supervisory agency supersede bank shareholder rights and declare bank insolvent?" and values "Yes = 1/ No = 0" set.

The full list of questions in the questionnaire is disclosed in the Appendix, Table A1 and all answers are disclosed in the Appendix, Table A2.

Table 1. Intervention level of the Baltic countries (authors made based on previously developed methodology and source: World Bank, 2001, 2003, 2007, 2011, 2019, 2021)

Country	Intervention level, points					
	2001	2003	2007	2011	2019	2021
Lithuania	12	12	14	20	19	19
Latvia	10	12	13	18	20	20
Estonia	16	16	15	20	20	20
Baltic countries (average)	12.7	13.3	14.0	19.3	19.7	19.7

Details on the numbers in the Table 1 are reflected in the Appendix, Table A3. Several adjustments were made in the data as inconsistencies were discovered. Further in the analysis Baltic average figures are used.

Table 1 shows that not all years in the period of 2001 – 2021 are covered. As for further calculation purposes those figures are needed, linear approximation approach has been used by authors, e.g., for year 2002 figure of 13.0 has been calculated using formula: 12.7 + (13.3 – 12.7)/ 2.

Parameters α, β were assumed based on the European financial market survey ICF (2019): α = 2.89%, β = 2.60%. Interpretation of the significant regulation was based on the official European Commission's website stating all basic financial market regulations (European Commission, n.d.). Criteria for the scope of regulations to be reviewed were as follows:

1. Regulation should fall within the period of 2001 – 2021,
2. Regulations should be related to the operations of commercial banks, exceptions included:
   (a) insurance and pensions regulations,
   (b) investments funds regulations,
   (c) general company reporting and auditing requirements.

27 regulations were included in the review. Results show that year 2014 is clearly the exception with the number of regulations that came into force. Thereby in this analysis authors have chosen year 2014 as the significant year.

Compliance costs are used from financial statements of major Baltic banks, based on the data collected by Bloomberg Finance L.P. (n.d.). Data are adjusted to reflect reporting standards as per IFRS 16 by Bloomberg. Time series of major Baltic banks were reviewed, and two banks were chosen for validation based on the conclusions in the Table 2 – Swedbank AB, SEB AB.

Table 2. Choice of banks for validation (authors made based on Bloomberg Finance L.P., n.d.; FKTK, n.d.; Lietuvos bankas, n.d.; Finantsinspektsioon, n.d.)

Major Baltic bank	Criteria for selection			
	Market share > 5%	Data available in Bloomberg	Available > 5 reported years*	Selected for validation
Citadele Banka	Yes	No	-	No
SEB	Yes	Yes	Yes	**Yes**
Swedbank	Yes	Yes	Yes	**Yes**
Rietumu Banka AS	Yes	Yes	No	No
Siauliu Bankas AB	Yes	Yes	No	No
LHV Pank AS	Yes	Yes	No	No
Luminor Bank AS	Yes	Yes	No	No

**Available position "Total Operating Expenses"*

Additionally, authors adjusted data by the inflation rate, calculated from the annual data of Harmonised Index of Consumer Prices, HICP (2015 = 100), collected from the Eurostat (n.d.) for Estonia, Latvia, and Lithuania.

Function's IC test as methodology validation. Authors based on the data described in the previous section run the econometric test on the function IC, which explains relationship between government intervention level and bank's compliance costs. It is expected that relationship of Compliance costs' function will be the same or similar to the function IC.

If used polynomial function with order 3, R-squared is exceeding 90% (see Figure 3 and Figure 4, and more details in the Appendix, Table A4 and Table A5).

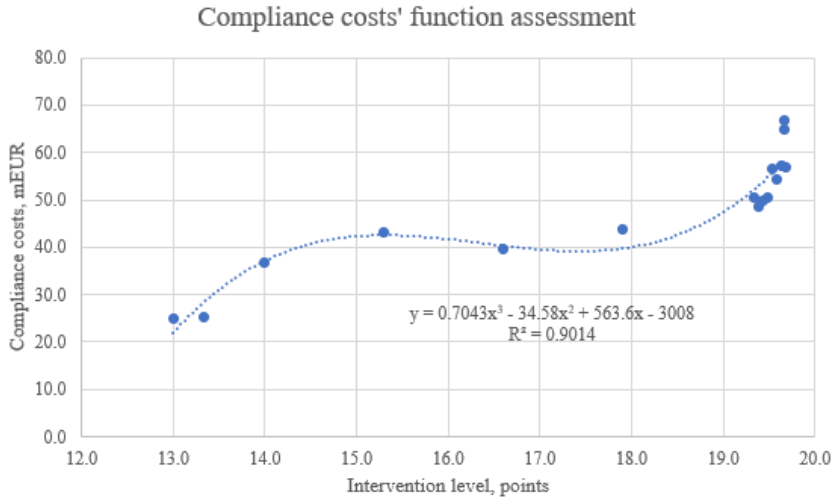

Figure 3. Correlation diagram for Swedbank (source: authors made based on Bloomberg Finance L.P., n.d.; Eurostat, n.d.)

