



MS thesis
in Financial Economics

Determinants of corporate performance in Iceland

What make good companies great in a turbulent economy?

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Department of Economics

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HÁSKÓLI ÍSLANDS

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Preface

This thesis is a 30 ECTS final project for MS degree in the Department of Economics at the University of Iceland. Advisor of this project was Ph.D. Ásgeir Jónsson, Assistant Professor at the University of Iceland. I thank him for his excellent guidance and his suggestions with the construction of paper.

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Abstract

Since the middle of the 20th century, many theories on corporate performance have been developed and tested. However, most of analytical papers examine corporate performance determinants with respect to one single selected theory. And, not many of them take into consideration the full set of variables (macro-, micro- and organizational) presenting the complete picture of factors affecting corporate performance. As well, the most of previous work is based on data set for big economies. To my knowledge, it is the first analytical analysis of this type for the Icelandic economy. The aim of this thesis is to examine a variety of factors affecting ROA during expansion period, during recession period and during the period of 2005 – 2011. By the end of this research, I will be able to answer the following question: "What make good companies great in a turbulent economy?" This research is based on a dataset received from the Creditinfo Group hf., which I used in the organizational model; and data from Statistics Iceland, Landsbankinn and CBI, which I used in the economic model.

The main result of this research is – corporate performance in Iceland is greatly dependent on macro-economic variables, which are outside of firm's control. Moreover, "great" corporation in Iceland has a high degree of market power and competitive advantage, and is able to sustain them. As well, it minimizes agency costs, has increasing transaction costs, younger CEO and small Board of Directors. However, it doesn't matter how great corporation is; it is not able to reduce extremely negative impacts of ISK volatility and growth of private consumption.

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1 Introduction

In this paper I want to examine the performance of relatively well-performing corporations during the period of 2005 – 2011; which factors were affecting it and to what significance. The main aim of the research is to answer the question: "What make good companies great in a turbulent economy?"

In the second part, the main performance measurements are identified: earnings-based and process-based. Earnings-based performance measurements consist from financial indicators: traditional and modern. And, process-based frameworks consist from financial and non-financial indicators. Moreover, I will review advantages and disadvantages of described performance indicators and frameworks for the researcher.

In the third part, I will explain for whom and why corporate performance is important on basis of shareholders and stakeholders models.

In the fourth part, I will review factors affecting corporate performance from theoretical perspectives. In the first chapter of that part, I will take a look at institutional theory. According to this theory, social infrastructure (institutions and policies) affects private and social returns to activities. On the basis of past corporate returns, a corporation will choose future activities: investment, production or rent seeking. As a result, future corporate performance will be affected by that choice. Social infrastructure may be separated into three main groups: government's fiscal policy; environment, where private decisions are made in and government's rent-seeking behavior. In the second chapter of fourth part, I will take a closer look at technological theory, developed by Porter. According to this theory, competitive advantage of any given firm is the main determinant of corporate performance. Industry structure and firm's positioning within the industry are the source of such competitive advantage. Industry structure (buyer power, threat of substitutes, threat of new entrants and entry barriers) affects it's profitability; and firm's positioning within the industry (supplier power) is affected by firm's economies of scale and scope of physical and human capitals. The third and final chapter of fourth part will review organizational theories. These theories explain how organizational architecture affects corporate performance. There are three main theories: agency cost, transaction cost and competency theories.

Agency cost theory is based on the principal-agent problem and explains how asymmetric information within a firm may increase the agency cost, which will result in less than optimal corporate performance. Transaction cost theory explains how market making costs (internal and external) may affect firm's choice of its activities. Internal costs are based on firm's production process and are predictable by firm's decision-makers. On another hand, external costs may vary unpredictably due to various factors, affecting corporate performance negatively. Competency theories explain how collection of human capital within any firm affects corporate performance. An increase in human capital is achievable through R&D, specialization and collective learning.

In the fifth part, I will take a look at historical development of macro- and micro-economic environment in Iceland during expansion period of 2005 – 2007, banking and BoP crises in 2008 and recession period of 2009 – 2011. The first chapter of sixth part will review factors which led Iceland towards the 2008 crises: financial liberalization and globalization, fiscal and monetary expansions, the ISK index appreciation and high CBI interest rates, which led to further ISK appreciation; and a boom in asset- and construction-markets. The second chapter will explain banking and BoP crises' development, and credit- and asset-markets bursts; which led to the 2008 recession in Iceland and worldwide. In the third chapter, we will see how loss of confidence by foreign investors, high inflation rate and depreciated ISK index affected public and private consumptions, the GDP growth rate and the unemployment rate. In the fourth chapter, I will review Icelandic industries' development during the period of 2005 – 2011. Industries will be compared by: number of enterprises, aggregate profitability, average profitability per firm, and aggregate equity ratios in them.

In the sixth part, I will explain the process and the method employed in this research. Furthermore, I will develop the economic research model, based on institutional and technological theories; and organizational research model based on organizational theories. These models will be used for selection of performance determinants and will give predictions for expected research results. The integrated model will incorporate most significant performance determinants from economic and organizational models. Finally, I will describe shortcomings of this research.

In the seventh part, I will present sample description of empirical research; descriptive statistics and correlation matrices for dependent and independent variables

from economic and organizational models during expansion period, recession period and the full period of 2005 – 2011 (2008 will be omitted from the research due to high volatilities in internal financial markets).

In the eighth part, I will present results of empirical research for economic and organizational models during expansion period, recession period and the full period of 2005 – 2011. These results will be used to analyze determinants of corporate performance from two different perspectives: environmental change and external determinants' versus internal determinants' importance. Later, I will present results of empirical research for the integrated model for the full period of 2005 – 2011. These results describe most important determinants for corporate performance in the complicated Icelandic economic environment.

In the ninth part, I will discuss and compare how determinants and their importance were changing. As well, I will discuss some possible policies for greater corporate performance in Icelandic environment.

I will finish the paper by presenting the research conclusion.

2 The evolution of performance measurement

2.1 Definition of performance measurement

The performance measure or framework can be defined as a metric or the set of metrics used to quantify efficiency and/or effectiveness of corporate operations. The performance measure should be multi-dimensional. It should include financial and non-financial indicators, and internal and external indicators. It should be based on the past performance (results) and should help to predict the future performance (with the help of main drivers of performance).

The performance measurement depends on the corporation's environment (internal and external) in the past and will influence the corporation's environment (internal and external) in the future. Because of that, it is used in control and planning systems of given corporation.

In other words, the performance measure should provide a balanced picture of corporation across all divisions and through its hierarchy for all interested parties.

2.2 Indicators and frameworks of corporate performance measurement

According to Johnson (1981) the first recorded use of performance measurement could be found in the Medici accounts. Early accounting systems (in double entry form) were used to trace transactions in accounts (costs of produced goods/services and prices of sold goods/services), even before industrial revolution started.

However, during and after industrial revolution, accounting techniques became more and more sophisticated due to higher complexity of external and internal transactions. According to Johnson (1972), in the eighteenth century big industrial corporations began to use such techniques as standard costing, variance analysis, return on investment and many others well known today financial ratios.

There were developed traditional measurements of corporate performance, during that period. Traditional measurements are earnings-based and are used to measure financial performance of corporations based on their historic data from the near-past. Various rates of returns such as ROA (the rate of return on assets), ROE (the rate of return on equity) and ROI (the rate of return on investment) should be mentioned, as

examples of such traditional indicators. Others broadly used ratios such as gross profit margin, net profit margin, debt ratio, and the current ratio belong to this group, as well.

During the 60's and all away to the 80's, the other kind of indicators was developed, which is now referred to as modern and concentrate on future value creation. Modern indicators of performance measure financial performance, as well. However, they are more relevant for shareholders of corporation and are less relevant for others parties that are involved in operations of corporation. This approach takes into consideration not only the return on invested capital, but the cost of invested capital, as well.

Beginning for modern indicators was set in 1930, when Fisher introduced the DCF (discounted cash flow) model, which resulted into the FCF (free cash flow) model. Later on in 1961, Miller and Modigliani introduced the capital structure theorem and a year later, Gordon incorporated the growth rate in the FCF model. These works were followed by cost of capital theory, which was developed by Lintner (1965). These theories gave rise to value-based indicators measuring financial performance, but take into consideration future growth opportunities for the relevant period, as well. SVA (shareholder value added), EVA (economic value added), EP (economic profit), EPS (earnings per share), CFROI (cash flow return on investment) and the dividend yield should be mentioned, as examples of such modern indicators.¹

By the end of the 80's, more and more often traditional and modern indicators became criticized, because it was difficult to adapt them under the business environment, which was rapidly changing: changes in costs of labor; increasing competition; demand for higher quality of goods; importance of human capital, international trade and rapid development of informational technology. Corporate world was in need of more balanced measurements of corporate performance.

There was introduced the process-based approach to measure corporate performance, as a response to that need. This approach is based on the corporation's manufacturing strategy and employs both financial and non-financial indicators. These indicators may vary between different departments of same corporation and may

¹ Maditinos, D. I.; Sevic, Z. and Theriou, N. G. (2005, July). *Performance measures: traditional accounting measures versus modern value-based measures. The case of earnings and EVA in the Athens Stock Exchange (ASE)*. Pp. 3.

change as the business environment changes. There are different variations of that approach.

The most popular framework of this approach is the balanced scorecard (Kaplan and Norton, 1996); another – the performance measurement matrix (Keegan, Eiler and Jones, 1989). Both frameworks evaluate combined internal and external, financial and non-financial performance of corporation. Results' and determinants' matrix (Fitzgerald, Johnston, Brignall, Silvestro and Voss, 1991) evaluates financial performance and competitiveness, which are depending on the quality, flexibility, resource utilization and innovation of production process. The performance pyramid (Lynch and Cross, 1991) evaluates performance of corporation for opposite interested parties: internal and external. Inputs, processes, outputs and outcomes framework (Brown, 1996) evaluates the impact of production process on corporate performance².

2.3 Advantages and disadvantages of traditional and modern indicators, and process-based frameworks

2.3.1 Advantages and disadvantages of traditional indicators

Advantages: traditional indicators measure the return on invested capital. They are based on the past financial data, and because of that – they are very simple in calculation. Indicators of corporation can be easily compared against similar indicators of other corporations.

Disadvantages: traditional indicators do not take into account the cost of invested capital. Because of that, they are criticized for encouraging only short-term performance goals. They do not take into consideration characteristics (the quality, responsiveness and flexibility) of production process, the quality of management, human capital and many others important factors, which affect corporate performance. Indicators are not adaptable for unpredictable and constant changes in the present business and competition environment. They fail to highlight factors (affecting performance negatively) that are in need of improvement.

² Neely, A.; Bourne, M. and Kennerley, M. (2000, October). *Performance measurement system design: developing and testing a process-based approach*. Pp. 4 – 8.

2.3.2 Advantages and disadvantages of modern indicators

Advantages: modern indicators measure the return on invested capital with respect to the opportunity cost. Because of that, they are very useful for shareholders. Modern indicators also measure future value creation's opportunities. Indicators are based on the past financial data and prediction of future growth, and because of that – they are simple in calculation (if prediction of growth is estimated correctly). Indicators of corporation can be easily compared against similar indicators of other corporations in the same industry.

Disadvantages: modern indicators give less information that is relevant for management, debt holders and other parties involved in operating process of corporation (except for shareholders). As well, they do not take into consideration characteristics of production process, the quality of management, human capital and many others important factors, which affect corporate performance. Indicators are not adaptable for unpredictable and constant changes in the present business and competition environment. The predicted growth rate is the most important part of indicators' calculation. However, the growth prediction is not an exact science and that fact makes the quality of indicators to be questionable.

2.3.3 Advantages and disadvantages of process-based frameworks³

Advantages: process-based frameworks are solving all disadvantages of traditional and modern indicators, which were described above. In another words, they reflect non-financial information, which is based on key performance drivers of each corporation. They are dynamic and will change if there are changes in corporation strategies. Some frameworks highlight performance's factors that are in need of improvement.

Disadvantages: process-based frameworks are difficult (or even impossible) to use for comparison purposes, due to their complicated results. They are not one number measurement. Some are very complicated in calculation and difficult in understanding. The most of them use big variety of internal data, which is not available for outsiders

³ Review is based on Striteska, M. and Spiskova, M. (2012). *Review and comparison of performance measurement systems*.

(investors, debt holders and other interested parties). Some of process-based frameworks do not take into consideration financial measurements.

3 Importance of corporate performance

3.1 The shareholder model

In earlier literature, importance of corporate performance was associated with the principal-agent problem and incentive problems that occur when different parties own, control and manage the corporation. The investor (principal) employs the manager (agent), which is obligated to create the return on principal's investment. In return, the agent receives negotiated payment for his/her human capital (knowledge), which was invested in corporation's development. As a result of such principal-agent relationship, the main objective of corporation is to maximize investor/shareholder wealth. This model for corporate performance is called the shareholder model.

According to the model, shareholder wealth is maximized through maximization of corporate profits. For the shareholder/investor, corporate performance is based on the market value of given corporation. However due to the principal-agent problem, performance of corporation may be affected negatively by actions of another interested party – the agent. He/she may want to pursue his/her own objectives, such as maximization of his/her salary, an increase in market share or pursuit of high risk projects.

The most efficient way to deal with that problem is to introduce benefit compensation plan, stock options or etc. It may help to tie agent objectives with principal objective. As a result of such arrangement, performance of corporation will be important not only for shareholders, but for the management team, as well.

3.2 The stakeholder model

However, shareholders and managers are not only ones that have a stake in the corporation. Other parties, such as employees, suppliers, distributors, contractual partners, customers, creditors and social constituents are contributing their resources (human and physical capitals) to corporate development. Based on such broad picture of contributors, the stakeholder model was introduced by Blair, in 1995.

According to this model, corporate performance is important for much wider constituency of stakeholders than it was assumed in the shareholder model. However, as a number of interested parties increases; the complexity of multiple principal-agent relationships increases, as well. Solution of this problem is necessary condition for the achievement of the most optimal corporate performance.

Intellection and identification of objectives and interests for all involved parties is a solution of problem, described above. But, the concept of performance has different meaning and may be various importance for different stakeholders. As an example of such differentiation, Table 1 shows how objectives/interests and performance indicators differ for all stakeholders of any given corporation. Managers, owners, shareholders, commercial partners and credit institutions are more interested in financial performance indicators; because their objectives are finance-based. However, employees, customers and government are more interested in economic and organizational performance indicators; because their objectives are quality-of-life-based.

Corporate performance is important for shareholders/owners, because it will create value/wealth for them, which can be used later on for other projects' investment. It is important for management team, because it will proportionally (positively or negatively) affect each member's salary and position in the given firm. For commercial partners, such as distributors, suppliers and other contractual partners; knowledge about firm's performance is important, because it will give them an opportunity to plan and to organize their own productions, distribution networks and investments more efficiently.

Credit institutions are interested in performance of corporation, because they need to be sure that the company has the necessary capacity to repay loans (the firm is solvent) on time (the firm is liquid). Well-performing corporations are not only important for some given credit institution, but for the capital market as a whole. More firms are solvent – lower default rate, lower interest rates on loans to them and to other firms in economy.

Employees are interested in performance of corporation, because the high-performing corporation is able to reward its employees with material and physical benefits according to their abilities and specific human capital. Such corporation is

willing and has more financial capacity to make necessary adjustments and investments, which will insure safety and well-being of its employees.

Table 1. The stakeholder model.⁴

Stakeholders	Objective or/and interest	Performance indicators
Managers	Obtain profit Corporation's welfare Sustainable development	Rates of return (ROE, ROA, ROI), net profit margin
Owners	Maximize investment Sustainable development	Profit, EVA, MVA
Shareholders (current and potential)	Dividends	TSR, dividend yield, price earnings ratio (PER), CFROI, MBV, Q-Tobin
Commercial partners	Stable and long term commercial relationships	Solvency, sustainability
Credit institutions	Repayment of loans on time	Solvency, liquidity, cash-flow
Employees	Workplace safety Wages Career opportunities	Employees commitment
Customers	Competitive price of purchased good/service Quality and safety of purchased good/service Warranties	Customers' loyalty
The state and/or local government	Job creation Payment of taxes	Employment or/and unemployment rates Revenue from taxes
Society	Environment The quality of life	Impact on GDP

⁴ Based on Table 1 from Costea, V. (2012). *Determinants of corporate financial performance*. Pp. 13.

Corporate performance is important for costumers, because the high-performing and competitive corporation will not cut costs of production by decreasing quality and safety of produced goods or/and supporting services during the life cycle of goods/services. As a result, such firm will be able to sustain its costumers' loyalty in the long run, which is important for the future of corporation.

High-performing firms have more opportunities for the future growth, which will result in new jobs creation. These dynamics will affect negatively/positively unemployment/employment rates. As well, better performing firms pay higher tax revenues; which will be spend by government on education and welfare. In other words, more firms perform well – higher quality of life for population of that country. Increasing number of well-performing corporations affects country's GDP positively. The increasing value of GDP will indirectly affect such economic indicators as: the exchange rate, the risk premium, interest rates in international financial markets, FDI and so on. Due to all these effects, corporate performance is very important for federal and local governments and society as a whole.

Therefore, estimation and understanding of performance determinants is useful for many parties. Main interested parties are corporate managers, institutions supervising corporations and the government. Corporate managers may use determinants for further value creation. As well, corporate performance determinants may help institutions to concentrate on relevant financial ratios for credit score determination. Moreover, they may be helpful in policies creation, which will have a positive impact on corporate performance in the long run.

4 Overview of theories on factors affecting corporate performance

Firm performance can be explained by: the environment in which the firm operates (institutional theory); firm's competitive advantage (technological theory) and the organizational architecture (organizational theories).

4.1 Institutional theory

4.1.1 Social infrastructure and its determinants

Roots of institutional theory can be traced to the end of the nineteenth century and the beginning of the twentieth century. It was developed on the basis of neoclassical theory in economics, behavioralism in political science, and positivism in sociology. This theory explains how country's institutional environment can be affected by different variables and how these same institutions affect country's income and growth.

Hall and Jones (1999) explained why social infrastructure is affecting country's aggregate income, which consists from public and private incomes. They defined social infrastructure as institutions and policies. Characteristics of institutions that contribute to country's social infrastructure may be separated into three main groups:

- *Characteristics of government's fiscal policy:* such as tax treatment of investment, tariffs, subsidies, and marginal tax rates on labor income and etc. High tax rates and/ or subsidies promote rent-seeking behavior.
- *Characteristics of environment, where private decisions are made in:* peace or war, a geographical position, diversity, initial natural resources, economy openness, efficiency of legal system, strength of law enforcement, protection of property rights in intellectual capital, and promotion of competition in all markets, and etc.
- *Characteristics of government's rent-seeking behavior:* such as corruption or any other actions that benefit government officials (a response to lobbying, dictatorship/democracy and etc.).

Because of quantity of all possible combinations of described above characteristics, there is a wide range of institutions and policies. Therefore, there are many different types of social infrastructure, as well.

Social infrastructure affects private and social returns to activities. There is a wide range of activities that can be taken into consideration. However, they fall into two main categories:

- *Investment activities*: an individual (or, a corporation owned by an individual) may choose to save, to invest his/her time in human capital or to invest his/her resources in R&D. However, his/her individual returns may be lower than social returns, as a result of social infrastructure's specifics.
- *Activities, to increase individual current benefit*: it can be done by employing production or rent-seeking. *Production* is an activity that increases total output of country at some point of time. *Rent-seeking* (crime, lobbying, price discrimination, and lawsuits and etc.) is an activity that relocates resources, but does not increase total output of country at some point of time. Social returns from rent-seeking activities are zero; and social returns from production activities are the amount that an individual contribute for output production.

4.1.2 Related research

Importance of country's institutions for development of corporation is impossible to deny. They can create broad access to economic opportunities for all companies or may limit it for some. Institutions can promote competition among companies or may restrict it. Therefore, corporate performance depends on country's institutions and will be affected by same variables.

Dependence of corporate performance from various institutions was researched from different perspectives: law and finance, factor endowments, culture and ethnic diversity, openness, political, country's financial institutions strength and firm's organizational form, industrial sector impacts and interaction between ownership structure and the institutional environment.

The environment, in which a firm operates, can be described by country specifics and industry specifics. In other words, country specifics are affecting development of industries and corporate performance. For example, there is a tendency that capital-

intensive firms become larger in countries with stable capital markets; and R&D-intensive industries have larger firms in countries with high level of human capital and strong patent protection. As well, firm's performance can be affected by characteristics of industry in which it is operating. Some industries are more profitable (have lower costs or/and higher sales, therefore – higher profits) than others.

In financial economics, research is done mainly by implementing empirical research.

Engerman and Sokoloff (1997) argued that various features of factor endowments in any given country will affect growth and development's paths of institutions in that country. Therefore, they will affect economy as a whole. In that paper, it was explained how initial country's factor endowments affected the degree of equality in wealth among population, human capital and the political structure. As a result, these developments affected the quality of country's institutions and policies, such as the legal framework, the tax system, the regulation of financial institutions' and corporations' establishment, the granting of property rights in intellectual capital (patents), industrial policies, and the provision of access to natural resources on government-owned land and etc. Moreover, institutions affected the degree of equality, human capital and the political structure even further, and etc.

Here, we can see how feedback effect may be created by characteristics of initial factor endowments. Economic and political structures were affecting institutions and institutions were affecting economic and political structures. As a result of such feedbacks, corporate structure and performance were affected, as well.

In 1997, Easterly and Levine wrote the paper on how ethnic and/or cultural diversities may affect country's public policies, political stability, and other economic indicators. Ethnic and/or cultural heterogeneities were estimated as the probability that two randomly selected individuals in a country will belong to different groups. This paper states that higher ethnic or/and cultural heterogeneity weakens various country's institutions and leads to low schooling, political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, and insufficient infrastructure. These consequences may have growth effects, income effects or both effects simultaneously.

As well, they found that increasing heterogeneity decreases capital per worker and the productivity significantly. Another effect of heterogeneity that needs to be

mentioned was discovered by Mauro (1995). He estimated that increasing cultural and/or ethnic diversities were positively correlated with corruption.

Ethnic and/or cultural fragmentation “may also weaken the organization of the government in which policies are made, weakening the centralization of control emphasized by Shleifer and Vishny (1993) and weakening the useful checks and balances emphasized by Persson, Roland, and Tabellini (1997). Weaker organization makes competitive rent-seeking more feasible and... reduces the consensus for public goods, creating long-run growth tragedies”.⁵ Therefore, all affected institutions, which were mentioned above, will negatively affect corporate structure and performance in short and long run.

In 2003, Rajan and Zingales argued that trade openness is positively correlated (and significant) with financial market development, especially when there are no cross-border capital controls or/and limitations. They found that tariffs (another proxy for openness, because they are affecting the volume of trade) on cross-border trade are highly negatively correlated with a number of companies in the economy. This result is easily explainable, because lower taxes decrease prices on inputs and outputs for/from production. As a result, it allows more firms to enter market and to sustain a competitive production.

Another finding was that demand for finance is negatively correlated with market capitalization in less open countries. As demand increases, market capitalization (combined corporate valuation) decreases in countries with capital controls and/or limitations. In that case, companies with investment opportunities have to compete in the internal financial market for funds, which are limited (because, they do not have access to external financial markets). But need to remember that valuation of corporations is based on corporate performance. Therefore, corporate performance decreases, as well. Taking into account this evidence, it is safe to say that small country should promote more openness, since it is difficult to manufacture everything internally.

The third finding was that choices in policies selections are consistent with interests of political groups. As a result, these selected policies are affecting financial market

⁵ Easterly, W., Levine, R. (1997, April). *Africa's growth tragedy: policies and ethnic divisions*. Pp. 29.

development (and corporate performance). As well, policies that are promoting efficient and competitive industries rather than inefficient and rent-seeking ones will have the impact on development path of country's institutions. Same time, country's institutions might slow-down or speed-up interests of groups activities. It indicates that institutions are matter. However the way, they might be matter, is primarily in tempering with activities of interests groups. In this research, Rajan and Zingales proved that more emphasis has to be placed on establishing political pre-conditions for the efficient institutional environment.

Boyd, Levine and Smith (2000) showed that inflation tends to reduce stock market liquidity and banking sector activity. This result is in line with economic theories. In economies with high inflation, financial intermediaries lend less and allocate capital less effectively; and equity markets are smaller and less liquid. Therefore, availability of funds for investment opportunities will be reduced. Further, corporate performance will be affected negatively due to lost opportunities in short and long run. However, this relationship is highly non-linear, because it depends on countries specifics. They found that in low-inflation countries increased inflation is not matched by greater nominal equity returns; but in high-inflation economies, nominal stock returns move one-for-one with marginal increases in inflation rates.

Also, inflation has a negative correlation with intermediaries' lending activity and stock market' size and liquidity; but only in countries with low-to-moderate rates of inflation. They found that 15% annual inflation's threshold characterizes the relationship between inflation and financial sector conditions. Moreover, once inflation exceeds that level, further increases in the (long-run) rate of inflation will have no additional impact on financial sector activity.

In 1998, La Porta, Lopez-de-Silanes, Shleifer, and Vishny researched the impact of different legal regimes on corporate valuation (in other words, corporate performance). They explored how civil law, common law, "antidirector" rights, cash flow rights and control rights affect value of companies across 27 countries, with respect to protection of minority shareholders and magnitude of cash flow ownership by the controlling shareholder.

Evidence shows that in countries, where common law was protecting minority shareholder, corporate performance was significantly higher than in countries, where

civil law was protecting minority shareholder. It can be explained by philosophy of common law, which allows judges consider certain principles more broadly than civil law, such as fiduciary duty. Therefore, it authorizes them to prohibit more forms of minority expropriation. Another explanation was proposed by Rajan and Zingales (2000). They stated that corporate owners have less political influence in countries with common law origin.

As well, research proved that corporate performance has a positive correlation with higher cash flow ownership by the controlling shareholder, especially in countries with poor investor protection.

In 2013, Gonzalez researched the relationship between leverage and corporate performance worldwide. This analysis took into consideration the level of development of banking system and equity markets, common and civil laws origins, debt holders and equity holders' interests, the presence of economic distress and the strength of legal enforcement power. According to it, equity holders enjoy greater protection in civil law countries; and debt holders enjoy greater protection in common law countries. Therefore, debt no longer serves as a punishment mechanism for the management team in civil law countries. As well in the presence of turbulences, interests of equity holders are more dominant than interests of debt holders in such countries. As a result of all that, leverage has a negative correlation with corporate performance in countries with common law origin; and a positive correlation – in countries with civil law origin. The significance of these correlations depends on the strength of legal enforcement power.

In 1999, La Porta and Lopez-de-Silanes proved that privately owned firms outperform state owned companies. Research was based on the case of Mexican privatizations. In other words, ownership structure does affect corporate performance. As continuance to this research, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) investigated interaction between ownership structure and the institutional environment. They found that the level of legal “protection of minority shareholders determines the level of ownership concentration, the existence of family firms worldwide, the patterns of

separation between ownership and management, and the degree of expropriation by corporate insiders”.⁶

In 2002, Beck and Levine examined the impact of legal and financial systems on growth of industrial sectors. They found that industries (both R&D and manufacturing), which are heavily dependent on external sources of funds; grow faster in countries with the well-developed financial system (market- and banking-based) and in countries with the efficient legal system. Moreover, findings showed that new companies’ formation and more efficient capital allocation depend on the overall level of financial development along with effective contract enforcement mechanisms.

Tian and Zeitun (2007) showed that company’s risk, an access to external sources of funds, capital structure, business cycle, the sensitivity to external shocks and growth vary across industrial sectors. Therefore, characteristics of industrial sector will have an impact on corporate profitability along with performance. Gleason, Marthur and Marthur (2000) found evidence that larger industries perform better in competitive market. As a result, it may be stated that company, which belong to large industry, will outperform other firms in smaller industries.

According to Stohs and Mauer (1996) corporate performance depends on the use of funds. Firms with high business risk have less levered capital structure (finance themselves with equity) and firms with low business risk have higher level of leverage. Therefore, profitability and performance of less levered corporations will be less affected due to lower interests’ expenses, during recession and through. Olokoyo (2012) found that industrial sectors, which are dependent on higher level of short term debt, will have lower market performance. Moreover, there is a negative correlation between corporate performance and the level of short term debt.

In 2003, Beck, Demirguc-Kunt and Maksimovic investigated how country’s financial and legal institutions’ strength and corruption affect firm’s organizational form. They found that these variables are very important for (small) firm’s ability to finance investment projects. Small companies have it more difficult to get an access to financial

⁶ Ayyagari, M., Demirgüç-Kunt, A., Maksimovic, V. (2005, September). *How well do institutional theories explain firms’ perceptions of property rights?* The World Bank, the Policy Research Working Paper No. 3709, pp. 10.

markets in economies with poor legal and financial institutions. Therefore, their growth and performance will be adversely affected. Further, corruption has a negative correlation with corporate performance. However, this process is reversible if mentioned above constraints are relaxed.

Performance of small firms is mostly affected by difficulties in dealing with banks, such as paperwork and bureaucracy, and the need to have special connections with banks. Collateral requirements and certain access issues, such as financing for leasing equipment, are significant constraints for corporate performance. Macroeconomic issues, such as high interest rates and lack of money in the banking system, reduce significantly firm's growth rates as well. Further, these effects remain significant for any level of financial development. Legal and corruption obstacles (especially the amount of paid bribes, the percentage of senior management's time spent with regulators and corruption of bank officials) also have the significant negative relationship with firm's growth (therefore, performance). However, the speed at which courts work, the need to make additional payments or the access to long-term loans does not affect their growth rates significantly.

4.2 Technological theory

4.2.1 Competitive advantage and its determinants

The quality and the level of production technology may be characterized by competitive advantage. In 1985, Porter wrote his first book on this subject. According to his theory, industry structure and firm's positioning within the industry are the source of competitive advantage.

Figure 1 shows main forces (and their determinants) of competition in any given industry. According to Porter, any industry can be described by five forces: supplier power, buyer power, threat of substitutes, threat of new entrants and entry barriers. Competitive advantage will be affected positively by supplier power and entry barriers; and it will be affected negatively by buyer power, threat of substitutes, and threat of new entrants.

Therefore, the strength of competitive advantage depends on characteristics/determinants and cross-relationships of these forces. In other words, an industry, where competitive advantage is more easily created and sustainable in the long run, would be

more attractive for firms. Therefore, profitability of industry depends on its structure. Moreover, profitability of industry consists from profitability of firms in it. And as a result, corporate performance depends on industry structure and firm's positioning within the industry.

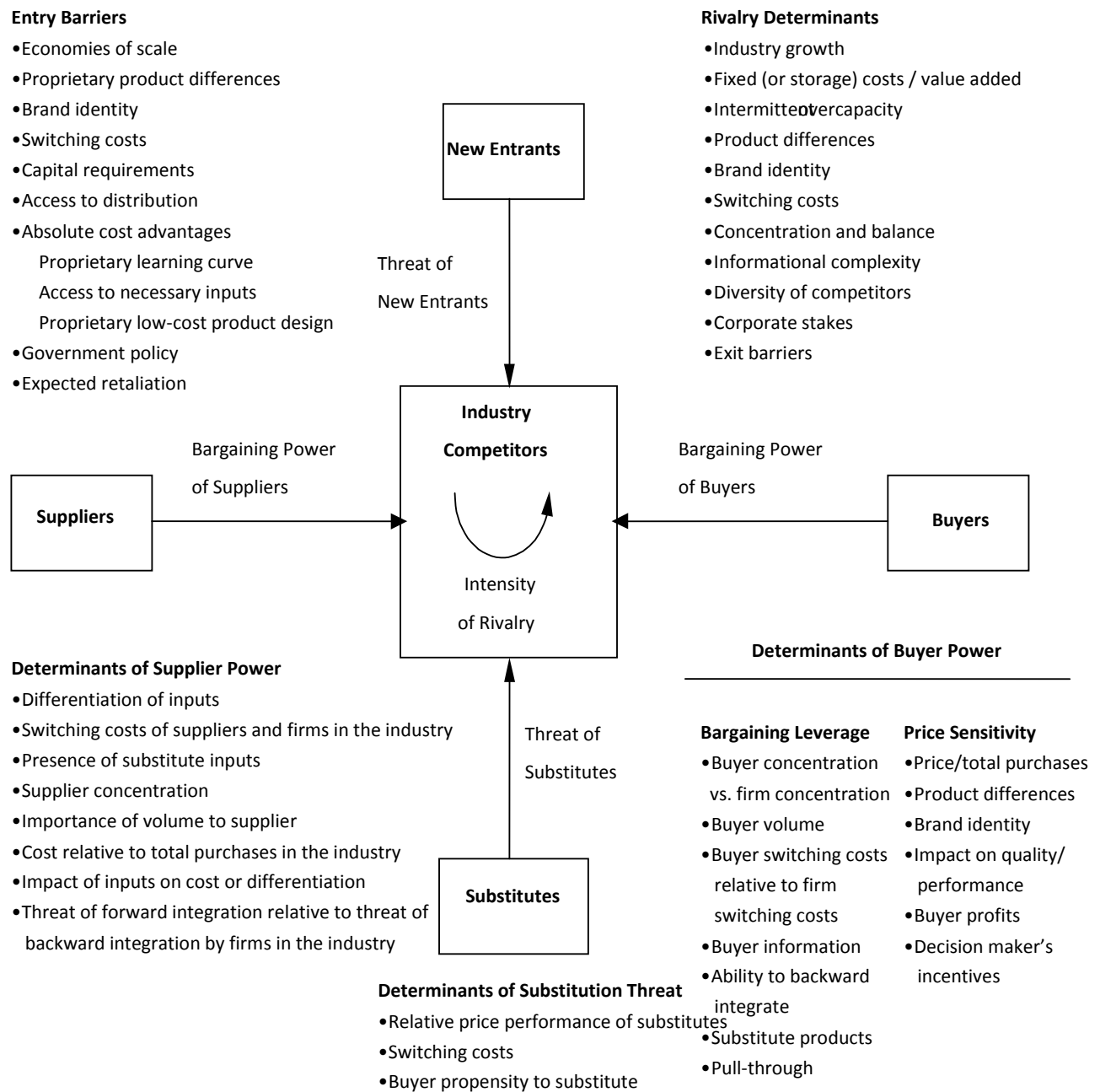


Figure 1. Porter's 5 forces – elements of industry structure.⁷

⁷ Based on Figure 1 from Porter, M. (1985). *Competitive Advantage*. Pp. 6.

Firm's performance is related to economies of scale and scope of physical and human capitals. Increasing economies of scale and/or scope will decrease the cost of production or/and increase demand for products/services. Therefore, profit will increase and ROA will increase, as well. Lower production cost and improved efficiency create competitive advantage for a firm. Competitive advantage can be created by innovating or discovering new and better ways to produce or to deliver products/services to customers. If rivals are unable or unwilling to follow new trends in technologies or/and consumers' taste, the corporation with competitive advantage will be able to capture greater market share than its rivals in same industry. Therefore, it will increase profit's revenue and will improve corporate performance further.

Competitive advantage could be achieved through:

- *Cost leadership strategy* implemented by lowering the cost of operations.
- *Differentiation strategy* implemented by developing and marketing unique products for different customer segments.
- *Innovation strategy* implemented by investing human and physical capitals in R&D.
- *Resource distribution*.
- *Operational effectiveness* is continual improvement, flexibility, and relentless efforts to achieve best practices in a company. It is necessary, but not sufficient condition for improvement of corporate performance.

The choice of strategy will depend on availability of new technologies, shifts in consumers' tastes, the emergence of new industry segment, shifts in input costs or/and availability of inputs, changes in government regulations.

4.2.2 Related research

An empirical analysis can be based on two kinds of frameworks: external and internal. The external analysis is built on economic characteristics of industry structure, which affects strategic investments and decisions. It is the main framework for analysis of competitive advantage. The internal analysis is built on strategic organization (competencies and decision-making) of firm, which affects business operations and decisions.

In 1972, Lieberman and O'Connor investigated how industry characteristics affect corporate performance. They were represented by sales and concentration. Industry sales represent the level of economic activity within an industry; and industry concentration ratio represents the level of competition within an industry. They found that these variables are significant for corporate performance.

The relationship between the corporate size and performance was researched by Weiner and Mahoney, in 1981. They found that the size of firm has significant impact on corporate performance. This result is in line with theory, because larger firms should enjoy competitive advantage from economies of scale. Therefore, they production will be more efficient with lower costs. As a result, profitability will be affected. As well, such corporations have higher production capacity; therefore, sales will be affected positively. Another fact – larger firms have higher rate of survivorship; however, stock prices are not affected by it.

In 1984, Karnani researched the impact of competitive advantage on corporate performance. Firms' market shares were used as a proxy for companies' specific competitive advantages. There was a significant relationship.

4.3 Organizational Theories

Organizational theories explain how the organizational architecture can lead to increase in costs. And as result of it, decrease firm's profitability. Organizational theories consist of: agency cost, transaction cost and competency theories.

4.3.1 Agency cost and its determinants

This theory grew from the principal-agent problem and can be traced back to Jensen and Meckling (1976). It explains why managers fail to maximize long-term value of firm (therefore, corporate performance). This result is independent from environmental variables and industry specifics. Moreover, it explains why debt is usually preferred, as outside source of financing; and why some industries are more leveraged than others for equivalent levels of risk.

Managers may fail to maximize value of firm, because of information asymmetries; which occur, when parties have different types of information. Therefore, asymmetries lead to the imbalance of power. Asymmetric information may be separated into three different types:

- *Adverse selection* is a situation in which one party has more information than other about some aspect of product/activity, during negotiation. Other party knows that it does not have full information and tries to protect itself. This situation results in inefficient quality or/and quantity of products/activities in the market.
- *Moral hazard* is a situation in which one party is willing to take more risk (in hope of gaining more); because he/she knows that in case of failure, potential costs or burdens will be paid by others.
- *Information monopoly* is a situation in which information is available only to one party and not to others.

Agency cost is all costs that could emerge due to differences in interests and information asymmetries; which a principal (shareholders) and an agent (corporate management) have, and agent's selfish behavior. These differences affect corporate performance negatively. In other words, agency costs exist because the principal tries to protect himself from agents' actions. Therefore, agency cost is a sum of:

- *Monitoring expenditures* (incurred by the principal) designed to decrease agents' divergences from principal's interests and to limit undesirable agents' actions. They can be explicit or implicit.
- *Bonding expenditures* (incurred by agents) designed to limit or to restrict agents' actions, which could harm the principal. Agents are bounded by some contract and should compensate the principal in case of breach of contract. These costs are usually implicit.
- *The residual loss* is further principal's and agents' welfare losses, despite the use of monitoring and bounding.

Agency costs could be affected by the source of funds:

- *Agency cost of outside equity* (shareholders).
- *Agency cost of debt*.

They found that agency cost of outside equity is much higher than agency cost of debt. It happens, because new shareholders recognize that the agent-principal problem just became greater. Therefore, they evaluate a firm much lower. As a result, agency costs increase, because principal's loss in equity is greater than a gain in funds (it

explains why profitable projects maybe passed, if debt funding is not available). Moreover, agency costs will increase proportionally with the increasing volume of outside equity funding. On another hand, agency cost of debt consists from same costs plus bankruptcy cost (legal fees, reorganization, and etc.). However, firm's value is not affected, because the agent-principal problem did not increase. This difference explains why debt is preferred for funding purposes.

Based on these findings, they assumed that in regulated industries, where the freedom of management (to take riskier projects) is constrained, bounding and monitoring costs are the lowest. Therefore, such industries are mainly funded by debt.

4.3.2 Transaction cost and its determinants

Transaction cost theory may be traced back to Coase (1937). In that article, Coase sought to explain why firm exists and how firm chooses its activities. Firm's choice of activities is based on transaction costs, because they affect negatively corporate performance.

Transaction costs are all costs that are incurred during economic exchange (the cost of market making) related to planning, organizing and enforcing firm's input or/and output contracts. These costs are increasing with the increasing scale of firm's activities. The volume of activities will increase until some efficient level is reached. A firm always minimizes its costs. Therefore, it has to make a choice between producing itself and outsourcing the production to others. Selected solution will be based on the lowest cost.

Transaction costs may be separated into three main groups, based on the stage of firm's activity:

- *Search and information costs* are incurred before firm's activity.
- *Bargaining and decision costs* are incurred during firm's activity.
- *Policing and enforcement costs* are incurred during firm's activity at the final stage of it.

Transaction costs may be separated into two main groups, based on the environment of activity:

- *Internal costs*, if activity performed by the firm.
- *External costs*, if activity outsourced to others.

If external costs are higher than internal costs, a firm chooses to produce itself, rather than outsourcing. As a result, it will grow because it is able to perform its activities more cheaply than if activities would be performed by the market. Otherwise, a firm will need to outsource.

The volume of external transaction costs could increase due to following factors:

- *Uncertainty.*
- *Opportunism* – a situation, in which any contractual partner of firm (suppliers, distributors, and etc.) may choose to take selfish advantage of circumstances.
- *Risks.*
- *Bounded rationality* – a situation, in which a decision-maker is lacking the ability and resources to select the optimal solution. Therefore, he/she applies rationality only after having simplified choices available. As a result, not always the optimal solution is selected, especially in complicated situations.
- *Core firm's assets vulnerability* – a situation, in which essential assets of firm could be used by the opportunistic contractual partner. Core assets are assets without which a firm will dissolve, because they are essential for firm's profit making activities.

Due to described externalities, external transactions costs may be potentially too high and a firm may need to stop its outsourcing activities to the market. These externalities can be solved with long-term contracts. However, short-term contracts are not sustainable due to constant costs of information collection and negotiations. As well, it may be difficult to identify all sufficient conditions in long-term contracts due to bounded rationality.

4.3.3 Core competence and capabilities

Competency theories of firm states that the firm is a collection of human capital that allows it to earn the abnormal return (due to competitive advantage that this human capital creates). Rumelt (1974, 1982) analyzed the variance in long-term profit within and between industries. He found that the variance is greatly higher within industry than between industries. This variation can be explained only by the quality of human capital and skills in companies.

This framework emphasizes that any firm should concentrate on its core competence or capabilities. Due to the dynamic modern business environment, it should be ready to move in and out of industries, markets, regions, products and customers. Such high professionalism and specialization will help any firm to achieve competitive advantage and to distinguish it from competitors. Therefore, only core competence/capabilities and further R&D in them will deliver sustainable long-term performance, according to this theory.

The first time, core competence was defined by Prahalad and Hamel (1990). It is “the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technology.”⁸ In other words, a firm which has core competences will be able to:

- Access many markets (markets diversification).
- Increase quality of final product.
- Make it impossible for competitors to imitate firm’s production process (the firm will gain sustainable competitive advantage) by concentrating on few competences.

Capabilities were defined by Stalk, Evans, and Schulman (1992). They set emphasis on the entire chain of firm’s value creation, rather than few production specializations.

4.3.4 Related research

Duysters and Hagedoorn (2000) researched how core competence affects corporate performance in computer industry. They defined core competence as the degree of technological specialization (patent specialization – measured as the ratio of computer patent applications to total patent applications for a given company); the degree of technological sophistication (paten activity – measured by total number of patent applications for a given company) and the degree of market specialization (measured as the share of computer sales in aggregate corporate sales). They found that technological and market’s specializations are important for corporate performance and affect it positively.

⁸ Foss, N. J., Knudsen, C. (1996). *Towards a competence theory of the firm*. Pp. 61.

Robb and Seamans (2011) researched how transaction costs affect corporate performance. Transaction costs were defined as debt ratio (because, debt was viewed as the main source of funding for market making); and they have a negative correlation with corporate performance.

Carvalho, Gomes and Gomes (2013) analyzed how agency costs may affect corporate performance. In their research, agency costs were represented by leverage, loan maturity, and personal and corporation's collaterals. They found evidence that leverage is significant for corporate performance; and has a negative correlation with corporate performance.

5 The economic environment in Iceland in the 21st century

Iceland was assimilated in the ninth century. All away to the twentieth century, Iceland was a part of the Norwegian and later on the Danish monarchies. As a result of such close relationship with Scandinavian countries, many Icelandic institutions were built to reflect existing institutions in these Scandinavian countries. Such forms of institutions had a positive impact on the degree of equality in wealth among the population, human capital and the political structure in Iceland.

Between 2005 and 2011, the Gini index was distributed in 23.6% – 29.6% interval (earlier data was not available), according to Statistics Iceland. That means that Iceland has one of most equally distributed total incomes among the population in the world. And, around 22.6% to 25.9% of population attended tertiary education, during the period of 2005 – 2011.⁹

The high degree of equality and human capital in the twentieth century resulted in even greater quality of country's institutions and policies, such as the legal framework, tax system, the regulation of financial institutions' and corporations' establishment, the granting of property rights in intellectual capital (patents), industrial policies, and the provision of access to natural resources.

"Iceland has a civil law legal system and thus Icelandic law is characterized by written law"¹⁰. As a result of such legal system, interests of equity holders may be more protected than interests of debt holders in Icelandic corporations, according to previous researchers.

In 1993, Iceland became country with the open economy. This development allowed Icelandic financial intermediaries to access international financial markets. It resulted in greater volume of available liquidity and easier access to it for Icelandic corporations.

All these and described above institutions had significant positive impact on the Icelandic corporate development in the twentieth century.

⁹ Source: Statistics Iceland, earlier data was not available.

¹⁰ Rán Tryggvadóttir, Thordis Ingadóttir. (2007). *Researching Icelandic Law*. Chapter 2.3: The Judiciary.

In Figure 2, it is possible to see how Icelandic GDP was growing during the period of 1993 – 2012. GDP is measured in millions ISK at constant prices (2005 is reference year). During 20 years period, GDP volume increased by 71% (with recessions in the sample). From 1993 until 2008, GDP was exhibiting constant growth – 16 years of constant growth. However due to banking and BoP crises in 2008, it was decreasing during 2009 and 2010. And in 2012, GDP was still around the level of 2006.