Function is as follows:

$$y = 0.7043x^3 - 34.58x^2 + 563.6x - 3008, \quad (2)$$

where: y – compliance costs, mEUR; x – government intervention level (points), range [12; 20].

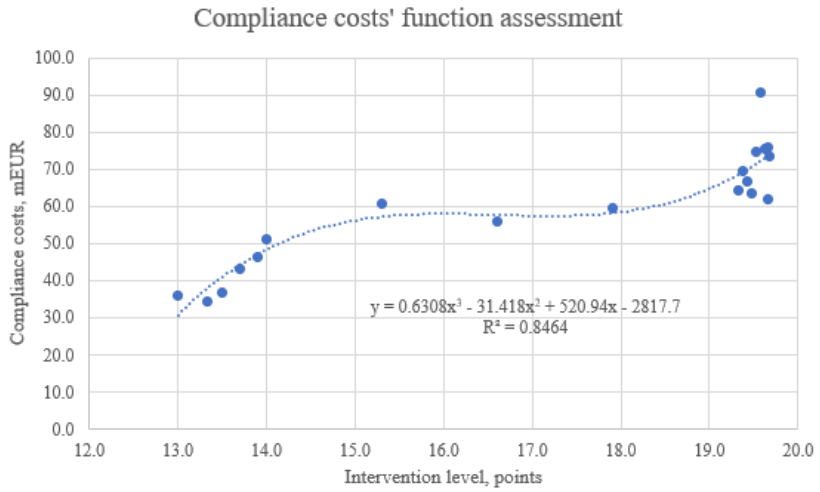

Figure 4. Correlation diagram for SEB (source: authors made based on Bloomberg Finance L.P., n.d.; Eurostat, n.d.)

Function is as follows:

$$y = 0.6308x^3 – 31.418x^2 + 520.94x – 2817.7, \quad (3)$$

where: y – compliance costs, mEUR; x – government intervention level (points), range [12; 20].

R-squared for the function is 90.14% (Swedbank) and 84.64% (SEB), all orders of variable *x* are statistically significant with probability 94 – 95% (see p-values in the Appendix, Table A4 and Table A5). Polynomial function with order 3 was suitable for function's assessment considering that increase in the intervention level did not immediately result in the compliance cost increase. Relationship in broad terms is like what Hertog (2010) predicted however additional insights have been observed – when the intervention becomes more intense the cost rise increases. Polynomial function within specified range is the one able to capture such type of relationship.

Conclusions. Authors have made following conclusions to the research conducted: (a) in general methodology works as expected, i.e., higher government intervention levels lead to higher compliance costs, (b) additional insight was captured: when the intervention becomes more intense the cost rise increases, (c) methodology validation identified econometric equations with the determination coefficient (R-squared) above 84% and statistical significance of variables above 94%.

Current research has highlighted areas for further research: (a) other European countries could be validated, especially those with large banks reported by Bloomberg, (b) methodology for the intervention level assessment could be made even more granular to better assess the function IC.

Disclosure statement. Authors declare that they do not have any competing financial, professional, or personal interests from other parties.

REFERENCES

Ajefu, J. B., & Barde, F. (2015). Market efficiency and government intervention revisited: What Do recent Evidence Tell Us? *Journal of International Business and Economics*, *3*(1), 20–23. https://doi.org/10.15640/jibe.v3n1a3

Allen, F., & Carletti, E. (2013). Systemic risk from real estate and macro-prudential regulation.

International Journal of Banking, Accounting and Finance, *5*(1/2), 28–48. https://doi.org/10.1504/IJBAAF.2013.058091

Arrow, K. J. (1970). The organization of economic activity: Issues pertinent to the choice of market versus nonmarket allocation. Public expenditure and policy analysis. Chicago: Rand MacNally College Publishing Company, 67–81.