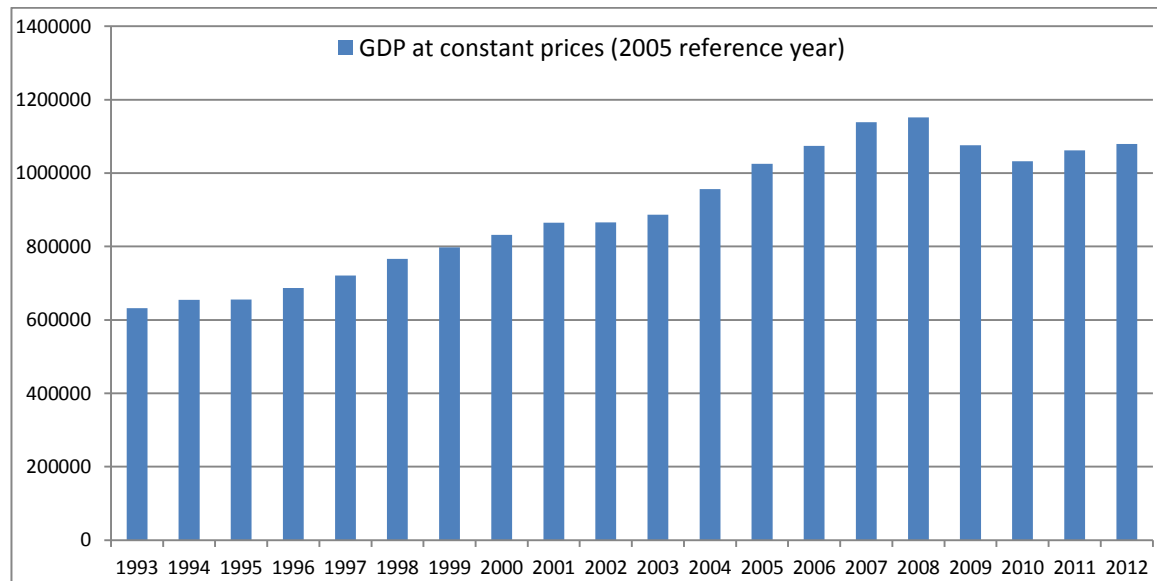


Figure 2. The Gross Domestic Product, 1993 – 2012 (2005 – reference year, millions ISK).¹¹

5.1 Liberalization and build-up of vulnerability in the Icelandic economy prior to 2008

By the end of 2003, the three biggest banks in Iceland were privatized. They were operating under the Gramm-Leach-Bliley Act. This Act ended the separation of commercial and investment banking. Therefore after 1999, it was worldwide common practice for commercial banks to collect deposits at their homeland and to use that liquidity for investment banking on internal and international financial markets. However in Icelandic case with population around 300.000, this scheme could never survive in the long run without specified restrictions (which were never introduced). It created a very weak deposit base for Icelandic investment banks with operations overseas.

¹¹ Source: Statistics Iceland.

As well in 2003, public expenditures were increased significantly by the Icelandic government. It was done to finance the Karahnjukar, which was the biggest investment project in Icelandic history at that time (around 35% of Icelandic GDP)¹².

Therefore, the rise in public expenditures and the fall in tax revenues (due to tax cuts: on personal income, inheritance, some VAT rates and wealth tax elimination after elections in 2003) led to the fiscal expansion (which is in line with Keynesian theory). And, it resulted in the increasing aggregate output, consumption, investment and appreciation of ISK.

In 2003, CBI decreased the reserve requirement (the percentage from deposits that banks were not allowed to lend out) from 4% to 2%. It created extra liquidity for banks: approximately 20 thousand million ISK; and resulted in the monetary expansion on the internal financial market. That liquidity made it possible for Icelandic banks to enter real estate mortgage market. As well, lines of credit for corporations were widened. Icelandic firms found it easier to access credit facilities.

In the end of summer 2004, Icelandic real estate mortgage market became very competitive, after the first Icelandic bank – KB entered it. As a result of it, many of Housing Financing Fund's (HFF's) borrowers changed their mortgage provider. It resulted in increased liquidity on HFF's balance sheets. To resolve the problem, HFF lent extra liquidity to banks and other financial intermediaries: approximately 95 thousand million ISK, during the period of 2004 – 2005. It increased the volume of available liquidity for further out lending and investment.

In 2001, the Central Bank of Iceland gained full independence from the Icelandic government. Same time, it adopted the new monetary policy based on inflation targeting. Under this commitment, annual inflation target is 2.5% with +/- 1.5% deviation. However starting from 2004, annual inflation became unsustainable and rose above the target. And, it continued to stay above target's level until the beginning of 2011, as it is possible to see in Figure 3. In hope to regain the control over inflation, CBI began to raise aggressively short-term interbank interest rates in 2004, trying to decrease the expansion of economy. At that point, the monetary contraction began.

¹² Ministry of Finance of Iceland. (2003, January). *The macro-economic impact of the construction of power plants and aluminum smelters*. Nr. 1, pp. 9.

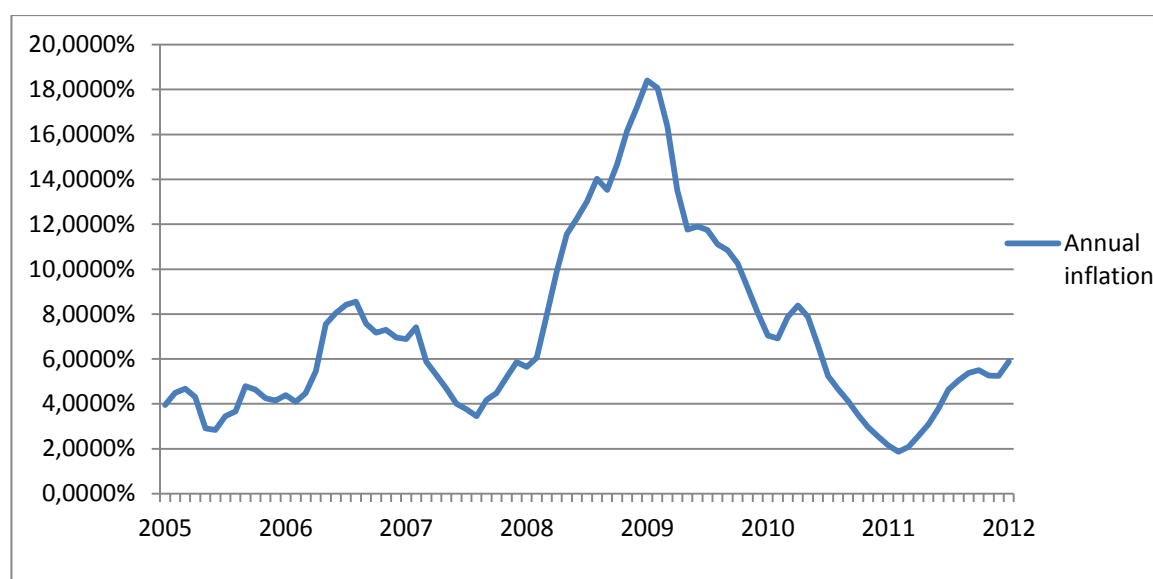


Figure 3. Annual inflation (%), 2005 – 2011.¹³

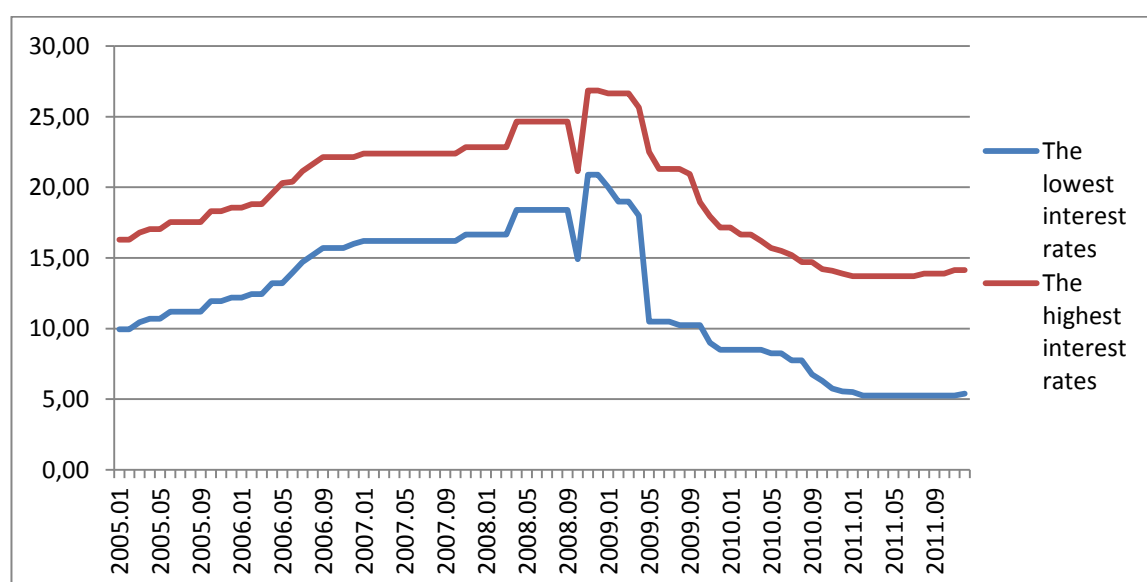


Figure 4. Coupon rates on non-indexed corporate bonds (%), 2005 – 2011.¹⁴

Increased short-term interbank interest rates affected long-term interest rates (it was CBI goal) on non-indexed banking loans for enterprises and individuals. In Figure 4, it is possible to see that prior to the middle of 2008, long term rates rose up to 18% – 25%, dependently with characteristics of loan and borrower. These increases in inflation and long-term interest rates pushed corporations and individuals into foreign

¹³ Based on author's calculations, source: Statistics Iceland.

¹⁴ Source, the Central Bank of Iceland.

denominated debt incurrence. According to CBI, 75% of all companies' debt was denominated in foreign currency, in September of 2008.¹⁵

As domestic assets and stocks were increasing in their prices, due to continuing ISK appreciation and increased demand (as mortgage interest rates and the collateral percentage decreased) in real estate market; leverage of Icelandic banks continued to decrease. It pushed foreign investors to revisit their valuation on possible growth of Icelandic banks. That and high interest rates in the Icelandic financial market played its role in attracting foreign capital to the country. They (interest rates) created much higher returns on Icelandic deposits compared to deposits' interest rates in Europe, Great Britain or Canada. The first foreign investors, attracted by high interest rates, were carry traders. They took loans in a low yielded currency and invested in a high yielded currency (in our example, ISK). Therefore, increased foreign capital inflow into shallow Icelandic financial markets resulted into further ISK appreciations.

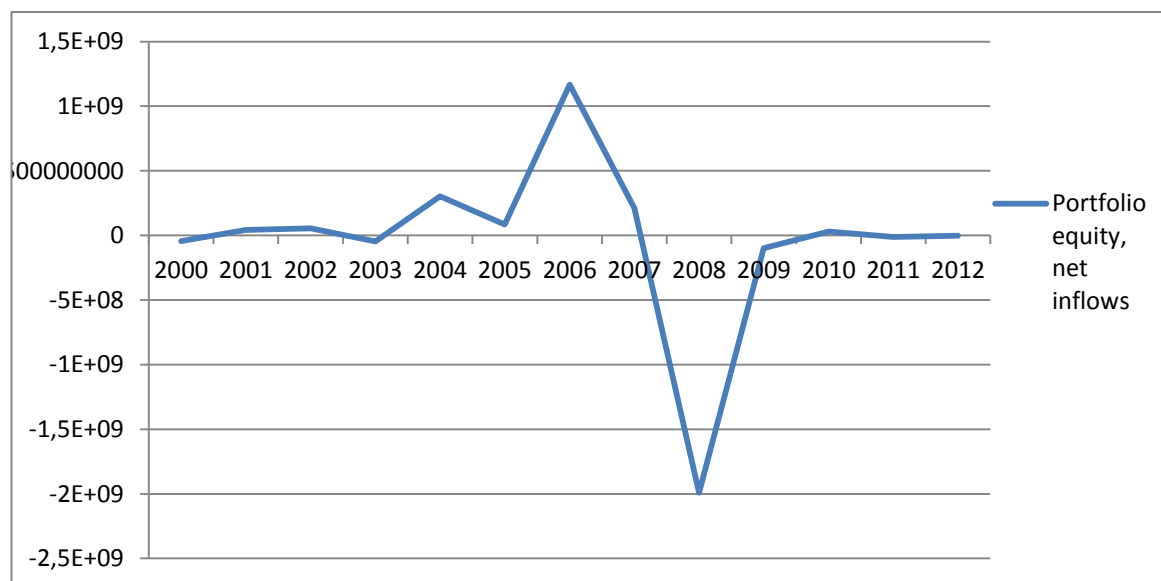


Figure 5. Portfolio equity, net inflows (BoP, current USD), 2000 – 2012.¹⁶

Later on, big foreign banks began to issue “glacier bonds” denominated in ISK, but sold to investors in foreign currency. That increased demand for ISK, and led to further ISK appreciation. In Figure 5, it is possible to see net inflow of foreign capital, during the

¹⁵ Olafsson, Þ. T. (2009, September). *Endurskipulagning skulda heimila og fyrirtæk í kjölfar kerfislægrar fjármálakreppu*. Seðlabanki Íslands, pp. 50.

¹⁶ Source: the World Bank.

period of 2000 – 2012. During the period of 2004 – 2006, the volume of net inflows increased by more than 10 times at current USD prices.

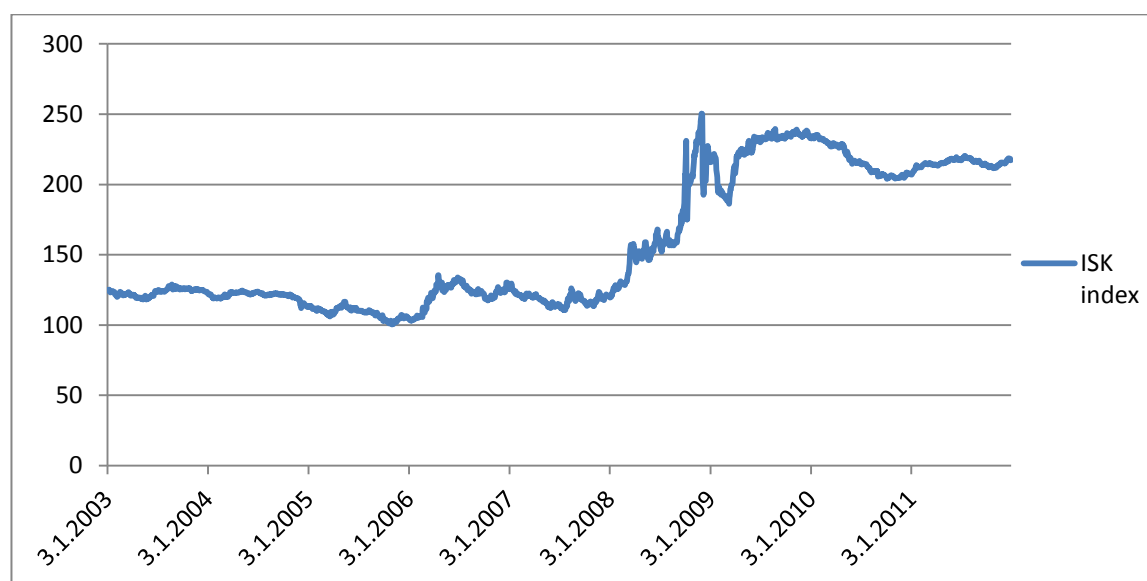


Figure 6. ISK index, 2003 – 2011.¹⁷

In Figure 6, it is possible to see that during the period of 2003 – 2005, ISK index appreciated approximately by 16%.

Therefore, it is safe to say that previous actions of the Icelandic government, government institutions and CBI, created conditions for the rise in domestic stocks' and real estates' prices, and currency appreciation. Movements in all three markets increased assets' value (domestic + foreign). And as a result, decreased leverage level on banks' balance sheets. Decreased leverage level made it possible for banks to take on even more debt in internal and international financial markets. Higher debt volumes led to higher out-lending volumes to corporations and individuals, which led to greater domestic assets' value and so on. The process was self-fulfilling. The expansion of Icelandic economy, characterized by stock and real estate markets' bubbles and overvalued ISK, began.

In Figure 7, it is possible to see that the current account balance from 2005 to 2006 (at current USD prices) was negative and was continuing to decrease. From the middle of 2006 to the middle of 2007, there was some positive development in the balance, as it was retrieved (due to a decrease in inflation and stabilization of ISK index and interest

¹⁷ Source, Landsbankinn.

rates). During that period, GDP was increasing at greater rate than the current account balance. Therefore, the balance retrieved to the 2005 level, as percentage of GDP. However, after that period the current account balance decreased even further, until the sudden stop in 2008. Icelandic companies and individuals were living in credit from one period to the next and were collecting liabilities. This deficit was sustainable as long as foreign investors believed that it will be repaid sometime in the future.

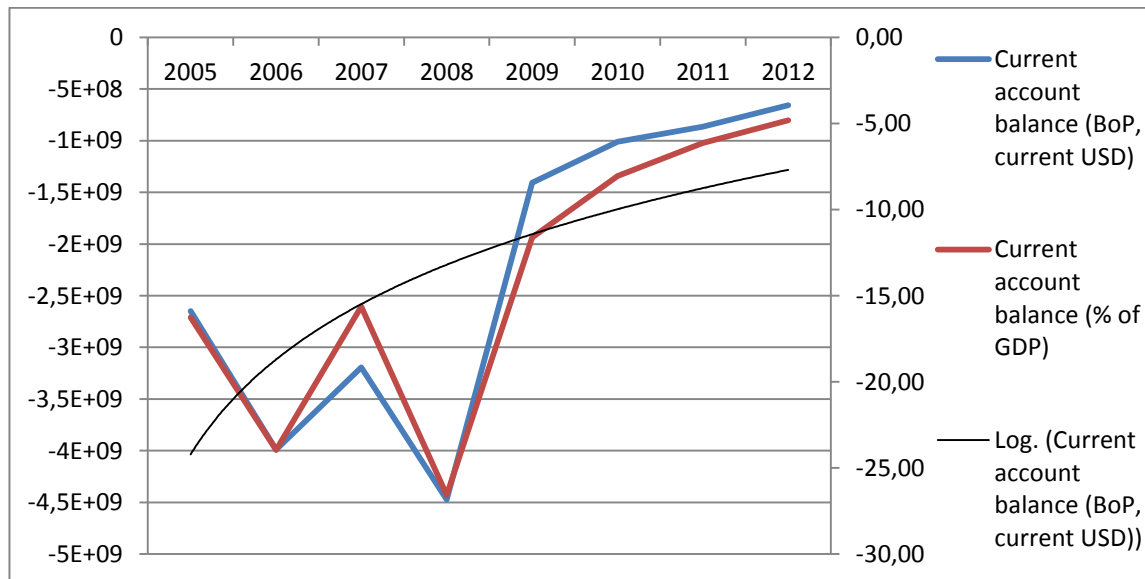


Figure 7. Current account balance, 2005 – 2012.¹⁸

5.2 Banking and BoP crises; credit and asset markets burst

On the 15th of September, 2008, one of the largest American financial service providers, the Lehman Brothers, collapsed. This collapse affected financial markets worldwide. They suddenly became illiquid. International investors were running scared and trying to invest only in very safe assets, such as government bonds and notes of the largest countries. All other financial securities became toxic for them.

As international financial markets dried out, Icelandic banks found it difficult to continue rolling over their short-term liabilities. Without new sources of liquidity, they would become illiquid. As a result of it, they would default on their debt payments and finally, would become insolvent. Glitnir was the first bank to ask CBI for refinancing. On the 29th of September, 2008, CBI announced that it took over 75% of Glitnir's assets

¹⁸ Source: the World Bank.

(Danielsson and Zoega, 2009). It had no other choice, because there was no separation of investment and commercial banking in place. Therefore, the collapse of Glitnir would affect its deposit holders, as well.

Due to codependence and systematic risk in the banking sector, news of Glitnir's takeover created domino effect within the Icelandic financial system. As the price of Glitnir's shares crashed, the value of companies which owned stakes in Glitnir decreased (Glitnir's shares were assets on their balance sheets). It had the negative effect on their shares' prices. Moreover, it affected values of their stakeholders and so on and on. The following week, Landsbankinn was taken over by CBI; and soon after same was done with Kaupthing, the largest Icelandic bank. These takeovers increased the fiscal deficit of Icelandic government many times and led to the crash of rest of Icelandic stock market in a matter of days.

The financial situation of Icelandic economy continued to worsen. On the 6th of October, a number of private interbank credit facilities were closed for Icelandic banks' activities.

On the 8th of October, UK Minister of Finance announced a provision of Anti-terrorism, Crime and Security Act (2001) against Landsbankinn. The implementation of this Act meant that assets of Landsbankinn within UK were frozen; and any sale or movement of assets within UK was forbidden. As a result of Act, international capital flows towards Iceland stopped immediately. It is possible to see in Figure 5 that in the autumn of 2008 net capital inflows into Iceland dipped downwards and became highly negative.

It was followed by the crash of Icelandic currency exchange market on the same day. In Figure 6, it is possible to see that ISK index depreciated by approximately 43% with "overshooting", during next two months.

The economic situation was developing from bad to worse, as the crisis of confidence peaked among foreign and domestic investors. In Figure 5, it is possible to see that net capital inflows plunged down, during that period. Carry traders and other investors were trying to escape Iceland – therefore, the Central Bank of Iceland did not have other choice than to impose controls on capital flows.

All these described above factors: ISK index depreciation, the loss of foreign investors' confidence, and large current account and fiscal deficits led to the Balance of

Payments (BoP) crisis. The Icelandic government was no longer able to borrow in international financial markets; and the foreign-exchange reserve (held by CBI) was no longer sufficient to insure the financial stability of Iceland. That crisis was solved with the assistance from the International Monetary Fund (IMF), Scandinavian countries, and Poland.

During the same period, asset market bubble started to lose air due to excess supply and the sudden stop in demand.

5.3 Recession of 2008 – ...

After CBI imposed capital controls, it continued to increase short-term interest rates to prevent them from leakage. CBI was trying to prevent capital outflows from Iceland.

That action was necessary, but it had devastating effect on the internal credit market. It became frozen. All interest rates (short- and long-term) on indexed and non-indexed debt were raised significantly in the short period of time. It is possible to see in Figure 4 that long-term interest rates were increased by 4% - 5%, during the next month. This sudden stop in credit market negatively affected short- and long-term firms' activities. During next six months, interest rates were staying high. As a result, it increased costs of non-indexed debt for all Icelandic enterprises and individuals.

The sudden stop in credit market and other uncertainties affected real estate's and other real assets' markets negatively, as well. Due to excess supply and no demand, prices on domestic assets were falling quickly.

As was mentioned above, ISK index depreciated by approximately 43% with "overshooting", during next two months (Figure 6). It increased volumes and costs of foreign denominated debt (hold by individuals and corporations) by approximately 43%. As a result of it, equity (in assets financed with such debt) decreased significantly (as debt rose, and the price of asset had fallen). As was mentioned above, 75% of foreign denominated debt was owned by Icelandic enterprises, which led to highly negative equity positions in most cases.

Inflation continued to rise. In Figure 3, it is possible to see that by the end of 2008, it passed 18%. It increased volumes and costs of indexed debt by approximately 18%. As a result of it, equity in assets financed with such debt decreased significantly (as debt rose, and the price of asset had fallen) or even became negative. However during next

years, annual inflation was constantly decreasing. By the end of 2009, it was above 7%; and by the end of 2010 – slightly above 2%. The most of indexed debt was owned by Icelandic individuals.

All those factors added led to an increase in the cost of debt and a decrease in consumption level. In Figure 8, it is possible to see that from 2005 until the end of 2007 private consumption was growing at decreasing rate; and public consumption was growing at constant rate. However during 2009, both growths became negative (private more than public). Private consumption growth became positive in the following year, but growth of public consumption stayed negative until 2011.

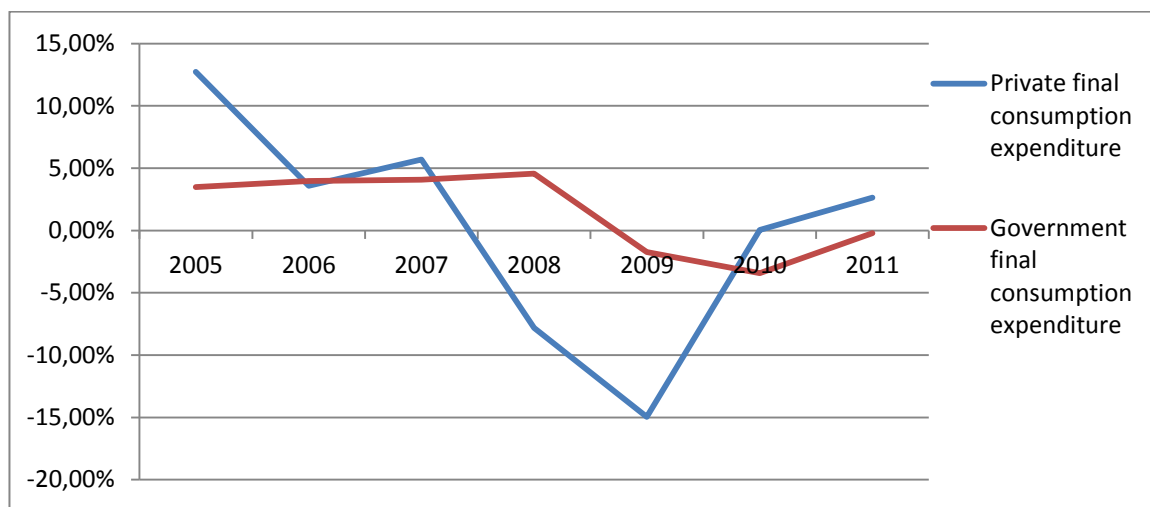


Figure 8. Growth of private and public final consumptions (at constant prices, %).¹⁹

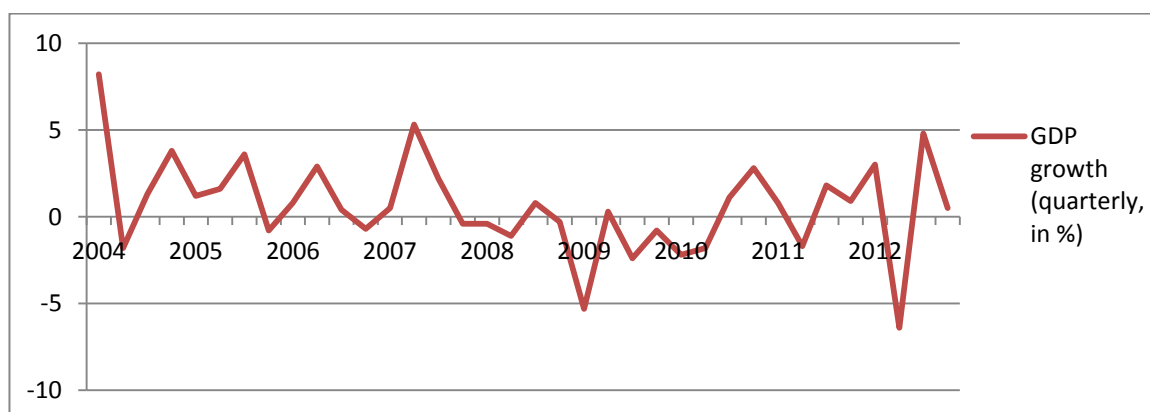


Figure 9. GDP growth (quarterly, %), 2004 – 2012.²⁰

¹⁹ Based on Statistics Iceland database and author's calculations.

It resulted in the significant fall in country's production (GDP) and the high bankruptcy rate among enterprises and individuals the following year. In Figure 9, it is possible to see that quarterly GDP growth after the 2008 crisis was constantly negative until the middle of 2010. Annual GDP growth became positive by the end of 2011.

Due to the high fiscal deficit after crises, the Icelandic government had no other choice than to cut down all public expenditures and to increase all types of taxes. Due to a decrease in public expenditures, a number of employees in the public sector continued to fall (the cost of labor is the highest operating expense in the balance sheet, over 60%). Due to an increase in tax burden and the cost of debt, insolvency in the private sector increased significantly and led to the high bankruptcy rate among enterprises. As a result, unemployment rate was on the rise. In Figure 10, it is possible to see that by the end of 2008, unemployment rate was over 5%. And during the period of 2009 – 2011, it varied between 9% and 7%. In retrospective, natural unemployment rate in Iceland prior to 2008 crises was approximately 2%.

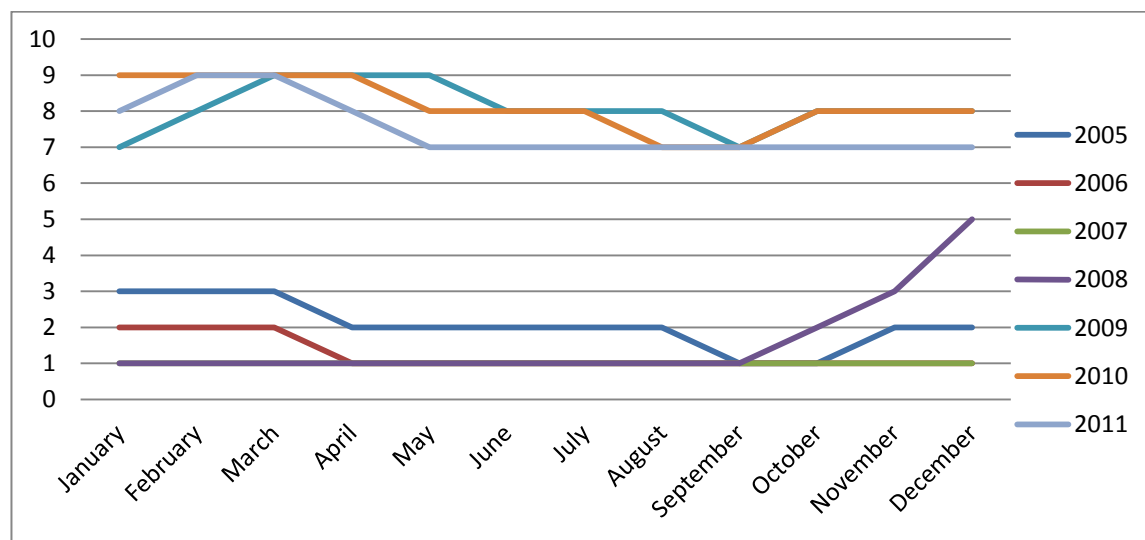


Figure 10. Unemployment rate (%), 2005 – 2011 (by month).²¹

Another reason of my interest in unemployment rate is the end of recession. According to the rule of thumb, recession period is over when unemployment rate decreases by 1.5% within 12 months. As it seen in Figure 10, there were no movements

²⁰ Source: Statistics Iceland.

²¹ Source: Statistics Iceland.

of such size in unemployment rate. It allows me to assume, that Iceland never go out of recession.

5.4 Industries' development during the period of 2005 – 2011

Financial and insurance industries are omitted from this overview due to the presence of high turbulences in these industries, during the period of 2005 – 2011. Manufacturing of basic metals is omitted, as well. Inputs in this production are mainly imported and outputs – exported and sold in foreign markets. Assets are measured in foreign denominated currencies, because Icelandic corporations in this industry owned by foreign corporations. Therefore, the Icelandic economic development at macro- and micro- levels has very small importance for this industry.

Moreover, in 2008 ISAT 1995 was replaced by ISAT 2008. As a result of it, some industries were united in same division; others – were separated in multiple divisions. Therefore, for review purposes I adapted and simplify changes in ISAT 2008 (industries' classification) to ISAT 1995. In Appendix 1, it is possible to see more detailed explanation of that adjustment.

This review explains how Icelandic industries differ in their structure (a number of firms in an industry helps to explain competitiveness within), profitability (aggregate and average per firm) and transaction costs (debt ratio).

In Figure 11, it is possible to see how quantity of firms (the level of competition within an industry) was changing in industries during the period of 2005 – 2011. The size of changes allows reviewing of entry/exit barriers. And Figure 12 shows aggregate profits after taxes by industries measured in millions ISK, during the review period.

Construction and real estate, others business activities' (specialized domestic services), health and social works, and land and water transportation industries exhibit a high number of firms in them. It can be explained: as demand for their outputs was increasing, it created an opportunity for new firms to enter those industries. Therefore, the level of competition within them is higher than in others. However, all those industries produce goods/services that are non-tradable. As a result, they are not facing international competition, only domestic. Therefore, not necessary all firms within industries are operating at efficient levels, especially during expansions.

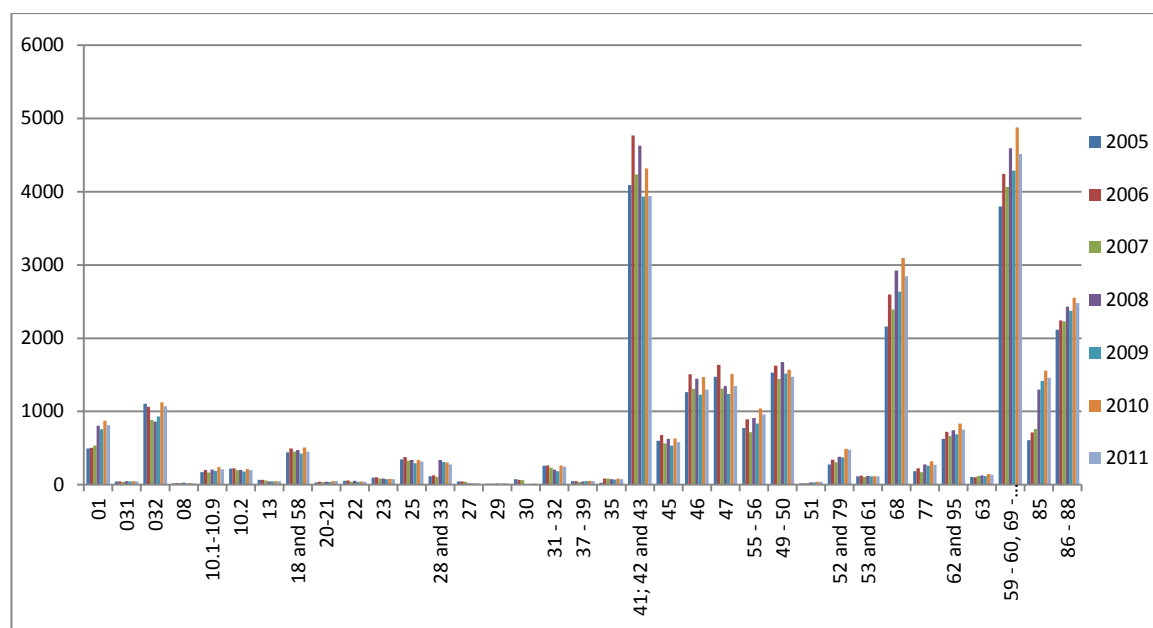


Figure 11. A number of enterprises by an industry, 2005 – 2011.²²

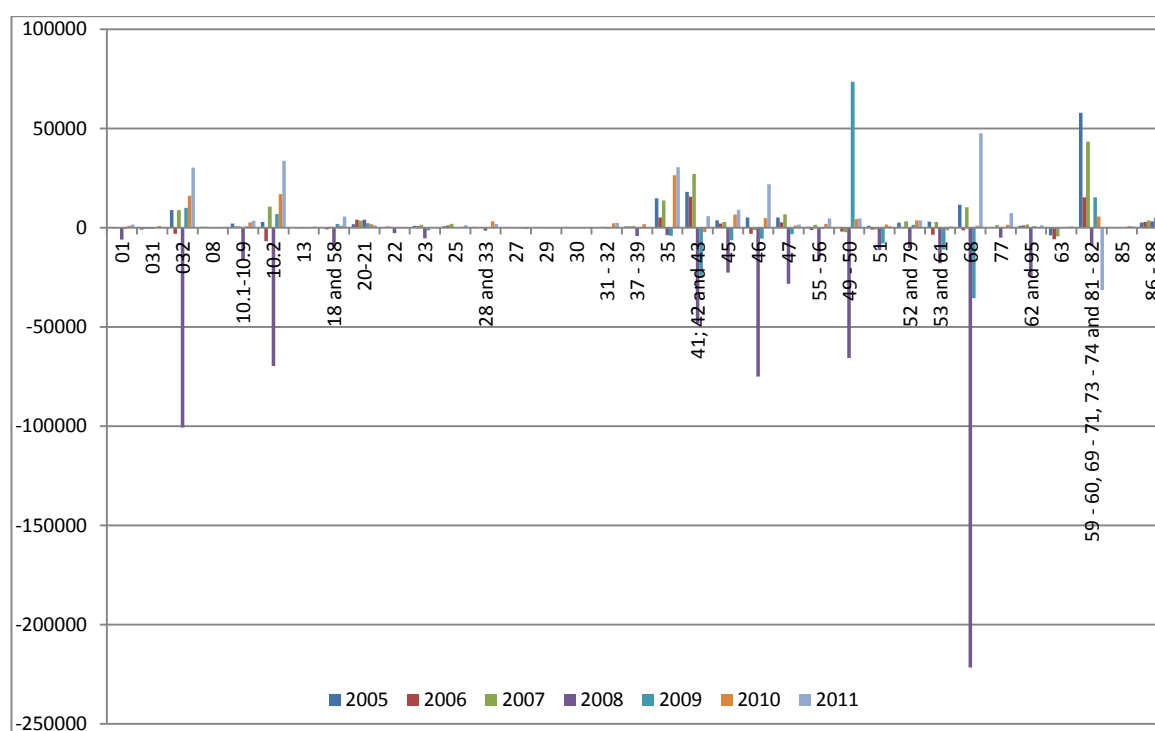


Figure 12. Aggregate net profits after taxes by industries, 2005 – 2011 (millions, ISK).²³

²² Based on Statistics Iceland database and author's assessment, classification ISAT 2008.

²³ Based on Statistics Iceland database and author's calculations, classification ISAT 2008.

A proof of that is possible to see in Figure 12. During 2006, aggregate net profits after taxes in described above industries were decreasing or even negative. As a result of it, the number of firms was decreasing in the following year. An exception was health and social works. However, activities in this industry are supported by public expenditures.

On another hand, mining and quarrying, electric equipment manufacturing, and chemical and pharmaceutical manufacturing industries exhibit very low number of firms in them. These industries belong to tradable sector and are facing international competition. As a result, only firms that can produce at efficient levels enter and operate in these industries. Therefore, it is not surprising, that a very small number of firms was entering or exiting market during the review period.

In Figure 12, it is possible to see that aggregate net profits after taxes in these industries increased significantly, during 2006.

The number of firms increased significantly across all industries that were not mentioned above, during 2006. An exception was fish hatcheries' and fish farms' industry. In Figure 12, it is possible to see that during that year aggregate profits in this industry were negative, as well.

However, a number of firms (Figure11) decreased across many non-tradable industries in 2007, due to low profits of 2006. In Figure 12, it is possible to see that aggregate net profit after taxes was below the 2005 level in many industries, during 2006 (except for tradable sector industries described above). These lower profits in 2006 resulted in lower firms' numbers in 2007. Only firms that could produce most efficiently were able to survive. In retrospective, GDP growth rate was at the highest level due to performance levels in financial and insurance sectors, during that year.

In 2007, an exception in non-tradable sector was only education and agriculture industries, which production is supported by public expenditures/subsidies. In these industries quantity of firms was increasing.

On another hand, lower competition and small depreciation of ISK index (Figure 6) in 2007 had the positive effect on aggregate net profit after taxes (during that year) across industries in non-tradable sector, as it possible to see in Figure 12. However, industries in tradable sector were exhibiting decreasing or even highly negative aggregate net profit, during that year. Still to high ISK index was affecting negatively their profits. Relative wages (2/3 of operating expenses) increased due to an increase in ISK index. It

resulted in higher costs and higher outputs' prices in comparison to their competitors in other countries.

As it would be expected, the number of firms increased in previously well-performing industries, and the number of firms decreased in under-performing industries, during 2008. However, as it possible to see in Figure 12, aggregate profits across many industries plunged down by the end of 2008. It happened, because a rise in interest rates and depreciation of ISK index increased inputs' costs and interest's expenses in all industries. Most negatively affected profits by this development were in hatcheries' and fish farms', land and water transportation, fish processing, and whole sale industries. Whole sale was affected by an increase in inputs' costs; other industries – by an increase in the cost of foreign denominated debt (their debt ratio was slightly below 75%, as it possible to see in Figure 14).

In 2008, real estate industry's performance suffered the most due to the sudden stop in real estate market from uncertainties, inflation and frozen credit market.

During 2008, an exception was aggregate profitability in the pharmaceutical industry, which belongs to tradable sector (with debt ratio below 20%, Figure 14); and health and social work's industry, which is fully financed by the government. Aggregate profits in these industries increased or just slightly decreased.

As a result of low or negative aggregate profits in 2008, the number of firms decreased across all industries during 2009. An exception from this rule was education industry due to increased demand on its outputs among Icelandic and foreign individuals. In 2010, the number increased again; and in 2011 it decreased. It looks like across all industries the number of firms was very volatile around some mean, which was specific for each industry, during these three years.

According to Figure 12, aggregate net profit after taxes was constantly increasing in most of industries, during the period of 2009 – 2011. However, some manufacturing industries in tradable sector (depending on foreign produced inputs) and some industries employed by municipal governments (with controlled prices on outputs) had volatile performances.

Over all, most competitive industries are in the non-tradable sector – domestic services, such as construction and real estate, others business activities', health and social works, and land and water transportation industries. And least competitive

industries are in the tradable Icelandic sector – goods production, such as electric equipment manufacturing and chemical and pharmaceutical manufacturing industries. However, these industries are competing at the international level. Therefore, they have less market power than non-tradable sector.

The highest aggregate profitability has others business activities' industry, but it has the biggest number of firms in it, as well. The lowest and negative aggregate profitability has real estate industry, which was greatly affected by 2008's crises.

Therefore, it is a great help in reviewing profitability within industries – Figure 13. There is possible to see relative net profits after taxes per firm (100% as a profit in a whole economy) by an industry, during the review period. In Appendix 2, it is possible to see more detailed explanation of calculation.

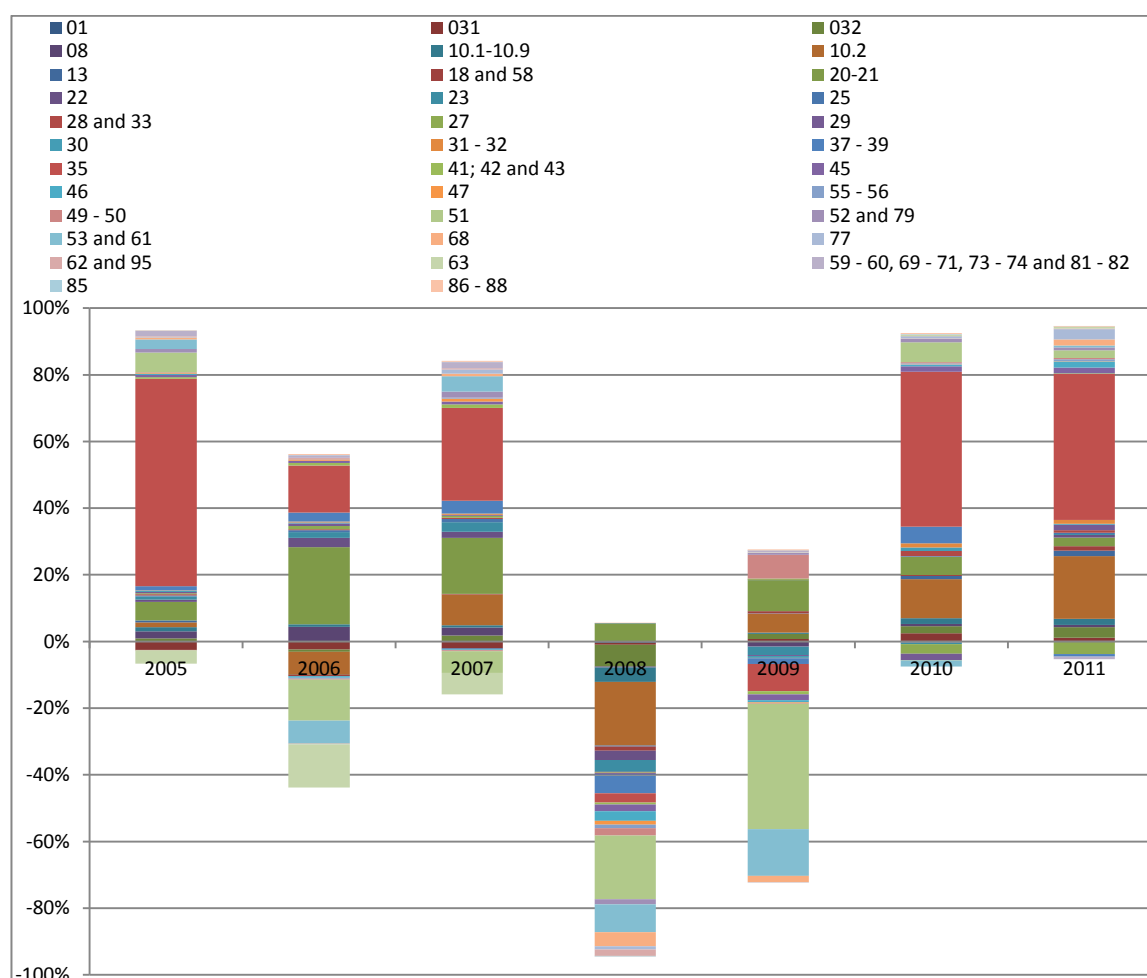


Figure 13. Relative net profits after taxes per firm by an industry, 2005 – 2011 (as a part of 100%).²⁴

²⁴ Based on Statistics Iceland database and author's calculations, classification ISAT 2008.

In Figure 13, it is possible to see that the most profitable industry is electricity, gas, steam and air conditioning supply. It belongs to the non-tradable sector (at this point of time) and has very high fixed cost, financed by foreign denominated debt. However, it is owned by the government. Therefore, its debt costs are lower in comparison to other industries. Its inputs produced domestically at very low prices, and outputs are sold in the domestic market, as well. However, here exists some dependence on international prices of some basic metals. In 2005, this industry had the highest net profit per enterprise in the economy. However, as the index of ISK significantly depreciated in 2008 and 2009, net profit per firm became negative due to increased cost of capital. After ISK stabilization in 2010 and 2011, industry began to recover to its previous levels.