Arrow, K. J. (1985). The potentials and limits of the market in resource allocation. In G. R. Feiwel (Ed.), Issues in Contemporary Microeconomics and Welfare (pp. 107–124). Palgrave Macmillan, London. https://doi.org/10.1007/978-1-349-06876-0_2

Bator, F. M. (1958). The anatomy of market failure. *The Quarterly Journal of Economics*, *72*(3), 351–379. https://doi.org/10.2307/1882231

Besanko, D., & Braeutigam, R. (2011). *Microeconomics* (4th ed., parts 1, pp. 4–7). United States: John Wiley & Sons, Inc.

Besley, T. (2010). How do market failures justify interventions in rural credit markets? *The World Bank Research Observer*, *9*(1), 27–47. https://doi.org/10.1093/wbro/9.1.27

Bjornstad, D. J., & Brown, M. A. (2004). *A market failures framework for defining the government's role in energy efficiency*. Joint Institute for Energy and Environment, JIEE 2004-02.

Bloomberg Finance L.P. (n.d.). *Financial statements of Swedbank AB, Siauliu Bankas AB, SEB AB, Rietumu Banka AS, Luminor Bank AS, LHV Pank AS*. Retrieved from Bloomberg database.

EBA (2020). *Explanatory note to the EBA study of institutions' reporting costs under Article 430(8) CRR*. European Banking Authority, 22 July 2020. Retrieved from https://www.eba.europa.eu/regulation-and-policy/supervisory-reporting/cost-compliance-supervisory-reporting

European Commission (n.d.). *EU banking and financial services law*. Retrieved from https://ec.europa.eu/info/law/law-topic/eu-banking-and-financial-services-law_en

Eurostat (n.d.). *Harmonised Index of Consumer Prices*. Retrieved from https://ec.europa.eu/eurostat/data/database

Finantsinspektsioon (n.d.). *The Estonian Financial Services Market as at 31 December 2020*. Retrieved from https://www.fi.ee/en/publications/estonian-financial-services-market-31122020#h2-1

FKTK (n.d.). *Reports of the credit institutions*. Retrieved from https://www.fktk.lv/statistika/kreditiestades/publiskie-ceturksna-parskati-banku-dalijuma/

Freimanis K., Šenfelde M. (2020). *Approach of Scaling the Level of Government Intervention in the Financial Market*. 11th International Scientific Conference, electronic proceedings of VGTU, 2020, Vilnius, Lithuania. https://doi.org/10.3846/bm.2020.591

Hertog, J. (2010). *Review of economic theories of regulation* (Discussion Paper Series 10–18). Tjalling C. Koopmans Research Institute.

ICF (2019). *Study on the costs of compliance for the financial sector*. European Commission, ISBN 978-92-79-81800-4, doi:10.2874/068657

Grochulski, B., & Morrison, W. (2014). *Understanding market failure in the 2007–08 Crisis*. Economic Brief of Federal Reserve Bank of Richmond, EB14–12.

Jehle, G. A., & Reny, P. J. (2011). *Advanced microeconomic theory* (3rd ed., chapters 4, 8). United Kingdom: Pearson Education Limited.

Lietuvos bankas (2020). *Bank Activity Review*. Retrieved from https://www.lb.lt/en/reviews-and-publications/category.39/series.171?category=&series=&ff=1

Mankiw, N. G. (2009). *Principles of microeconomics* (5th ed., parts 2–5). United States: South-Western Cengage Learning.

NSW. (2017). *Market failure guide. A guide to categorising market failures for government policy development and evaluation*. State of New South Wales through Department of Industry.

OECD (2014). *OECD (Organisation for Economic Co-operation and Development) Regulatory Compliance Cost Assessment Guidance*. OECD Publishing. http://dx.doi.org/10.1787/9789264209657-en

Renda, A. et al. (2013). *Assessing the costs and benefits of regulation*. Study for the European Commission, Secretariat General. Retrieved from https://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/131210_cba_study_sg_final.pdf

Rosengard, J. K., & Stiglitz, J. E. (2015). *Economics of the public sector* (4th ed., chapter 4). New York: W. W. Norton & Company, Inc.

Rubinfeld, D. L., & Pindyck, R. S. (2013). *Microeconomics* (8th ed., parts 1, 4). United States: Pearson Education, Inc.