The second most profitable industry is pharmaceutical. It belongs to the tradable sector, which depends on prices of inputs/outputs in international markets. The Icelandic economic environment has very little importance for that industry. The interesting thing is that independently from Icelandic and worldwide economic situations: an expansion or a recession, net profits per firm in this industry were always highly positive. Such profitability may be explained by low debt ratio (below 20%), as it is possible to see in Figure 14. Therefore, volatilities of interest rates and ISK had a small effect on the cost of capital in this industry. However, net profits per firm were much higher during expansion period.

The lowest average profit industry was air transportation, during the review period. It belongs to the tradable sector, which depends on prices of inputs/outputs in international markets. However, the Icelandic economic situation is important for that industry, as well. Demand in this industry could be separated into domestic and foreign. Therefore, it is highly dependable on the balanced value of ISK index. If ISK index is over-valuated or under-valuated, net profits per company will be negative. A proof of that is possible to see in Figure 13. During the period of 2006 – 2009, average net profits in this industry were highly negative. Another explanation of low net profits per firm in this industry may be too high debt ratio, around 80%. However, equity ratio was doubled, during the period of 2010 – 2011. And it resulted in positive average net profits for these years.

Postal and telecommunication industries have the second lowest average net profit per firm in the Icelandic economy. They belong to non-tradable sector and provide

domestic services. Therefore, they are mainly dependent on the Icelandic economic situation. As well, there were significant technological developments in these industries, which led to an increase in expenses and a decrease in revenues. In Figure 13, it is possible to see that net profits per firm were positive only in 2005, 2007 and 2011.

As well, these two industries had not so long time ago enjoyed monopolistic rights in Iceland. However, after they became competitive; average profits in these industries plunged down. It is possible that it took some time for their production to reach efficient levels.

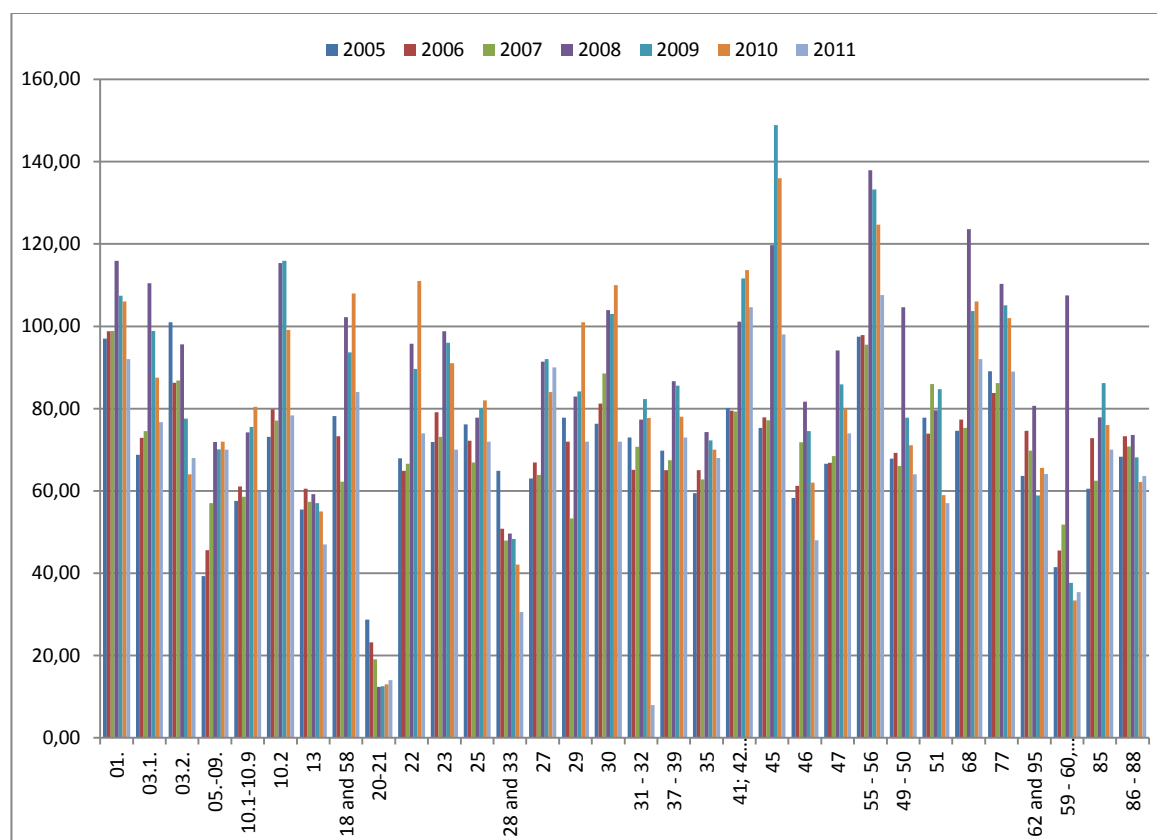


Figure 14. Debt ratio (%) by an industry, 2005 – 2011.²⁵

In Figure 14, it is possible to see debt ratio (measured as the percentage of total assets) in industries, during the review period. In Appendix 3, it is possible to see more detailed explanation of calculations.

As was mentioned above, the pharmaceutical industry in Iceland has the lowest debt ratio. It was constantly decreasing during the period of 2005 – 2009. And, it stopped

²⁵ Based on Statistics Iceland database and author's assessment, classification ISAT 2008.

around 14% in 2011. Therefore, volatilities in internal and international financial markets have very small impact on its net profit. As a result, it is the second most profitable industry in Iceland.

The second lowest debt ratio belongs to manufacturing of machinery and equipment's industry. The ratio was decreasing, during the review period. In 2008 and 2009, there was an insignificant increase in it. However, taken into account the full period debt ratio decreased by more than 50%: in 2005, it was 65%; and in 2011, it reached 30%. That change had the proportional effect on net profit per firm, as it possible to see in Figure13. In 2009, debt ratio was decreased to 48% and net profits per firm became highly positive.

It is interesting to see, that the lowest debt ratios (14% – 50%) belong to manufacturing industries. All these industries belong to tradable sector. Therefore, their outputs' prices should be highly competitive at the international level. As a result of it, an increase in debt ratio would increase their costs and prices; and it would make them less competitive.

The highest debt ratio belongs to hotels' and restaurants' industry. These industries have high initial fixed costs, usually financed with foreign denominated debt. A proof of that is possible to see in Figure 14. During expansion period, debt ratio was around 92% – 98%. However, as ISK index dramatically depreciated by 43% in 2008, debt ratio increased above 137%. However, due to ISK index stabilization, Icelandic courts' rulings and high foreign demand for this industry's outputs, debt ratio was constantly moving towards 100%, in following years. And in 2011, it reached 107%.

Sale of motor vehicles has the second highest debt ratio. Supply in this industry depends on ISK index (lower ISK index – lower costs of inputs) and is financed by foreign denominated debt, as well. Demand in industry depends on the economic situation in Iceland (higher GDP growth – higher revenues). As a result, it is not surprising that debt ratio was under 80%, during expansion period. And it increased to 120% in 2008 and above 148% in 2009. However, after stabilization in ISK, GDP and Icelandic courts' rulings debt ratio was mowing downwards. And in 2011, it reached 102%.

Agriculture's industry has the third highest debt ratio. Its development was very similar as in previously described industries: around 98%, during expansion period; around 116% in 2008 and moving downwards during recession period.

It is interesting to see, that the highest debt ratios (98% in expansion years and greatly above 100% in recession years) belong to service industries in non-tradable sector and agriculture. They are not facing international competition. Therefore, they are able to add their increasing costs into outputs' prices. A proof of that is possible to see in Figure 12. Their aggregate net profits were negative only in 2008 and 2009. Other years of review were positively profitable for these industries.

6 Research model and determinants selection

6.1 Research process

In Figure 15, we can see that research model consists from three models: economic, organizational and integrated. As well, there is a description of independent variables, under each model. These models will analyze how independent variables are affecting ROA – the dependent variable.

$$ROA_{it} = EBIT_{it} / Total Assets_{it}$$

Where, i – characterizes a specific firm;

t – characterizes given research year.

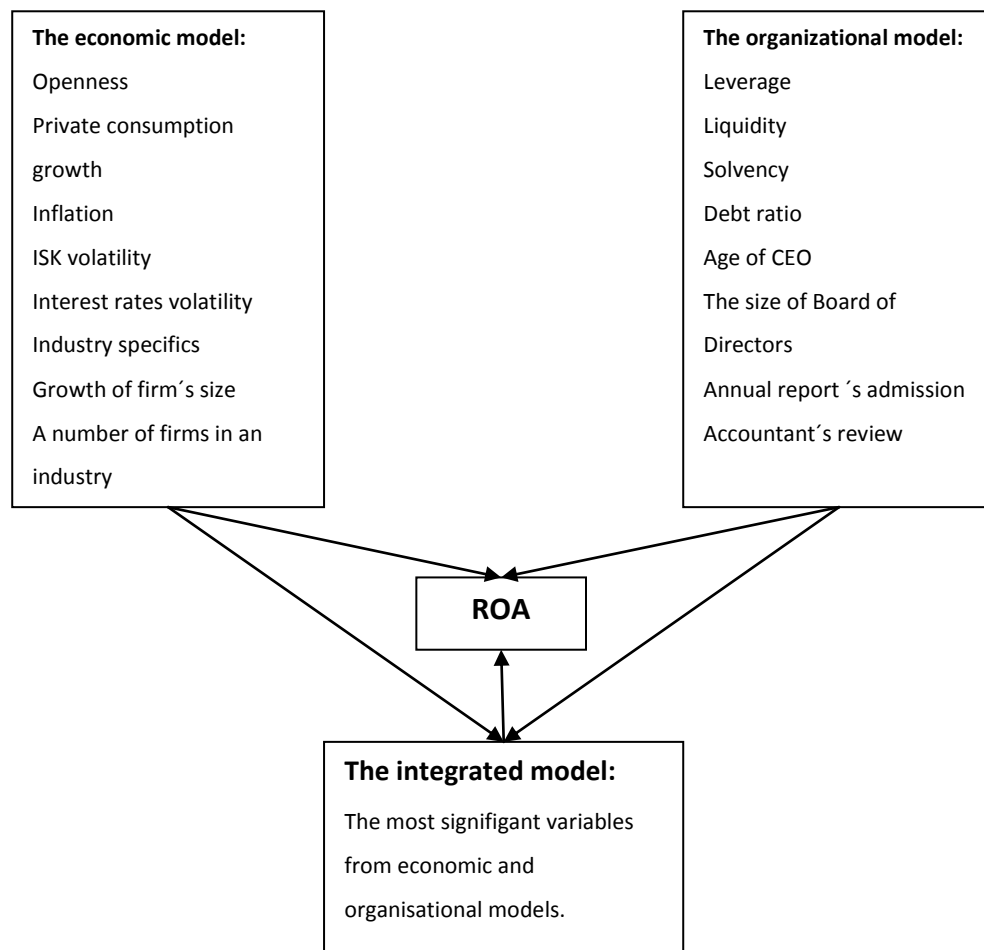


Figure 15. Research model and determinants of corporate performance.

ROA was selected as corporate performance indicator, because of its advantages and research specifics, such as different periods of economic activities (business cycles). It is very simple in the calculation and can be easily compared across all firms in unrelated industries. As well, ROA was less affected by crises in 2008, than other rates of return. In ROA, sales and operational costs are partially affected by business cycles, same time changes in the financial structure do not affect it. However, as sales are decreasing/increasing, variable operating costs are decreasing/increasing as well. Therefore, ROA is less volatile than ROE, which is strongly dependable on Icelandic economic characteristics, such as inflation and ISK index. Same time, ROA's calculation is based on limited external data, which is available for outsiders, unlike the calculation of ROI and process-based frameworks.

The first, I will estimate two models: economic and organizational. In the economic model, I will estimate how private consumption, inflation, the development of internal financial market, characteristics of given industry, and competitive advantage are affecting performance. In the organizational model, I will estimate how debt, age of CEO, annual report's admission, solvency, liquidity and etc. are affecting performance.

These two models will allow me to estimate influence of macro- and micro- (external) variables (not controlled by a firm) against influence of internal variables (controlled by a firm) on firm's performance.

Both models will be run using data from before and after crises periods and data from whole research period. However, 2008 will be excluded from analysis, because that year's shocks will distort measurements and estimators. Such estimation will allow us to see how importance of variables (for firm's performance) will change, as the economic environment was changing during 2005 – 2011.

Therefore, I can analyze determinants of corporate performance from two different perspectives: environmental change and external against internal influences.

After estimating the first two models, I will run the third model – the integrated model. From economic and organizational models, most significant variables for corporate performance will be selected and will be used as independent variables in this model. There will be estimated their impact on ROA. This will allow me to select most important determinants for corporate performance in complicated Icelandic economic environment.

6.2 The economic model

The economic model represents both institutional and technological theories (described in the fourth part).

Institutional theory is defined by macro variables, which will describe state of economy (openness and private consumption growth) and internal financial market development (annual inflation; interest rates on non-indexed loans and ISK index annual volatilities).

Technological theory is defined by micro variables, which will describe internal specifics: firm's production, competitive advantage and market power (growth of firm's size and annual inflation – CPI changes); and external specifics: economic characteristics of industry's structure (industry's profitability and competitiveness within it).

Corporate performance is affected by:

- its *investment activities*, through costs of invested capital;
- its *production activities*, through costs of production process and revenues from final goods/services.

Firm's investment activities depend on:

1. State of economy: opened (no capital controls) or closed (capital controls are present); expansion or recession.

A firm in an open economy has more diversified choice of capital types and capital providers, because it has an access to international financial markets. As a result, a firm is able to minimize its capital costs by selecting the most efficient capital structure, based on its long- and short- term operations.

A firm in closed economy has limited choice of capital types and capital providers, because it has an access only to the internal financial market. As well, it may need to compete in the internal financial market for funds, which are limited. As a result, a firm is no longer able to minimize its capital costs. It may result in delay or abandonment of investment, or an increase in capital costs.

Corporations/individuals choose how to distribute their capital and resources: invest/save into the production or consume them. However, high levels of private consumption may reduce market power of domestic firms, if foreign produced goods/services will become cheaper than domestically produced goods/services, in an open economy.

As well, private consumption and corporate performance in the tradable sector are moving in opposite directions, because appreciation/depreciation of ISK increases/reduces private consumption and reduces/increases performance in exporting industries.

In closed economy, growth of private consumption above the efficient level may reduce savings. In such economy, savings are tied to investment. Therefore, growth of private consumption may reduce indirectly investments' growth, which may lead to decreasing level of competitive advantage and lower corporate performance in near future.

2. Financial markets development. A firm has two choices how to fund its projects and activities: debt or equity. Funding by increasing equity will be not considered in this model because of banking, currency and debt crises. Equity funding became very risky investment for outside investors; and stock market was non-existing up to the present.

A firm can take three types of loan: non-indexed; indexed and denominated in foreign currency. Firm's choice of debt will depend on: annual volatility of long-term interest rates on non-indexed loans, annual inflation and annual volatility of ISK index. These variables represent the cost of debt. Debt, which has minimum cost, will be selected by a firm for financing of investments and operations. However, uncertainties associated with selected financing may affect prices of outputs, and as follows market power of firm in domestic and foreign markets.

Firm's production activities depend on:

1. Industry specifics. An industry may be described by barriers to entry, rivalry within it, consumer power in it and substitutes threat. An industry, in which a number of firms is large and volatile between research years, has no significant entry or exit barriers. Such industry has competitive market structure. Opposite holds for an industry with small and constant number of firms in it – it has monopolistic market structure. Increasing number of firms represents increasing rivalry (the level of competition) within an industry; and opposite holds if a number is decreasing. Therefore in competitive industry, increasing rivalry should have the negative effect on corporate performance. However,

many industries in Iceland maybe characterized by the oligopolistic stricture. In such case, increasing level of competition within an industry may put a pressure on well-performing firm to invest more in R&D and to find more efficient ways of production. Such activities may result in greater performance.

If substitutes for industry's outputs are present (in the domestic market) at competitive prices, consumer power is increasing. In that case, if firms in an industry will decide to increase outputs' prices; consumers will switch from more expensive goods/services to cheaper one. And, it will result in lower revenues and profits among firms in an industry, due to unsold final outputs. As a result, industry's net profit after taxes will be affected negatively. However, availability of substitutes at competitive prices may change (due to changes in inflation and ISK index) between research years. As a result, the strength of consumer power will be changing, as well. Taken into consideration such changes, consumer power and threat of substitutes should be represented by the average (of four years) of industry's profits after taxes.

2. Firm specifics. A firm may be described by its market power and competitive advantage. A firm that has competitive advantage is able to reach it's the most efficient size (in a given industry). A larger firm has lager amount of (capital and production) resources available for new projects' investment and development. And, it will result in an increase in revenues. Lager amount of internal resources affects the rate of survivorship positively, especially if a turbulent moment is present.

As well, a larger firm has economies of scale. It will result in a decrease in production costs. A larger firm has higher production capacity; therefore, sales will increase, providing firm with more market power.

A firm that has market power is able to add an increase in (capital or production) costs into the price of final goods/services. It will result in increasing revenues. An increase in outputs' prices will affect CPI and will result in higher annual inflation. Therefore, annual inflation may characterize market power of firms in the economy.

6.3 The organizational model

The organizational model represents organizational theories (described in the fourth part): agency cost and transaction cost theories.

Agency cost theory is defined by financial ratios and agency characteristics, which will describe the presence of moral hazard (CEO's age), agency cost of debt (leverage) and monitoring expenditures (accountant's review, annual report's admission and a number of members in the Board of Directors).

Transaction cost theory is defined by financial ratios, which will describe external transaction costs: incurred due to uncertainties (liquidity) and bounded rationality (solvency); and internal transaction costs: the main source of funding for market making (debt ratio).

Corporate performance is affected by:

- its *agents activities*, through costs incurred from agents failure to maximize the value of firm;
- its *market making activities*, through costs incurred during the economic exchange related to planning, organizing and enforcing firm's input or/and output contracts of production process.

Firm's agents' activities affected by:

1. The presence of moral hazard, if firm's decision-maker (CEO) is willing to take more risk (in hope to gain more); because he/she knows that in case of failure, potential costs or burdens will be paid by principals (firm's owners). Usually, it is assumed that conservatism (defined as less risky operations and financing) of CEO is proportionally increasing with his/her age and experience.
2. Agency costs and expenditures. Because of management-shareholder problem (the agent-principal problem), the cost of outside equity is much higher than the cost of debt. This difference would explain why debt is preferred as the funding source for corporations rather equity financing. Therefore, agency costs may explain corporate leverage that will increase firm value. Furthermore, a high level of debt serves as a punishment mechanism for inefficient management and leads to cost efficiency.

To decrease management team's divergences from shareholders' interests and to limit their undesirable actions, monitoring is used. However, with increasing

size of management team, monitoring expenditures will increase, as well. These expenditures may be explicit or implicit. Explicit monitoring expenditures are represented by accountant's review and annual report's admission. Implicit monitoring expenditures are represented by a number of members in the Board of Directors.

Firm's market making activities create:

1. Internal transaction costs. A firm chooses to start some kind of production. It's short- and long-term activities are financed with debt and equity funding. As was mentioned before, the cost of equity is higher than the cost of debt (the loss in equity greater than the gain in funds). It may explain why (short- and long-term) debt may be preferred as the funding source of operations and investment opportunities. It is represented by debt ratio. However, debt ratio should be at the efficient level. Therefore, too high debt level will increase interest expenditures; and too low debt level (high equity level) will decrease value of firm. As before, debt ratio has a disciplinary role in corporate performance. However, due to specifics of Icelandic legal system it may be less relevant, as previously mentioned on page 39.
2. External transaction costs. External transaction costs incurred when some activity of firm's production process is outsourced to others firms. Outsourcing is chosen by a firm if the market can produce more cheaply. The volume of external transaction costs could increase when short-term contracts are not sustainable due to constant costs of information collection and negotiations. And, it may be difficult to identify all sufficient conditions in long-term contracts due to uncertainty and bounded rationality. Costs of inputs are main operating expenditures in firm's accounts. Therefore, uncertainty in short-term inputs' prices may be solved with increased liquidity. However, liquidity should be at the efficient level, because an excess of liquidity do not creates returns, but creates costs (therefore, revenues will decrease) and a shortage of liquidity may lead to an increase in firm's operating costs and interest payments. Bounded rationality of decision-maker may have an impact on firm's solvency level. The inefficient level of solvency (the proportion between short-term assets

and short-term debt, and their structure) may increase external costs (interest payments), decrease firm's revenue or even lead to firm's bankruptcy.

6.4 Corporate performance determinants and their estimators

The impact of openness on corporate performance will be estimated indirectly, by comparing results for 2005 – 2007 and 2009 – 2011 periods. During 2005 – 2007, the Icelandic economy was opened to any international financial capital inflow and outflow. However, it changed during 2009 – 2011, when capital controls were imposed. There were no changes in international trade during these periods. Therefore, impact's assessment will be partial.

Private consumption growth is based on annual data and is measured at constant prices (2005 – reference year). For each year of research, it is estimated, as follows:

$$\text{Private consumption}_{it} = \ln(\text{private consumption}_t)$$

Where, private consumption_t – annual private consumption for a given year at constant prices (2005 – reference year);

Annual inflation (12 month) is based on monthly data. For each year of research, it is estimated, as follows:

$$\text{Annual Inflation for a given year}_{it} = N_t / N_{t-1} - 1$$

Where, N_t – Consumer Price Index (CPI), based on prices of the first two days in January for next research year;

N_{t-1} – Consumer Price Index (CPI), based on prices of the first two days in January for given research year.

Interest rates volatility is based on monthly data, and ISK index volatility is based on daily data. Annual interest rates and ISK index volatilities for each year of research are estimated, as follows:

$$I_t = \frac{1}{2} * (I_h + I_l)$$

Where, I_h – the highest coupon rate on non-indexed bonds for a given month;

I_l – the lowest coupon rate on non-indexed bonds for a given month;

I_t – average coupon rate on non-indexed bonds for a given month.

$$X_t = I_t / I_{t-1}$$

Where, I_t – ISK index/average coupon rate for a given day/month;

I_{t-1} – ISK index/average coupon rate from previous day/month;

X_t – the change in ISK index/average coupon rate between periods.

$$\text{Continuously Compounded } X_t = \ln(X_t)$$

$$\text{Average}_t = \frac{\sum_1^n \ln(X_t)}{n}$$

Where, n – a number of periods in annum;

Average_t – the average of continuously compounded changes per annum.

$$\text{Squared Excess Change}_t = \frac{\sum_1^n [(X_t - \text{Average}_t) * (X_t - \text{Average}_t)]}{n-1}$$

$$\text{Annual Volatility}_{it} = \sqrt[2]{\text{Squared Excess Change}_t * n}$$

Each firm belongs to some industry. Firm's industry is specified by ISAT code. Industry's specifics for a given year are described by the average of industry profits for four consecutive years (including a given year). And, it is estimated, as follows:

$$\Pi_t = \text{net } \Pi_t - T_t$$

Where, Π_t – industry's net income for a given year;

net Π_t - industry's net profit before income tax for a given year;

T_t – industry's tax expense for a given year.

$$\text{Average}_{it} = \frac{\sum_1^4 \Pi_t}{4}$$

Where, Π_t – industry's net income; and years range is from research year and three years before it;

Average_{it} – the average of industry profits for four consecutive years (including a given year).

A number of enterprises in firm's industry for a given year is based on annual data for operating accounts of all available enterprises for a given year and separated by industries' divisions.

Growth of firm's size is measured at constant prices (2005 = 100), as follows:

$$\text{Firm's Size}_{it} = \ln(\text{Total Assets}_{it} * N_{t-1} / N_t)$$

Where, N_t – adapted (if needed) Consumer Price Index (CPI), based on prices of the first two days in January for given research year;

N_{t-1} – Consumer Price Index (CPI), based on prices of the first two days in January for 2006;

Total Assets_{it} – total assets of given firm on given research year.

$$Debt\ Ratio_{it} = Total\ Debt_{it} / Total\ Assets_{it}$$

$$Leverage_{it} = Total\ Debt_{it} / Total\ Equity_{it}$$

$$Liquidity_{it} = Short\ Term\ Debt_{it} / Total\ Debt_{it}$$

$$Solvency_{it} = Short\ Term\ Assets_{it} / Short\ Term\ Debt_{it}$$

Age of CEO and the size of Board of Directors in each firm during research period are retrieved from Creditinfo data.

Annual report's admission and accountant's review (for each firm and for each year of research) are described by dummy variables: if the statement is true – a dummy variable is equal to 1, if the statement is false – a dummy variable is equal to 0.

6.5 Research method

The fixed effects model was selected as research method for pooling time-series and cross-section data. It is more appropriate model than the random effects model, because it allows me to omit individual effects and, sample's data is not random. Ordinary least squares (OLS) were considered as a sufficient method for estimation procedure. As well, the random effects model does not resolve heteroskedasticity problem. This model specifies that only intercept (β_{0it}) parameter varies, not slope parameters ($\beta_1, \beta_2 \dots \beta_n$):

$$\beta_{0it} = \beta_0 + e_i$$

$$\beta_{1it} = \beta_1$$

$$\beta_{2it} = \beta_2$$

...

$$\beta_{nit} = \beta_n$$

Where, n – represents a number of independent variables;

i – represents a specific firm;

t – represents a given year of research;

e_i – residuals across sections.

The intercept explains individual the difference between firms. However, according to this model the intercept varies only across individuals (it represents individual characteristics of each firm) and not over time. This creates a problem in estimating the model, because the research is based on expansion and recession periods. As a result of such research time-series, it is expected that the intercept may vary over time, as well. To fix this and many other possible problems, here was employed the demeaning method. It was implemented, as follows:

$$\begin{aligned}\tilde{Y}_{it} &= Y_{it} - \bar{Y}_i \\ \tilde{X}_{1it} &= X_{1it} - \bar{X}_{1i} \\ \tilde{X}_{2it} &= X_{2it} - \bar{X}_{2i} \\ &\dots \\ \tilde{X}_{nit} &= X_{nit} - \bar{X}_{ni} \\ \tilde{e}_{it} &= e_{it} - \bar{e}_i\end{aligned}$$

Where, \tilde{Y}_{it} – demeaned dependent variables (ROA_{it}) across sections and time-series;

Y_{it} – dependent variables (ROA_{it}) from the sample across sections and time-series;

\bar{Y}_i – sectional means of dependent variables (ROA_{it});

$\tilde{X}_{1it}, \tilde{X}_{2it} \dots \tilde{X}_{nit}$ – demeaned independent variables across sections and time-series;

$X_{1it}, X_{2it} \dots X_{nit}$ – independent variables from the sample across sections and time-series;

$\bar{X}_{1i}, \bar{X}_{2i} \dots \bar{X}_{ni}$ – sectional means of independent variables;

\tilde{e}_{it} – demeaned residuals across sections and time-series;

e_{it} – residuals from the sample across sections and time-series;

\bar{e}_i – sectional means of residuals.

Such estimation resulted into the transformed model:

$$\tilde{Y}_{it} = \beta_1 * \tilde{X}_{1it} + \beta_2 * \tilde{X}_{2it} + \dots + \beta_n * \tilde{X}_{nit} + \tilde{e}_{it}$$

Here was eliminated individual characteristic for firms ($\beta_0 = 0$), which had no importance for this research. Same time, parameters of independent variables are not affected. Therefore, I got the model which estimates impacts of independent variables

on ROA (β_n); and the importance of these impacts (R^2) was left unaffected by individual characteristics.

As it was mentioned above, the transformed model solves many other possible problems, such as feedback effect. This effect occurs when independent variable affects dependent one; and dependent variable affects independent one. It creates endogeneity problem:

$$\text{cov}(X_{nit}, e_{it}) \neq 0 \rightarrow \text{corr}(X_{nit}, e_{it}) \neq 0 \rightarrow \text{OLS estimators } (\beta_n) \text{ are inconsistent}$$

Where, $\text{cov}(X_{nit}, e_{it})$ – covariance between residuals and independent variable;

$\text{corr}(X_{nit}, e_{it})$ – the correlation between residuals and independent variable.

Therefore, OLS estimators do not converge to their true values even as $N \rightarrow \infty$. Furthermore, none of hypothesis testing is valid.

Moreover, the transformed model eliminates any possible random effect, as well as any other time-invariant factor.

Heteroskedasticity problem is often encountered in cross-sectional data, as well:

$$E(e_{it}^2) = E(e_{is}^2) = \sigma_i^2$$

$$E(e_{it}^2) \neq E(e_{jt}^2)$$

Where, i and j – two given firms;

t and s – two given time periods.

It means that the variance of error term is constant within the section, but varies between them. Therefore, OLS estimators are no longer the best – some another estimator has smaller variance.

To deal with it, panel data was estimated with the help of robust standard errors – PCSE (panel corrected standard errors), instead of $\text{cov}(\beta)$. PCSE corrects standard errors estimates for β_n :

$$\hat{\Sigma}_{ij} = (E^T E) / T$$

Where, $\hat{\Sigma}_{ij}$ – N x N matrix of covariances for all i and j;

$E^T E$ – T x N matrix of residuals;

T – a number of time periods in research.

$$\hat{\Omega} = \hat{\Sigma}_{ij} \otimes I_T$$

Where, $\hat{\Omega}$ – NT x NT block diagonal matrix with $\hat{\Sigma}_{ij}$ along the diagonal;

I_T – NT x NT identity matrix.

$$PCSE = (X^T X)^{-1} X^T \hat{\Omega} X (X^T X)^{-1}$$

Where, PCSE – panel corrected variance/covariance matrix of β ;

X^T – transposed independent variable's matrix;

X – independent variable's matrix.

In another words, for each section the variance of its error terms is estimated as MSE of its residuals.

Autocorrelation is another common problem, encountered during regression estimation:

$$\text{corr}(e_{it}, e_{i(t-1)}) \neq 0$$

Therefore, OLS estimators are no longer the best – some another estimator has smaller variance.

To test for the presence of this problem was used Durbin-Watson test:

$$d = 2 * (1 - \text{corr}(e_{it}, e_{i(t-1)}))$$

if the value of statistic d is near 2 – autocorrelation is not preset;

if the value of statistic d is below 1.4 – positive autocorrelation is present.

6.6 Expected results

Usually, economic variables explain about 10% – 25% of variation in corporate performance for big economies. And, organizational variables are responsible for 15% – 35% of variation in corporate performance for big economies.²⁶

I would expect that the importance of economic variables (especially, macro-variables) increases during the expansion and decrease during the recession. Because, when country's economy is doing well in all sectors, it is easier for a firm to achieve good performance. Another factor that may lead to higher performance during the

²⁶ Hansen, G. S., Wernerfelt, B. (1989, September – October). *Determinants of firm performance: the relative importance of economic and organizational factors*. Strategic Management Journal, Vol. 10, No. 5, 1989, pp. 401.

expansion is higher variety of funding sources and easier access to financial markets. To rephrase it, more open economy.

In Iceland, increasing private consumption creates higher domestic demand for goods/services. Affected by increasing domestic demand, the production is increasing even further (as seen in Figure 2). Thus, performance of non-tradable sector is affected positively. However, increased demand leads to a rise in prices of domestically produced goods/services, which makes them more expensive than foreign produced. It reduces performance in those industries. As well, performance in the tradable sector and private consumption are moving in opposite directions, due to ISK movements. Therefore, it is impossible to predict the sign of relation between these two variables.

Because of research sample's specifics, which consists from relatively well-performing firms with some level of market power (are able to pass-through increasing uncertainties into CPI); corporate performance and inflation may have positive correlation, during recession and expansion. On another hand, increasing inflation creates uncertainties in present and future costs/prices of inputs/outputs. Therefore, planning of activities is more complicated and more costly for any firm. As a result of it, increasing inflation may affect corporate performance negatively, during any research period. It is in question, which of these two impacts was more significant for ROA.

Increased GDP led to ISK appreciation. Better investment opportunities for foreign investors led to increasing levels of foreign capital inflow into the country. However, need to remember that Iceland is a small economy with shallow financial markets. Therefore, ISK index is easily affected by changes in capital flows. They create a higher level of ISK volatility. Increasing volatility creates uncertainties, as well. Therefore, planning of activities is more complicated and more costly for any firm. As a result, it is expected that higher ISK volatility during the expansion should affect corporate performance more negatively, than lower ISK volatility during the recession (capital controls insure less deviation in ISK index).

During expansion period, profitable opportunities for a firm in Iceland were more costly, because CBI was raising interbank interest rates. Its goal was to decrease money demand on the internal financial market. Therefore, interest rates on banking loans were increasing. The length of monetary contraction affects interest rates volatility proportionally: longer period of contraction leads to higher volatility. During the

recession, CBI implemented the monetary expansion. However, the length of that process has a similar impact on interest rates volatility. Over all, I would expect that interest rates volatility has a similar impact on ROA, as ISK volatility – negative (due to uncertainties in future plans), independently from the economic environment.

It is difficult to predict how micro-variables were affecting corporate performance during the expansion and the recession. However, it is expected that during expansion/recession, corporate performance of export industries decreases/increases due to high/low prices on their outputs.

Opposite should hold for organizational variables. Their importance increases during the recession and decreases during the expansion. The quality of management team and the relationship between owners and managers is very important for a company during the recession. Corporate performance will depend on managers' ability to reorganize capital structure, production process and etc. with respect to worsening economic environment.

Table 2. Expected results for the economic model.

	Ope nnes s	Private Consumpt ion growth	Infla tion	ISK vola tility	Interest rates volatility	Indu stry spec ifics	Growth of firm's size	A number of firms in industry
Perfor mance	+	+/-	+/-	-	-	+	+	+/-

In Table 2, it is possible to see expected results for the impact of economic variables on corporate performance. Capital market's development does affect firm's future plans and investments. Therefore, ISK and interest rates volatilities expected to have a negative sign. As uncertainty rises; costs of managing, organizing and planning firms' activities and investment opportunities are increasing; and profitability is decreasing, as a result of it.

It is difficult to predict the sign for inflation's impact on ROA. Increasing inflation increases revenues, but it increases costs of inputs, as well. So, the sign for inflation will

depend on the ability of firm to pass inflated costs to its consumers (the elasticity of firm's demand) and its market power.

As well, it is difficult to predict the sign for growth of private consumption; because it depends on the combination of consumers' market power and ISK movements.

I would expect that increasing industry's profitability should affect corporate performance positively. This prediction is based on the statement that some industries are more profitable than others. On another hand, it is difficult to predict how the quantity of firms in an industry affects ROA. This sign will depend on the level of competitiveness between firms within an industry. If the level of competition between firms in same industry is high, increasing number of firms should decrease corporate performance. Opposite holds if the level of competition across firms is low. As well, I expect that growth of firm's size (competitive advantage) is the main factor that affects performance positively.

Table 3. Expected results for the organizational model.

	Leve rage	Liqui dity	Solv ency	Debt ratio	Age of CEO	Size of Board of Directors	Account ant's review	Annual report's admission
Perfor mance	+/-	+/-	+	+/-	+/-	-	+	+

In Table 3, it is possible to see expected results for the impact of organizational variables on corporate performance. The sample consists from relatively well-performing enterprises. Good firms from a credit perspective choose less risky activities; therefore, they have an easy access to bank loans with lower interest rates than others, in the presence of investment opportunities. However in most cases, the high level of debt serves as a punishment mechanism for inefficient management. Therefore, I would expect that debt ratio has a negative impact on ROA. But, it is not necessary a case in this research. Icelandic legal system's specifics (such as, creditors' protection vs. share holders/owners protection) may affect the role of debt in corporate performance, which will result in a positive relationship between ROA and debt ratio. Liquidity impact

is difficult to predict, because too much of liquidity will decrease ROA (it doesn't create the value), and too small – will decrease ROA, as well (it may result in costs' increase).

Previous researchers' results suggest that leverage has a negative impact on corporate performance, especially during downturns. However because of sample's specifics ("good" firms with the efficient level of debt) and Icelandic legal system specifics, I would expect that agency costs are low and debt does not have a disciplinary role, therefore leverage may increase ROA.

According to agency cost theory, the size of Board of Directors should decrease performance. The impact of age of CEO on corporate performance is difficult to predict, because on one hand older CEO is more conservative with the financial side of corporation (less risky business model), but on another hand he/she is more conservative with new products development (less risky operations), as well.

Accountant's review and annual report's admission should have a positive correlation with corporate performance. A firm, which reviews its past mistakes, will try to omit them in the future. Another question is how significant they are for performance.

Therefore, I would expect that a big firm with sufficient leverage, efficient liquidity and solvency levels, and small Board of Directors should perform better than other good enterprises.

6.7 Shortcomings of research model

In this research, I was not able to estimate the importance of human capital and its quality (the average of years spend in school) for firm's performance, because data on human capital for each firm was not available.

Competitive advantage in selected firms was represented only by cost leadership strategy. Differentiation strategy (which could be described with market share and market power) and innovation strategy (which could be described with the quality of human capital) are not represented in the research, because data was not available.

As well, the importance of core competence and capabilities is not represented in this analysis, because it is based on human capital and skills within and between industries.

Ownership structure is not considered in this research, because data was not available.

7 Empirical research

7.1 Sample description

This research intends to understand factors, which determine the success of firms; especially, when the turbulent moment is present (research period 2005 – 2011). Analysis takes into account expansion period: 2005 – 2007, and recession period: 2009 – 2011. Year 2008 is omitted in this research due to high volatilities in internal financial markets and abnormal inflation: annual inflation was 18.4%, annual ISK index volatility – 11.97%, and annual volatility of interest rates on non-indexed loans – 35.4%.²⁷

Financial and organizational data was obtained from Creditinfo's database, coupon rates were obtained from Central Bank of Iceland database; ISK index – from Landsbankinn database; and CPI and micro-data were obtained from Statistics Iceland database.

Out of 41584 firms only 316 were selected, because their data fits necessary conditions:

- A firm was listed at least once on the Creditinfo list of most outstanding companies.
- A firm was established before 2005 (has full annual financial data for research period: 2005 - 2011).
- Organizational data is available for research period.

In Figure 16, it is possible to see how the sample of selected firms is distributed by geographical location. The location of firms is described by a distance between postcodes (from 101 to firm's post code) and is measured in kilometers. Figure 16 shows that over 250 of relatively well-performing firms are within 82 kilometers radius from the center of Reykjavik. In other words, they are on the territory of capital area. This is not surprising, because the Icelandic population is highly concentrated in this area. Another visible observation is that over 200 firms are on the 41st kilometer mark from the center of Reykjavik. It means that approximately 66% of outstanding

²⁷ Based on Statistics Iceland, CBI and Landsbankinn databases and author's calculations.

enterprises are operating on the territory of capital of Iceland and in the middle of capital area. It is in line with Hotelling's law, which states that all firms choose its location in the middle of its market (however, it is not necessary the most efficient location). By doing so, firms maximize their market share by minimizing distances between them and their customers. As well, it allows for firms to minimize transportation and delivering costs of final goods/services.

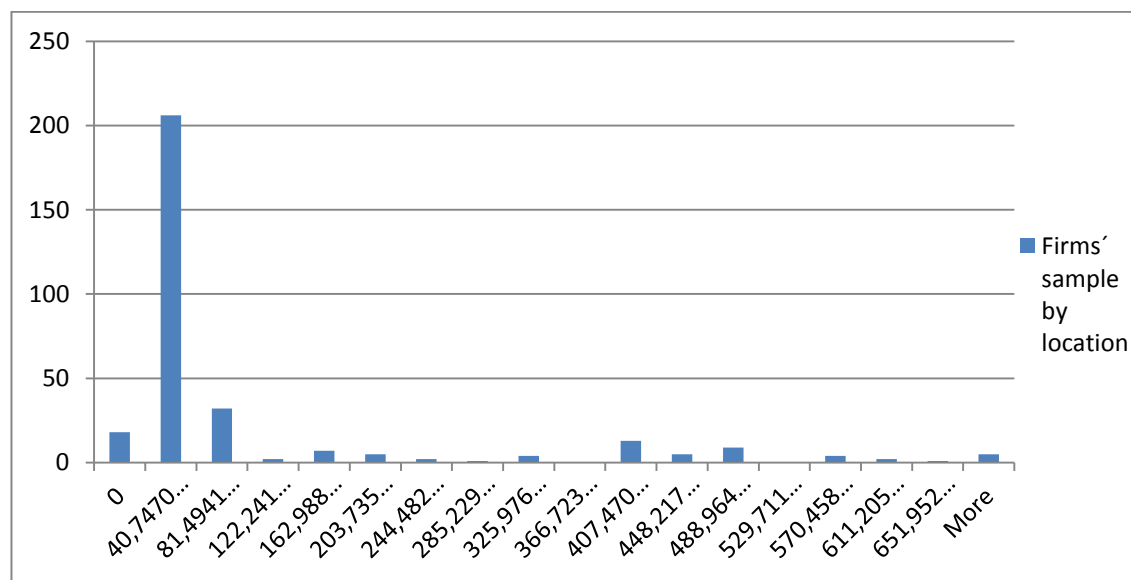


Figure 16. Firms' geographical location. ²⁸

In 2008, ISAT 1995 was replaced by ISAT 2008. As a result of it, some industries were united in same division; others – were separated in multiple divisions. Therefore, for research purposes I adapted and simplify changes in ISAT 2008 (industries' classification) to ISAT 1995.

Moreover, firms which are operating in financial and insurance industries were omitted from the research. The reason is that due to the turbulence on the internal financial market in recent years; their annual accounts do not give a very clear picture of their activities and hardly comparable between research periods. As well, micro-data for these industries was not available in the database of Statistics Iceland.

Manufacturing of basic metals was omitted from the research, as well. Inputs in this production are mainly imported and outputs – exported and sold in foreign markets. Assets are measured in foreign denominated currencies, because Icelandic corporations

²⁸ Based on Creditinfo database and estimated with the help of Já.is website.

in this industry owned by foreign corporations. Therefore, the economic development at macro- and micro- levels in Iceland had very small importance for this industry.

As well, the biggest corporation in the pharmaceutical industry was omitted for similar reasons. The most of its production and sales is outside of Icelandic economy. Therefore, the economic development at macro- and micro- levels in Iceland had very small importance for performance of this pharmaceutical corporation.

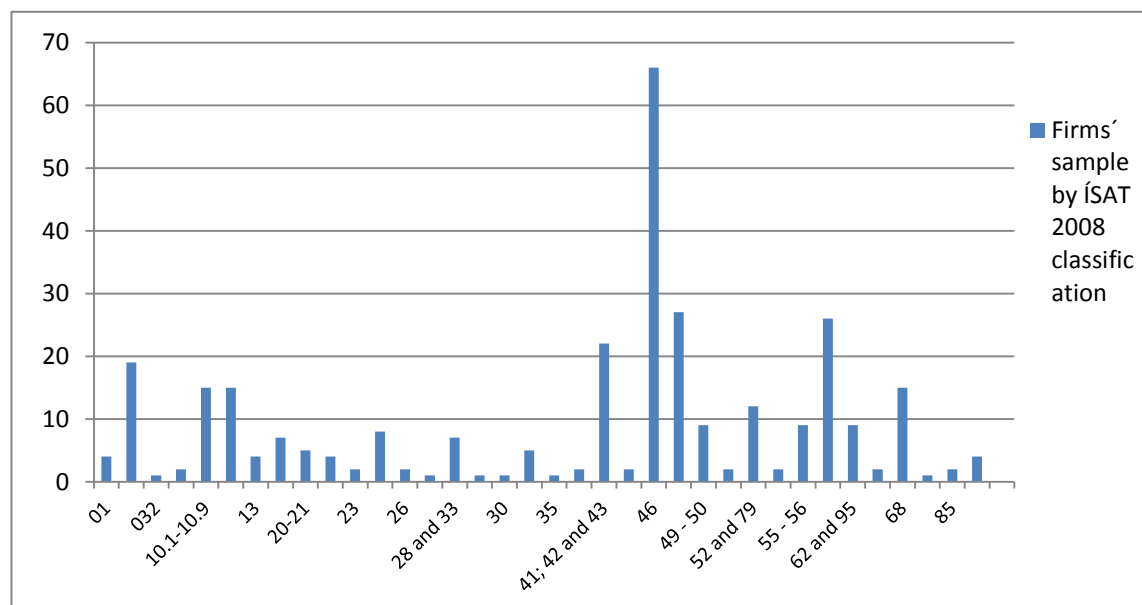


Figure 17. Firms' sample by ÍSAT 2008 classification.²⁹

In Figure 17, it is possible to see how the sample of selected firms is distributed by industries. Industries numeration is based on ÍSAT 2008. And in Figure 18, it is possible to see firms in the sample as a proportion of their industries. Figure 17 shows that over 90 of relatively well-performing enterprises (approximately, 30% of sample) are operating in wholesale and retail trades (except of motor vehicles and motorcycles) industries. These industries are highly dependent on import of goods and domestic demand. But in recent years Icelandic consumption and import volumes (at constant prices) decreased significantly. The explanation of such great number is possible to find in Figure 18. These “good” firms are only 5% and 2% (correspondingly) of their industries, because these two industries have a great number of firms in them.

²⁹ Based on Creditinfo database and author's calculations.

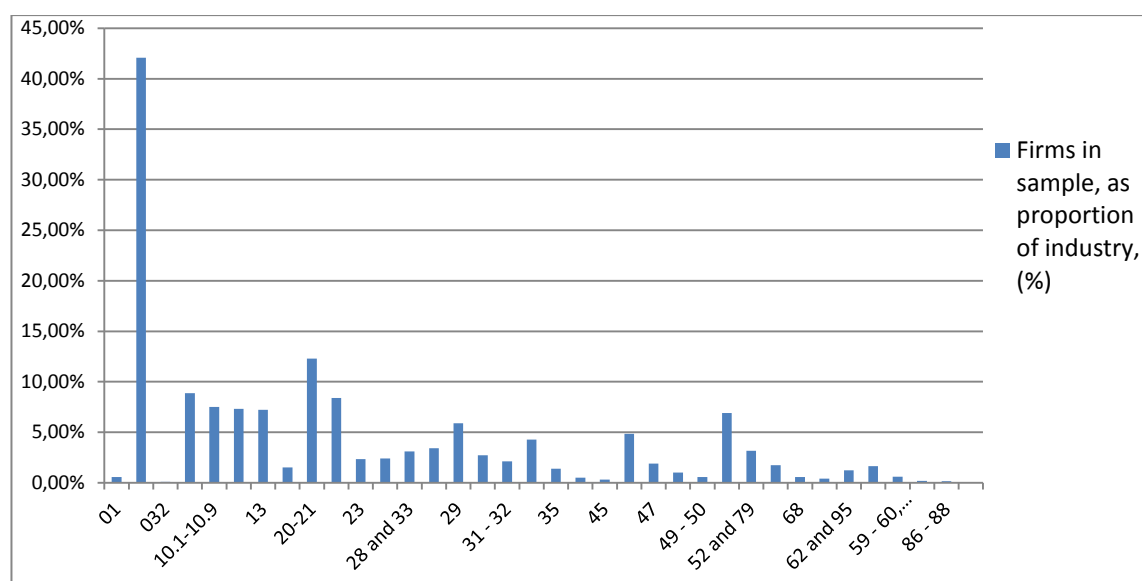


Figure 18. The proportion of “good” firms (firms from the sample) in each industry, (%).³⁰

On another hand, if we take further look at Figure 18, it is possible to see that over 42% of firms in fishing industry belong to “good” companies’ sample. It may have only one explanation: competitive advantage in this industry is more easily achievable than in others (through quotas distribution).