Shubik, M. (1970). On different methods for allocating resources. *KYKLOS*, 23(2) 332–337. https://doi.org/10.1111/j.1467-6435.1970.tb02562.x

Simkovic, M., & Zhang, M.B. (2019). *Measuring Regulation*. Summer Institute 2019 Law and Economics, conference proceedings, 2019, Boston, USA. Retrieved from http://conference.nber.org/conf_papers/f125600.pdf

Stiglitz, J. E. (2000). *Economics of the public sector* (3rd ed., chapter 4). New York: W. W. Norton & Company, Inc.

World Bank. (2001, 2003, 2007, 2011, 2019, 2021). *Bank regulation and supervision survey*. The World Bank. https://www.worldbank.org/en/research/brief/BRSS

М. Шенфелде, К. Фрейманис

ОЦЕНКА ЗАТРАТ НА СОБЛЮДЕНИЕ ТРЕБОВАНИЙ НА БАНКОВСКОМ РЫНКЕ

В области регулирования экономики исследователи до сих пор создали концептуальную основу, показывающую, как уменьшаются безвозвратные потери рыночных сбоев и увеличиваются затраты на государственное вмешательство с увеличением уровня государственного вмешательства. Для количественной оценки взаимосвязи между уровнем вмешательства, затратами на вмешательство и безвозвратными потерями с помощью эконометрических моделей важно понимать, как количественно оценить затраты участников рынка на соблюдение требований как часть затрат на вмешательство. Целью исследования, представленного в этой статье, является поиск подходящей методологии для количественной оценки затрат участников рынка на соблюдение требований на банковском рынке.

В исследовании представлена методология оценки затрат банка на соблюдение нормативных требований, показывающая, что основными компонентами являются операционные расходы и соответствующий параметр, представляющий долю операционных затрат. Проверка методологии показывает, что в целом она работает, как ожидалось, то есть более высокие уровни государственного вмешательства приводят к более высоким расходам банка по соблюдению нормативных требований, в то же время это общее правило имеет некоторые корректировки: когда вмешательство становится более интенсивным, возрастает рост затрат.

Результаты исследования будут использоваться для оценки всех затрат на государственное вмешательство (другие позиции включают затраты на регулирование и другие косвенные затраты) и завершения количественной оценки структуры. Количественная структура может быть использована для более точной разработки политики в отношении регулирования банковского рынка.

***Ключевые слова**: банковский рынок, безвозвратные потери, затраты на вмешательство, регулирование рынка, затраты на соблюдение требований.*

APPENDIX

Table A1. Adjusted scaling of the level of government intervention (source: authors' made based on previously developed methodology and source: World Bank, 2021)

Question	Score
Capital requirements index	
1. Is the minimum required capital asset ratio risk-weighted in line with Basel guidelines? Is capital adequacy assessed based on Basel I, Basel II or Basel III?	Yes = 1 No = 0
2. Does the ratio vary with market risk? Whether regulatory minimum capital requirements cover credit, market, operational and other risks?	Yes = 1 No = 0
3. Before minimum capital adequacy is determined, whether this item is deducted from the book value of capital: market value of loan losses not realized in accounting books? Is the following item deducted from Tier 1 regulatory capital: unrealized losses in fair valued exposures?	Yes = 1 No = 0
4. Before minimum capital adequacy is determined, whether this item is deducted from the book value of capital: unrealized losses in securities portfolios? Is the following item deducted from Tier 1 regulatory capital: investment in the capital of certain banking, financial and insurance entities which are outside the scope of consolidation?	Yes = 1 No = 0
5. Before minimum capital adequacy is determined, whether this item is deducted from the book value of capital: Unrealized foreign exchange losses? Is the following item deducted from Tier 1 regulatory capital: gain on sale related to securitisation transactions?	Yes = 1 No = 0
6. Is Tier 3 capital legally allowed in regulatory capital? **Are the sources of funds to be used as capital verified by the regulatory/ supervisory authorities?**	**Yes = 1** **No = 0**
7. Is leverage ratio applicable to the bank? **Can the initial or subsequent injections of capital be done with assets other than cash or government securities?**	**Yes = 0** **No = 1**
8. Can initial disbursement of capital be done with borrowed funds? Is Tier 2 capital legally allowed in regulatory capital?	Yes = 0 No = 1
Supervisory power index	
9. Can supervisors take legal action against external auditors for negligence? In cases where the supervisor identifies that the bank has received an inadequate audit, does the supervisor have the powers to take actions against bank or external auditor?	Yes = 1 No = 0
10. Are off-balance sheet items disclosed to supervisors?	Yes = 1 No = 0
11. Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses?	Yes = 1 No = 0
12. Is court approval required to supersede bank shareholder rights? **Can the supervisory agency supersede bank shareholder rights and declare bank insolvent?**	**Yes = 1** **No = 0**
13. Does the banking supervisory agency have a specific mandate set out in written form for the prevention of financial crime (anti-money laundering / combating financing of terrorism)?	Yes = 1 No = 0
14. Are Fit and proper requirements for the Board and senior management mandatory?	Yes = 1 No = 0
Market discipline index	
15. Is subordinated debt allowable (or required) as part of capital? Is subordinated debt allowed as part of Tier 1 capital?	Yes = 0 No = 1
16. Are financial institutions required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries? Are banks required to prepare consolidated accounts for accounting purposes?	Yes = 1 No = 0