It is not surprising, that more than 12% of firms in the pharmaceutical industry belong to “good” companies’ sample. This industry is the most profitable industry (if exclude industries with government’s support or regulations) in Iceland.

Over all, the most of “good” companies in the sample is distributed in the range of 1% – 8% across their industries. The mean of “good” firms’ proportion is equal to 4.27%. It suggests that the most of firms in the sample are distributed in the interval of sample’s mean \pm 4%; therefore, firms are consistently distributed across all Icelandic industries. Fishing and pharmaceutical industries are an exception; however they are only 7.6% of sample (and 33 other industries are the rest of sample). It indicates that the problem of sample selection bias is not significant in this analysis.

In the sample, 15 firms changed their annual report accounting from ISK over some other foreign currency. Therefore, firm’s size (other variables were not affected) for these firms was estimated into ISK equivalent. In Appendix 4, it is possible to see more detailed explanation of this adjustment.

³⁰ Based on Creditinfo and Statistics Iceland databases and author’s calculations.

Before 2008, CPI was based on prices, which were collected during the two first days of month. However, from January 2008 and onwards the index is based on prices collected for at least one week period in the middle of reference month. Therefore for the correct calculation of annual inflation, I used bootstrapping for CPI's data, which was measured during the period of 2008 – 2011. In Appendix 5, it is possible to see more detailed explanation of this adjustment.

In Appendix 6, it is possible to see more detailed description of dependent and independent variables and their measurement scales.

7.2 Descriptive statistics

In Table 4, it is possible to see summary statistics for the economic model, 2005 – 2007: expansion period. And in Table 5, it is possible to see summary statistics for the economic model, 2009 – 2011: recession period. Both tables are based on the full set of observations (no missing values): 316 (sections): 3 (time-series).

Table 4. Descriptive statistics for the economic model, 2005 – 2007.³¹

Summary Statistics, using the observations 1:1 - 316:3								
Variable	Mean	Median	Minimum	Maximum	Std. Dev.	C.V.	Skewness	Ex. kurtosis
PERFORM	0.0705	0.1571	-97.50	1.6077	3.1765	45.027	-30.617	937.954
PRIVCON	13.363	13.356	13.3208	13.412	0.0373	0.0028	0.2634	-1.5000
INFL	0.0564	0.0565	0.0439	0.0689	0.0102	0.1809	-0.0098	-1.5000
ISKVOL	0.1190	0.1249	0.0865	0.1457	0.0245	0.2061	-0.3452	-1.5000
INTERVOL	0.0490	0.0580	0.0249	0.0640	0.0172	0.3513	-0.6431	-1.5000
FSIZE	12.226	11.992	1.3863	18.194	1.3353	0.1092	0.8442	7.2451
AVERPROF	5697.7	2893.2	-4504.8	38942.	9417.2	1.6528	2.4983	5.1909
NUMBENT	1420.0	1264.0	11.0000	4767.0	1330.7	0.9371	1.165	0.3105

Interesting to see that the mean of PERFORM is higher during recession period – 15.98 % against 7.05% – during the expansion. However, in 2005 – 2007 the difference between the minimum and the maximum was much higher for this variable than during

³¹ Based on author's calculations and Gretl output.

the recession. Therefore, it is not surprising that standard deviation and the coefficient of variation (C. V.) around the mean are much higher during that period. Skewness and excess kurtosis points out that during the period of 2005 – 2007 more firms performed above the mean for this period than below. Same time, very extend number of firms performed at the mean level. On another hand, PERFORM was more normally distributed during the recession, but the most of firms underperformed with respect to mean value.

Table 5. Descriptive statistics for the economic model, 2009 – 2011.³²

Summary Statistics, using the observations 1:1 - 316:3								
Variable	Mean	Median	Minimu m	Maxi mum	Std. Dev.	C.V.	Skewn ess	Ex.kur tosis
PERFORM	0.1598	0.13	-0.5760	0.7888	0.1426	0.8927	0.9639	2.8273
PRIVCON	13.177	13.169	13.168	13.195	0.0124	0.0009	0.7062	-1.500
INFL	0.0503	0.0589	0.0215	0.0704	0.0209	0.4155	-0.5496	-1.500
ISKVOL	0.0647	0.0436	0.0308	0.1197	0.0393	0.6068	0.6511	-1.500
INTERVOL	0.1148	0.0532	0.0271	0.2640	0.1061	0.9246	0.6751	-1.500
FSIZE	12.411	12.127	3.8535	18.066	1.33702	0.1077	1.3701	5.0094
AVERPROF	-9003.1	-5560.0	-62030	16186.5	14349.4	1.5938	-1.741	4.6702
NUMBENT	1478.8	1228.0	10.000	4876.0	1385.6	0.9369	1.1804	0.2738

The mean and the median of PRIVCON are higher during the expansion than during recession period. For both periods, the median is slightly below the mean. And standard deviation and C.V. are close to zero. Over all, PRICON is normally distributed during both periods.

From tables it is possible to see that means of INFL and ISKVOL are much higher during expansion period than during the recession. However, standard deviation and C. V. for both variables are lower during the period of 2005 – 2007. Over all, INFL and ISKVOL are normally distributed during both periods, as well.

Opposite holds for INTERVOL, its mean is lower during the period of 2005 – 2007 and more than doubled during recession period. Same holds for standard deviation and the

³² Based on author's calculations and Gretl output.

coefficient of variation around the mean. INTERVOL is normally distributed during both periods.

The mean of AVERPROF is highly positive during the expansion – 5697.7 millions ISK; and highly negative during the recession – - 9003.1 millions ISK. Therefore, it is not surprising that the maximum at its highs during the expansion and the minimum at its lows during the recession for this variable. Moreover, AVERPROF is negatively skewed during the expansion (more industries perform below the mean); and it is positively skewed during the recession (more industries perform above the mean).

There is no big difference in all descriptive statistics of NUMBENT between periods. It means that over all there were no significant barriers for entry into or exit from industries between periods.

The mean and the median of FSIZE increased during 2009 – 2011 period. However, the maximum decreased and the minimum increased in comparison with expansion period. FSIZE is negatively skewed during both periods. It means that more firms in this sample are below mean level. It is in line with my expectations (The sample includes high-performing firms with competitive advantage. The level of competitive advantage is described by firm's size).

Table 6. Descriptive statistics for the economic model, 2005 – 2011.³³

Summary Statistics, using the observations 1:1 - 316:6								
Variable	Mean	Median	Minimum	Maximum	Std. Dev.	C.V.	Skewness	Ex.kurtosis
PERFORM	0.1152	0.1401	-97.500	1.6077	2.2483	19.522	-43.203	1873.3
PRIVCON	13.270	13.258	13.168	13.412	0.0969	0.0073	0.1980	-1.6613
INFL	0.0533	0.0215	0.0215	0.0704	0.0167	0.3134	-0.8644	-0.4801
ISKVOL	0.0919	0.0308	0.0308	0.1457	0.0425	0.4630	-0.2746	-1.4957
INTERVOL	0.0819	0.0249	0.0249	0.2640	0.0828	1.0116	1.6592	0.9765
FSIZE	12.319	12.068	1.3863	18.194	1.339	0.1087	1.1001	6.1389
AVERPROF	-1652.7	273.73	-62030.	38942.	14187.	8.5842	-0.9875	5.6769
NUMBENT	1449.4	1239.0	10.000	4876.0	1358.4	0.9372	1.1757	0.2917

³³ Based on author's calculations and Gretl output.

In Table 6, it is possible to see summary statistics for the economic model, 2005 – 2011. Table is based on the full set of observations (no missing values): 316:6.

The mean of PERFORM for full research period across all enterprises is 11.52%. It is below the median value. Therefore, variable is positively skewed. It means more firms performed above the mean for this period than below. In other words, good companies' sample has a great number of high-performing firms in it. Same time, most of firms performed at mean level during full research period.

The mean of AVERPROF for full research period across all industries is -1652.7 million ISK and is significantly below the median. It means that most of firms in the sample belong to industries which outperform AVERPROF mean.

Others variables are normally distributed during full research period; with very small standard deviation and C. V. around their means.

Table 7. Descriptive statistics for the organizational model, 2005 – 2007. ³⁴

Summary Statistics, using the observations 1:1 - 316:3								
Variable	Mean	Media n	Minim um	Maxi mum	Std. Dev.	C.V.	Skewn ess	Ex.kurt osis
PERFORM	0.0705	0.1570	-97.500	1.6077	3.1765	45.027	-30.617	937.95
LEVER	3.7851	1.0376	-80.605	1435.5	49.374	13.044	26.533	751.32
LIQUID	0.7097	0.7835	0.0000	1.0000	0.2797	0.3941	-0.6663	-0.7462
SOLVEN	3.6742	1.6963	0.0000	756.11	26.917	7.3260	24.563	656.61
DEBTR	0.5398	0.5282	0.0000	2.4760	0.2571	0.47620	1.17744	5.84336
ANNUREP	0.7859	1.0000	0.0000	1.0000	0.4104	0.5223	-1.3937	-0.0576
ACCOUN	0.5253	1.0000	0.0000	1.0000	0.4996	0.9511	-0.1014	-1.9897
CEOAGE	50.271	49.000	28.000	83.000	10.321	0.2053	0.5026	0.1348
MSIZE	2.8629	3.0000	0.0000	9.0000	1.3695	0.4784	0.8305	1.6988

In Table 7, it is possible to see summary statistics for the organizational model, 2005 – 2007: expansion period. Table is based on the full set of observations (no missing values): 316 (sections): 3 (time-series). And in Table 8, it is possible to see summary

³⁴ Based on author's calculations and Gretl output.

statistics for the organizational model, 2009 – 2011: recession period. It is based on the full set of observations (missing values were skipped): 316:3.

Table 8. Descriptive statistics for the organizational model, 2009 – 2011.³⁵

Summary Statistics, using the observations 1:1 - 316:3								
Variable	Mean	Median	Minimum	Maximum	Std. Dev.	C.V.	Skewness	Ex.kurtosis
PERFORM	0.1598	0.1299	-0.576	0.7888	0.1426	0.8927	0.9639	2.8271
LEVER	-54.551	0.7316	-52662.	7.6115	1710.4	31.355	-30.741	943.00
LIQUID	0.7458	0.8669	0.0064	1.0000	0.282	0.3780	-0.9059	-0.4467
SOLVEN	89.207	2.2500	0.0044	40551.	1849.5	20.733	21.636	466.16
DEBTR	0.4213	0.4219	0.0000	1.0000	0.2001	0.4751	-0.0441	-0.8204
ANNUREP	0.7036	1.0000	0.0000	1.0000	0.4569	0.6494	-0.8916	-1.2051
ACCOUN	0.4652	0.0000	0.0000	1.0000	0.4991	1.0728	0.1396	-1.9805
CEOAGE	52.848	52.000	28.000	87.000	10.309	0.1951	0.4753	0.3457
MSIZE	2.8703	3.0000	0.0000	10.000	1.3575	0.4729	1.0062	3.2054

The mean of DEBTR is 53.98% and the median is 52.6% during the first period. And during the period of 2009 – 2011, the mean is 42.13% and the median is 42.2%. Therefore, it is possible to say, that for the half of firms in the sample DEBTR actually decreased during recession period. It is another proof that the sample consists from strong firms. As well, the difference between the median and the mean is not high during both periods. It is in line with low standard deviation and C. V. for this variable. In both periods, there are firms with the minimum of DEBTR equals to 0%. And it is not surprising that the maximum is equal to 100% during the recession (as debt levels increased in some corporations), but it is surprising that the maximum of DEBTR is equal 248% during the expansion (it means, firm's debt was double value of its assets).

The mean of LEVER is higher during expansion period – 3.79 against -54.55 – during the recession, because debt levels were higher when investment opportunities were present. During the recession, relatively well-performing firms were paying their debt down, which reduced leverage levels. Negative leverage mean could be explained by

³⁵ Based on author's calculations and Gretl output.

significant negative impact from one firm, during the period of 2009 – 2011. If do not take into consideration that firm's impact, the mean of LEVER was around 1. As a result, the difference between the minimum and the maximum, standard deviation and the coefficient of variation (C. V.) around the mean are much higher for this variable during the recession. Median value between two periods varies just slightly. It means that LEVER for the top 50% of sample does not change significantly between periods. Skewness points out that during the period of 2005 – 2007 more firms had leverage below the mean than above. Opposite holds for the period of 2009 – 2011.

LIQUID mean is 70.97%, during the period of 2005 – 2007 and 74.58%, during the recession. There is a small increase in liquidity, but it may be explained by lower levels of debt. Over all LIQUID, ANNUREP, ACCOUN, CEOAGE and MSIZE are normally distributed during both periods. And, they do not exhibit visible abnormalities or unexpected results.

During 2005 – 2007, the mean of SOLVEN equals to 3.67; and 89.21 during the recession. Possible explanations may be that during recession period the short term assets increased or the short term debt decreased significantly. In most cases, it is the short term assets. It is in line with my expectations of good and great firms' sample. Because during recession times, a strong firm will increase its short term assets if its consumers have some difficulties with payables accounts (it is receivables accounts for a strong firm). Variable is negatively skewed during both periods. But still a great number of firms had solvency ratio at mean levels during both periods.

In Table 9, it is possible to see summary statistics for the organizational model, 2005 – 2011. Table is based on the full set of observations (missing values were skipped): 316:6.

The mean of LEVER for full research period across all enterprises is -25.38 (due to the impact of one firm, described above). It is significantly below median value. Therefore, the variable is positively skewed. It means more firms had leverage above the mean for the full research period than below.

SOLVEN mean is 46.31 and is above median level. Therefore, it is negatively skewed; more firms had solvency level below the mean for the full research period than above. However, still a significant number of firms had solvency ratio at mean level during this period. On another hand, it is possible to see the great difference between minimum

and maximum values. Therefore, high standard deviation and C. V. for this variable is not surprising. It means some firms in the sample are stronger than others (sample consists from “good” and “great” enterprises).

Table 9. Descriptive statistics for the organizational model, 2005 – 2011.³⁶

Summary Statistics, using the observations 1:1 - 316:6								
Variable	Mean	Median	Minimum	Maximum	Std. Dev.	C.V.	Skewness	Ex. kurtosis
PERFORM	0.1152	0.1400	-97.500	1.6077	2.2483	19.522	-43.203	1873.29
LEVER	-25.383	0.8846	-52662.	1435.5	1210.0	47.670	-43.453	1887.9
LIQUID	0.7277	0.8290	0.0000	1.0000	0.2813	0.3866	-0.7807	-0.6225
SOLVEN	46.305	1.9399	0.0000	40551.	1306.2	28.209	30.686	939.91
DEBTR	0.4806	0.4757	0.0000	2.4760	0.2378	0.4949	0.9019	4.6843
ANNUREP	0.7447	1.0000	0.0000	1.0000	0.4361	0.5856	-1.1226	-0.7399
ACOUN	0.4953	0.0000	0.0000	1.0000	0.5001	1.0098	0.019	-1.9996
CEOAGE	51.560	51.000	28.000	87.000	10.392	0.2016	0.4773	0.2252
MSIZE	2.8666	3.0000	0.0000	10.000	1.3632	0.4755	0.9171	2.4400

Other interesting results are the median and the mean of DEBTR for full research period. Debt ratio may vary in the range of 45% – 60%, dependent on industry’s specifics. However, for small and medium companies it is around 60% on average, based on data from other countries. At the same time, the half of corporations in the sample had debt ratio below 48%. It suggests that decision-makers in Icelandic “outstanding” corporations are more conservative than decision-makers in other companies.

Others variables are normally distributed during full research period; with very small standard deviation and C. V. around their means. And they do not exhibit visible abnormalities or unexpected results.

³⁶ Based on author’s calculations and Gretl output.

7.3 Correlation matrices

All correlation matrices are computed for demeaned variables.

In Tables 10 and 11, it is possible to see how correlation between demeaned variables changes between two research periods. Tables are based on the full set of observations (no missing values): 316:3.

Table 10. Correlation matrix for the economic model, 2005 – 2007.³⁷

	PERFO RM	INFL	ISKVO L	INTERV OL	FSIZE	AVERP ROF	NUMB ENT	PRIVCO N
PERFORM	1.0000	0.0513	0.0560	-0.0390	0.6673	0.1038	0.0888	0.0495
INFL		1.0000	0.9856	-0.1400	0.2222	-0.1579	0.6183	0.3860
ISKVOL			1.0000	-0.3054	0.2712	-0.1201	0.5637	0.5365
INTERVOL				1.0000	-0.3362	-0.1859	0.1805	-0.9674
FSIZE					1.0000	0.1703	0.0754	0.3701
AVERPROF						1.0000	-0.0347	0.1328
NUMBENT							1.0000	-0.0101
PRIVCON								1.0000

Table 11. Correlation matrix for the economic model, 2009 – 2011.³⁸

	PERFO RM	INFL	ISKVOL	INTER VOL	FSIZE	AVERP ROF	NUMB ENT	PRIVCO N
PERFORM	1.0000	0.1682	0.3704	0.3683	0.0736	-0.0493	-0.1381	-0.2753
INFL		1.0000	0.5789	0.6057	-0.0135	-0.0420	-0.7644	0.2762
ISKVOL			1.0000	0.9994	0.0565	-0.1150	-0.5255	-0.6238
INTERVOL				1.0000	0.0546	-0.1139	-0.5440	-0.5974
FSIZE					1.0000	-0.0270	-0.0098	-0.0795
AVERPROF						1.0000	0.0566	0.0953
NUMBENT							1.0000	-0.1133
PRIVCON								1.0000

³⁷ Based on author's calculations and Gretl output.

³⁸ Based on author's calculations and Gretl output.

During the period of 2005 – 2007, PERFORM has the most significant positive correlation with FSIZE – 66.73%. However during the recession, this relationship became less significant – 7.36%. It means that during the expansion, 66.73% of variation is shared between PERFORM and FSIZE. Moreover, it weakens during the recession. In other words, as competition increases; a firm needs some level of competitive advantage to perform well; but during the recession it becomes less relevant.

During the period of 2009 – 2011, PERFORM has the most significant positive correlation with ISKVOL – 37.04%. However during the expansion, this relationship became less significant – 5.6%. From Tables 4 and 5, ISKVOL is high during the first period (the expansion) and low during the second period. Therefore, shared variation between two variables increases when ISKVOL is low; and it decreases when ISKVOL is high. It means that low ISKVOL is very important for PERFORM.

Another moderate relationship is between INTERVOL and PERFORM – 36.83%, during recession period. However during the expansion, this relationship became less significant and negative – -3.9%. This result is in line with the internal financial market development in closed economy. After significant ISK depreciation and high inflation in 2008, firms were choosing non-indexed corporate bonds to finance it selves and their investing opportunities, due to inflation and foreign currency risks. These risks were much higher than risk of annual volatility of non-indexed coupon rates. On another hand, when internal financial markets were opened, correlation between two variables was negative and insignificant (foreign denominated bonds were preferred by corporations).

As well, during the period of 2009 – 2011, PERFORM has the weak negative correlation with PRIVCON – -27.53%. As growth of private consumption was negative during this period (Figure 8), corporate performance among firms in the sample was moving in the opposite direction (as it seen in Table 5). It means that factors (such as, INTERVOL and ISKVOL), which was affecting these variables, had the opposite effect on PERFORM and PRIVCON. However during the expansion, this relationship became less significant and positive – 4.95%.

The correlation between INFL and PERFORM is positively weak during both periods. It means that firms in the sample were able to pass inflated costs to its consumers. However, during the recession this relation became greater than during the expansion.

Because of ISK depreciation in 2008, foreign produced goods became too expensive, which resulted in lower quantity of available substitutes in the Icelandic market. This development increased demand for domestically produced goods and market power of domestic firms. As a result, the ability of Icelandic corporations' to pass increasing costs into prices increased, as well.

The correlation between AVERPROF and PERFORM is positively weak during the expansion, and negatively weak during the recession. It is not surprising, because as it seen in Tables 4 and 5; PERFORM was higher during the recession. So when all industries were underperforming during the recession, firms in the sample were outperforming (it characterizes their strength) during the recession.

The correlation between NUMBENT and PERFORM is positively weak during the expansion, and negatively weak during the recession. It means that only small part of variation is shared between these two variables. The positive correlation suggests that increasing competition would spark innovation and differentiation among firms in the sample (in line with Schumpeter's theory) and would result in higher PERFORM.

Interesting to see that during the expansion, INFL and ISKVOL had very strong positive correlation – 98.56%. In other words, INFL was following ISKVOL at 98.56%. Great volumes of capital inflows and outflows led to high volatility of ISK, during the expansion, and created increasing uncertainties in inputs' prices for domestically produced goods/services. These uncertainties were passed into outputs prices by Icelandic corporations. However, this perfect relationship broke down during recession period, when the economy became partially closed and the volume of capital inflows/outflows became insignificant.

As well, in Table 10 it is seen almost perfect negative correlation between INTERVOL and PRIVCON, during expansion period; -96.74% of variation was shared between these variables. It means decreasing volatility of interest rates was positively affecting growth of private consumption, as it seen in Figure 8. PRIVCON was growing at decreasing rate. However, during the recession this relationship became moderate.

During the recession, INFL and NUMBENT had strong negative correlation – -76.44%. As annual inflation was decreasing, NUMBENT was increasing – more new firms found it easier to enter some given industry.

As well during the period of 2009 – 2011, ISKVOL and INTERVOL were almost perfectly correlated – 99.94%; it seems that interest rates volatility has an impact on the strength of capital controls (however, this relation may be spurious – needs further research).

In Table 12, it is possible to see the correlation between demeaned variables during full research period. Table is based on the full set of observations (no missing values): 316:6.