Question	Score
17. Are off-balance sheet items disclosed to public?	Yes = 1 No = 0
18. Must banks disclose their risk management procedures to public?	Yes = 1 No = 0
19. Are directors legally liable for erroneous/ misleading information?	Yes = 1 No = 0
20. Do regulations require credit ratings for commercial banks?	Yes = 1 No = 0
21. Is an external audit by certified/licensed auditor a compulsory obligation for banks? Is an audit by a professional external auditor required for all banks in your jurisdiction?	Yes = 1 No = 0
22. Is there an explicit deposit insurance protection system?	Yes = 1 No = 0
Diversification index	
23. Are there explicit, verifiable, and quantifiable guidelines regarding asset diversification? Are there any regulatory rules or supervisory guidelines regarding asset diversification?	Yes = 1 No = 0

Table A2. Answers on the questions of the questionnaire (source: authors' made based on the World Bank, 2001, 2003, 2007, 2011, 2019, 2021)

	2001			2003			2007			2011			2019			2021		
	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE
1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	No	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	No	Yes	No	No	Yes	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No
8	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No
9	No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No
13	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
14	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No
16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
21	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	No	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No	No	Yes	No

No answer provided, authors' view reflected, which is based on the data in 2003 or regulation was not in force at that time
Inconsistent values, value changed to the opposite
Inconsistent values, however no changes done

Table A3. Full disclosure of the intervention level measured in points

	2001			2003			2007			2011			2019			2021		
	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE	LT	LV	EE
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
3	0	0	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1
4	1	0	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1
5	1	0	1	0	0	1	0	0	1	0	0	0	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	0	0	1	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1
8	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1	1
9	0	0	1	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	0	0	1	1	0	1	1	0	1	1	0	0	1	0	0
13	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	1
14	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
15	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	0	0	0	1	0	1	1	0	0	1	0	0	0	1	0	0	1	0
	12	10	16	12	12	16	14	13	15	20	18	20	19	20	20	19	20	20
Average BAL		**12.7**			**13.3**			**14.0**			**19.3**			**19.7**			**19.7**	

Table A4. Function's IC test (Swedbank)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.949
R Square	0.901
Adjusted R Square	0.877
Standard Error	4.281
Observations	16

ANOVA

	df	*SS*	*MS*	*F*	*Signifi-cance F*
Regression	3	2 011.177	670.392	36.577	0.000
Residual	12	219.937	18.328		
Total	15	2 231.115			

	Coeffi-cients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept	-3 008.045	920.325	-3.268	0.007	-5 013.262	-1 002.829	-4 648.329	-1 367.761
X Variable 1	563.602	171.780	3.281	0.007	189.325	937.880	257.441	869.764
X Variable 2	-34.580	10.570	-3.272	0.007	-57.610	-11.551	-53.419	-15.742
X Variable 3	0.704	0.214	3.284	0.007	0.237	1.172	0.322	1.086

Table A5. Function's IC test (SEB)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.920
R Square	0.846
Adjusted R Square	0.816
Standard Error	6.671
Observations	19

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	3 679.205	1 226.402	27.559	0.000
Residual	15	667.513	44.501		
Total	18	4 346.718			

	Coeffi-cients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept	-2 817.700	1 345.377	-2.094	0.054	-5 685.303	49.903	-5 176.214	-459.186
X Variable 1	520.940	250.645	2.078	0.055	-13.298	1 055.178	81.546	960.334
X Variable 2	-31.418	15.406	-2.039	0.059	-64.254	1.419	-58.424	-4.411
X Variable 3	0.631	0.312	2.019	0.062	-0.035	1.297	0.083	1.178