Table 12. Correlation matrix for the economic model, 2005 – 2011.³⁹

	PERFO	INFL	ISKVO	INTER	FSIZE	AVERPR	NUMB	PRIVCO
	RM		L	VOL		OF	ENT	N
PERFORM	1.0000	0.0271	0.0392	0.0048	0.5567	0.0392	0.0622	0.0443
INFL		1.0000	0.6707	0.5270	0.0747	-0.0619	-0.2678	0.2395
ISKVOL			1.0000	0.8107	0.1462	-0.1147	-0.0844	0.1027
INTERVOL				1.0000	-0.0150	-0.1152	-0.3443	-0.3333
FSIZE					1.0000	0.0418	0.0423	0.2785
AVERPROF						1.0000	0.0255	0.0770
NUMBENT							1.0000	-0.0313
PRIVCON								1.0000

As it would be expected, the most significant relationship for PERFORM is with FSIZE – 55.64%. Larger firm can produce with lower costs, can increase its market share with higher production capacity and/or differentiation, can innovate and has more resources for lobbying (if needed). Therefore, it enjoys higher level of market power than other firms in same industry and higher PERFORM.

Over all, PERFORM has positively weak correlation with INFL, ISKVOL, INTERVOL, AVERPROF, NUMBENT and PRIVCON during full research period.

In Tables 13 and 14, it is possible to see how correlation between demeaned variables changes between two research periods. Table 13 is based on the full set of observations (no missing values): 316:3. And Table 14 is based on the full set of observations (missing values were skipped): 316:3.

³⁹ Based on author's calculations and Gretl output.

Table 13. Correlation matrix for the organizational model, 2005 – 2007. ⁴⁰

	PERFO RM	LEVER	LIQUI D	SOLVE N	DEBTR	ANNU REP	ACCO UN	CEOA GE	MSIZE
PERFORM	1.0000	0.0004	0.1875	0.0059	0.0816	0.0330	-	-	-
M							0.0002	0.0928	0.0015
LEVER		1.0000	-	0.0004	0.0525	-	-	-	-
			0.0286			0.0005	0.0018	0.0059	0.0035
LIQUID			1.0000	-	-	0.0295	0.0109	-	-
				0.1144	0.1552			0.0972	0.0542
SOLVEN				1.0000	0.0144	0.0010	0.0004	0.0061	-
									0.0006
DEBTR					1.0000	0.0295	0.0120	-	0.0014
								0.0669	
ANNURE						1.0000	0.0033	-	-
P								0.0134	0.0181
ACCOUN							1.0000	0.0010	0.0042
CEOAGE								1.0000	0.0870
MSIZE									1.0000

During the period of 2005 – 2007, PERFORM has the most significant positive correlation with LIQUID – 18.75%. However during the recession, this relationship became less significant and negative – -11.59%. It means that during the expansion, 18.58% of variation was shared between PERFORM and LIQUID. Moreover, it weakened during the recession. In other words, an extra liquidity had the positive effect on corporate performance during the expansion, when ISKVOL was high and the short term debt was cheap. And, it had the negative effect on corporate performance during the recession, when ISKVOL was low and the short term debt became more expensive due to the significant increase in interest rates.

During the period of 2009 – 2011, PERFORM has the most significant negative correlation with CEOAGE – -13.47%. However during the expansion, this relationship became less significant – -9.28%. PERFORM decreases as CEOAGE increases during both periods.

⁴⁰ Based on author's calculations and Gretl output.

Table 14. Correlation matrix for the organizational model, 2009 – 2011. ⁴¹

	PERFO RM	LEVER	LIQUI D	SOLVE N	DEBTR	ANNU REP	ACCO UN	CEOA GE	MSIZE
PERFOR M	1.0000	0.0766	-	0.0852	0.0505	0.0394	-	-	0.0028
			0.1159				0.0250	0.1347	
LEVER		1.0000	-	0.0017	-	0.0000	-	0.1164	-
			0.2376		0.0692		0.0000		0.0000
LIQUID			1.0000	-	-	-	0.0033	0.0251	-
				0.0657	0.2468	0.0020			0.0204
SOLVEN				1.0000	-	0.0139	0.0072	0.0019	0.0417
					0.2610				
DEBTR					1.0000	0.0058	-	-	0.0215
							0.0253	0.1196	
ANNURE P						1.0000	-	-	-
							0.1958	0.0064	0.0097
ACCOUN							1.0000	0.0195	0.0030
CEOAGE								1.0000	0.1586
MSIZE									1.0000

Another weak relationship is between SOLVEN and PERFORM – 8.52%, during recession period. However during the expansion, this relationship became negligible – 0.59%. This result is expected, as SOLVEN becomes more important for PERFORM during the recession.

Correlations between PERFORM and LEVER, DEBTR are positively weak or negligible during periods. However, shared variation between PERFORM and DEBTR is increasing during the period of 2005 – 2007. And, shared variation between PERFORM and LEVER is increasing during the period of 2009 – 2011. DEBTR represents an ability of firm to finance its investment opportunities with debt. As a result of it, PERFORM depends on DEBTR during the expansion, when investment opportunities were present. It is harder to explain the positive relation between PERFORM and LEVER, during the second period (when LEVER and DEBTR were decreasing). As was mentioned before, Iceland has a civil law. According to previous researchers in countries with civil law, equity holders are

⁴¹ Based on author's calculations and Gretl output.

more protected than debt holders. As a result of it, debt no longer serves as a punishment mechanism for inefficient management, especially when the turbulent moment is present. Then, interests of equity holders are more dominant than interests of debt holders (the proof of that is possible to see in recent Icelandic courts' rulings on foreign denominated debt) in such countries. The strength of legal enforcement power may finalize the positive correlation between leverage and corporate performance.

PERFORM and ACCOUNT, MSIZE and ANNUREP had negligible correlations during both periods.

Interesting to see that during the recession, SOLVEN and DEBTR have close to moderate negative correlation – -26.1%. However, as it possible to see in Tables 7 and 8, SOLVEN was increasing and DEBTR was decreasing during this period. This result is consistent with behavior of “good firms” during the downturn: earnings were used to pay down debt and to support the long term relationships with their customers.

The correlation between LIQUID and DEBTR – -24.68% supports my assessment of later period, described above. LIQUID and DEBTR were moving in opposite directions, because debt levels were decreasing and liquidity levels were increasing (due to high inflation and volatilities in 2008), during recession period.

Same explanation holds for shared variation between LIQUID and LEVER – -23.76%, during the recession.

In Table 15, it is possible to see the correlation between demeaned variables during full research period. Table 15 is based on the full set of observations (missing values were skipped): 316:6.

The most significant positive correlation PERFORM has with LIQUID – 13.86%, during full research period. As total debt decreases or/and the short term debt increases, PERFORM increases. Or, an increase in total debt should be proportionally lower than an increase in the short term debt.

Over all, PERFORM has a positive correlation with LEVER, SOLVEN, DEBTR and ANNUREP during full research period. And it has a negative correlation with ACCOUNT, CEOAGE and MSIZE during full research period. It indicates that increasing monitoring costs decrease performance of firms' in the sample, and debt no longer serves as a disciplinary mechanism.

Table 15. Correlation matrix for the organizational model, 2005 – 2011.⁴²

	PERFOR M	LEVER	LIQUI D	SOLVE N	DEBTR	ANNU REP	ACCO UN	CEOA GE	MSIZE
PERFOR M	1.0000	0.0023	0.1386	0.0064	0.0698	0.0228	-	-	-
LEVER		1.0000	-	0.0004	-	-	-	0.0718	-
LIQUID			0.1573		0.0357	0.0000	0.0000		0.0001
SOLVEN			1.0000	-	-	0.0138	0.0073	-	-
DEBTR				0.0935	0.1854			0.0472	0.0409
ANNURE P				1.0000	-	0.0029	0.0014	0.0050	0.0050
ACCOUN CEOAGE					0.0191	1.0000	0.0189	-	-
MSIZE							0.0024	0.0840	0.0077
							1.0000	-	-
							0.0951	0.0099	0.0139
							1.0000	0.0091	0.0036
								1.0000	0.1127
									1.0000

⁴² Based on author's calculations and Gretl output.

8 Results

All fixed effects models were estimated with Beck-Katz standard errors (PCSE). Therefore, the problem of heteroskedasticity was eliminated from results. Values of statistic d in Durbin-Watson test for all estimated models are above 1.4. Therefore, autocorrelation is not dominating results. All estimated models were tested for differing group intercepts with null hypothesis that groups have a common intercept. Test showed that null hypothesis should not be rejected, because p -values are equal to 1 or near 1 for all fixed effects models.

Some estimated models have negative adjusted R^2 . In these models, constant equals to 0 and is insignificant according to F-test. Gretl was used in research computations of panel data. However due to specifics of that open-source statistical package, it is impossible to omit const. The restriction for panel data const is not available in it.

In Table 16, it is possible to see results of empirical analysis for the economic model. Table is based on the full set of observations (no missing values) – 316:3. The first three models are based on macro- and micro- economic data for the period of 2005 – 2007 (the expansion); next two models are based on macro- and micro- economic data for the period of 2009 – 2011 (the recession).

During expansion period, determinants of corporate performance in Iceland were private consumption growth, ISK index and non-indexed long term interest rates annual volatilities, annual inflation and growth of firm's size. All determinants are statistically significant at 1% level of significance.

During recession period, ISK index and non-indexed long term interest rates annual volatilities, the number of firms in the relevant industry and growth of firm's size were determining corporate performance at 1% level of significance.


Table 16. Results of panel data analysis for the economic model.⁴³

	1.	2.	3.	4.	5.
const	-9e-06*** ⁴⁴ (0.0746)	-9e-06*** (0.0746)	0.0001*** (3.9e-05)	2.21e-06 (0.0005)	2.21e-06 (0.0005)
PRIVCON	-23.99*** (5.462)	-15.127*** (2.611)	-14.6729*** (2.4649)		
INFL		-8.2877*** (2.6659)			
ISKVOL			-3.7708*** (1.213)	0.8195*** (0.0327)	
INTERVOL	-17.9097*** (5.7611)				0.307*** (0.016)
FSIZE	5.6113*** (0.8347)	5.6113*** (0.8347)	5.6113*** (0.8347)	0.0174*** (0.0042)	0.0176*** (0.0043)
AVERPROF					
NUMBENT				5.29e-05*** (1.49e-05)	6.0e-05*** (1.53e-05)
R ²	0.4914	0.4914	0.4914	0.1442	0.1438
Adjusted R ²	0.2343	0.2343	0.2343	-0.2884	-0.289
P-value (F)	3.67e-12	3.67e-12	3.67e-12	1.0000	1.0000
F (318, 629)	1.9114	1.9114	1.9114	0.3334	0.3323
Durbin-Watson	1.5912	1.5912	1.5912	1.6844	1.6857
Observations	948	948	948	948	948
Cross-sectional units	316	316	316	316	316
Time-series length	3	3	3	3	3

⁴³ Based on author's calculations and Gretl output.

⁴⁴ * significant at 10%; ** significant at 5%; *** significant at 1%.

The first, I will review how macro-variables were affecting corporate performance in the open Icelandic economy. There was great interaction between PRIVCON, INTERVOL, ISKVOL and INFL. Taken into account correlation matrix (Table 10), INTERVOL and PRIVCON were almost perfectly and negatively correlated. It means, when volatility of interest rates was decreasing after CBI's contraction policy, private consumption was growing at decreasing rate. Same time, ISKVOL and INFL were almost perfectly and positively correlated, which exemplifies the pass-through from the exchange rate to inflation. Moreover, PRIVCON and INFL were moderately and positively correlated. That could imply that increased demand increased prices of domestically produced outputs.

To simplify it: INTERVOL ↓ → PRIVCON ↑

 ISKVOL ↑ → INFL ↑ → ROA ↓

Therefore, it is possible to see triple relation of PRIVCON with described variables. And triple impact from INTERVOL, PRIVCON and ISKVOL on INFL; which made domestically produced goods/services to expensive in comparison with foreign produced goods/services (substitutes). Therefore, market power of many “good” firms decreased significantly. As a result of such development, ROA in tradable and non-tradable sectors was affected negatively due to high levels of CPI and ISK.

The tradable sector was especially suffering from too high ISK levels. However, firms in the non-tradable sector, which goods/services are used as inputs in tradable sector's production, had lower corporate performance because of low ROA in the tradable sector, as well. According to research by Linda Björk Bryndsardottir, direct and indirect contributions of fishing and fish-processing industries to Icelandic GDP are approximately 23.12%⁴⁵ (besides other exporting corporations). Therefore, it is possible to see that described macro-variables affected ROA negatively for firms in the tradable sector; for firms in the non-tradable sector, which depends on the tradable sector; and for some firms in the non-tradable sector producing for domestic demand.

For further research, a dummy variable was added to analysis. Export (fishing and fish-processing) industries were represented by 0, and others – by 1. Estimated correlations between that variable and the rest of variables were equal to 0. Especially, I

⁴⁵ Linda Björk Bryndsardottir. (2011, June). *Ekki er allt sem sýnist. Mat á þjóðhagslegri arðsemi íslensks sjávarútvegs*. The University of Iceland, BS thesis, pp. 24.

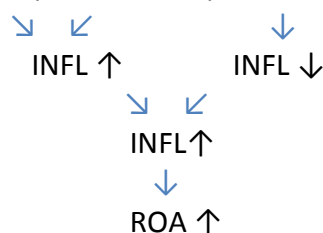
was interested in the relationship between PRIVCON and export/domestic demand variables; because, traditionally these two variables are moving in opposite directions (have a negative correlation). Another relationship – between PERFORM and export/domestic demand variables, suggests that there was no shared variation between them: corporate performance was not affected by the type of firm's (tradable or non-tradable) sector. That result suggests that statements on page 98 were true.

According to the first, the second and the third models, an increase in PRIVCON by 1% decreases ROA by 14.67% – 23.99% (depending on the model), during the expansion. High growth of private consumption affected domestic market power of firms negatively. An increase in INTERVOL by 1% decreases ROA by 17.91%; an increase in ISKVOL by 1% decreases ROA by 3.77%; and an increase in INFL by 1% decreases ROA by 8.29%.

The second, I will review how macro-variables were affecting corporate performance in closed Icelandic economy. INTERVOL and ISKVOL were almost perfectly and positively correlated. ISKVOL was almost perfectly following movements in INTERVOL. Moreover, INTERVOL and PRIVCON, and ISKVOL and PRIVCON were strongly and negatively correlated. And, PRIVCON and INFL were moderately and positively correlated. It means that increasing volatilities (uncertainties) and growth of private consumption were moving in opposite directions. Moreover, a decrease in private consumption reduced domestic demand. Because of decreased demand, prices on goods/services were decreasing and were affecting CPI's levels (INFL) negatively – consumers market power.

On another hand, INTERVOL and INFL, and ISKVOL and INFL were strongly and positively correlated. It means, when volatilities of ISK index and interest rates were increasing, firms were passing them (uncertainties associated with volatilities) into CPI (INFL) – producers/distributors market power.

To simplify it: INTERVOL \uparrow \rightarrow ISKVOL \uparrow \rightarrow PRIVCON \downarrow



Therefore, it is possible to see triple impact: positive from INTERVOL and ISKVOL, and negative from PRIVCON on INFL; which resulted in greater ROA. It indicates that in

closed Icelandic economy during the recession, corporations exhibit greater market power than consumers, because the threat of foreign produced substitutes is very low. As a result of such development, ROA in tradable and non-tradable sectors was affected positively by increased ability of corporations to pass through ISKVOL and INTERVOL.

Described above negative impact of PRIVCON on PERFORM is direct and not significant (the proof is results in models). However, moderate and negative correlation between these two variables suggests that here (in closed economy) exists indirect relationship, as well. Corporations/individuals choose to consume or to invest/to save. Therefore, growth of private consumption above efficient levels reduces investment/savings. Furthermore, in closed economy savings are tied to investment. Therefore, growth of private consumption reduces investment. Decreasing investment reduces the level of competitive advantage, which will result in lower PERFORM in near future.

According to the fourth and the fifth models, an increase in ISKVOL by 1% increases ROA by 0.82%, during the recession. And an increase in INTERVOL by 1% increases ROA by 0.31%.

The third, I will review how micro-variables were affecting corporate performance during both periods. During expansion period, ROA had the most significant positive correlation with growth of firm's size. As competition from foreign producers was increasing; a firm would need some level of competitive advantage to perform well. Estimated models support this result: an increase in FSIZE by 1% increases ROA by 5.61%. However, during recession period, this relationship became weaker. As a result, an increase in FSIZE by 1% increases ROA by 0.02%. It means that in closed economy, achievement of competitive advantage became less beneficial due to increasing market power of firm.

On another hand, increasing domestic competition is relevant for corporate performance only during the recession. An increase in NUMBENT by 10 enterprises increases ROA by 0.05% - 0.06% (depending on the model). In Iceland, many industries may be characterized by the oligopolistic structure. Therefore in closed economy, increasing level of competition within an industry may decrease market power of existing firms. As a result, it puts a pressure on "great" firm to invest more in R&D or/and to find more efficient ways of production, which results in greater performance.

Table 17. Results of panel data analysis for the economic model (continued).⁴⁶

	6.
const	0.0003*** (9.11e-05)
PRIVCON	-4.6324** (2.1761)
INFL	9.8628*** (2.1392)
ISKVOL	-11.8808*** (3.5055)
INTERVOL	3.5514*** (1.2149)
FSIZE	3.7087*** (0.8293)
AVERPROF	
NUMBENT	0.0014*** (0.0004)
R ²	0.3308
Adjusted R ²	0.1943
P-value (F)	1.88e-29
F (321, 1574)	2.4239
Durbin-Watson	1.7396
Observations	1896
Cross-sectional units	316
Time-series length	6

In Table 17, it is possible to see results of empirical analysis for the economic model. Table is based on the full set of observations (no missing values) – 316:6. The sixth model is based on macro- and micro- economic data for the period of 2005 – 2011 (the full period).

During the full period, economic determinants of corporate performance in Iceland were all described variables, with one exception – average profitability of relevant industry. It seems that industry's profitability is absolutely irrelevant for performance of "great" firm. All determinants are statistically significant at 1% of significance level, with one exception – private consumption growth. It is significant at 5% of significance level.

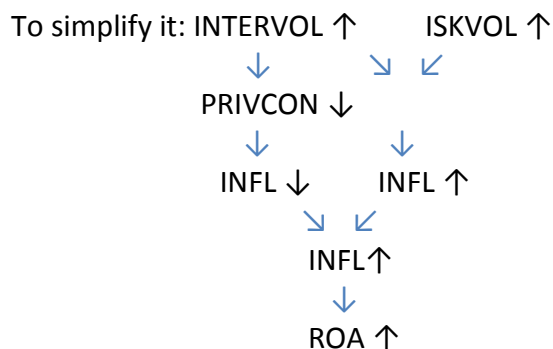
Taken into consideration correlation matrix (Table 12), ROA had the most significant positive correlation with growth of firm's size, during full research period. In other

⁴⁶ Based on author's calculations and Gretl output.

words, competitive advantage is main determinant of corporate performance with respect to the volatile economic environment in Iceland. Estimated model supports that statement: an increase in FSIZE by 1% increases ROA by 3.71%.

FSIZE and NUMBENT had weak positive correlation, during the period of 2005 – 2011. Therefore, an increase in NUMBENT was leading to higher levels of FSIZE. As was described above, increasing domestic competition was pressuring enterprises to achieve greater competitive advantage to sustain their market power. Therefore, an increase in NUMBENT by 10 enterprises increases ROA by 1.4%.

During the full period, INTERVOL and ISKVOL had very strong and positive correlation. Moreover, INTERVOL and INFL, and ISKVOL and INFL were strongly and positively correlated. It means, when volatilities of ISK index and interest rates were increasing, firms were passing them (uncertainties associated with volatilities) into CPI (INFL) – producers/distributors market power. On another hand, INTERVOL and PRIVCON were moderately and negatively correlated; and PRIVCON and INFL were moderately and positively correlated. It means that increasing volatility of interest rates was reducing growth of private consumption. Therefore, domestic demand was decreasing, as well. Because of decreased demand, prices on goods/services were decreasing and affecting CPI's levels (INFL) negatively – consumers market power.



It is possible to see triple impact: positive from INTERVOL and ISKVOL, and negative from PRIVCON on INFL; which resulted in greater ROA. It means, that in the volatile economic environment of Iceland corporations exhibit greater market power than consumers, because the threat of foreign produced substitutes is low.

According to the sixth model, an increase in INTERVOL by 1% increases ROA by 3.55%; an increase in INFL by 1% increases ROA by 9.86% and an increase in PRIVCON by 1% decreases ROA by 4.63%. However, an increase in ISKVOL by 1% decreases ROA

by 11.88%. It shows how big devastating impact ISK index volatility has on ROA even for firms with some level of market power.

Summarize it, independently from the level of economic activities in Icelandic small economy, the combination of competitive advantage growth; market power and its sustainability are insuring great performance for a firm.

In Table 18, it is possible to see results of empirical analysis for organizational and integrated models. Table 18 is based on the full set of observations (missing values were skipped) – 316. The seventh model is based on organizational data for the period of 2005 – 2007 (the expansion); the eighth model is based on organizational data for the period of 2009 – 2011 (the recession); the ninth model is based on organizational data for the full period; and the tenth and the eleventh models are based on macro- and micro- economic and organizational data for the full period.

During expansion period, organizational determinants of corporate performance in Iceland were liquidity, debt ratio and age of CEO. Liquidity is statistically significant at 1% of significance. Debt ratio and age of CEO are statistically significant at 5% of significance.

During recession period, organizational determinants of corporate performance in Iceland were liquidity, solvency, accountant's review and age of CEO. The first three variables are statistically significant at 1% level of significance. And, age of CEO is statistically significant at 5% level of significance.

During expansion period, ROA had the most significant positive correlation with liquidity. Liquidity is associated with external short-term transaction costs, if short-term contracts are not sustainable. Short-term contracts are mainly associated with production inputs, which are main operating expenditure in firm's accounts. Therefore, uncertainty in short-term inputs' prices may be solved with increased liquidity level. During the period of 2005 – 2007, volatility of ISK index (almost double of what it was during the recession) and annual inflation were high, which created such uncertainties. As a result, increasing liquidity affected ROA positively. The seventh model supports that statement: an increase in LIQUID by 1% increases ROA by 4.64%.

Table 18. Results of panel data analysis for organizational and integrated models.⁴⁷

	7.	8.	9.	10.	11.
const	-1.17e-06 (0.1344)	0.0136 (0.0145)	6.24e-07 (0.056)	0.0003 (0.0288)	0.0002 (0.0435)
LEVER				3.48e-05* (1.89e-05)	2.83e-05* (1.68e-05)
LIQUID	4.6381*** ⁴⁸ (1.6962)	-0.0849*** (0.013)	2.7666*** (0.9647)	2.7728*** (0.7166)	2.8885*** (0.7306)
SOLVEN		0.0012*** (0.0003)		0.0067*** (0.0024)	0.0071*** (0.0025)
DEBTR	2.35** (1.0513)		1.8208*** (0.6827)	1.4231** (0.5905)	1.1901** (0.5694)
ANNUREP					
ACCOUN		-0.0291*** (0.0073)			
CEOAGE	-0.0627** (0.027)	-0.0045** (0.002)		-0.0517*** (0.0117)	-0.045*** (0.0099)
MSIZE				-0.242** (0.1167)	-0.2279** (0.1122)
PRIVCON					-10.3933*** (2.8148)
INFL				7.0776*** (2.6412)	
ISKVOL				-19.162*** (3.1209)	
INTERVOL				7.4439*** (1.1557)	
FSIZE				4.7166*** (0.6288)	4.7172*** (0.6411)

⁴⁷ Based on author's calculations and Gretl output.

⁴⁸ * significant at 10%; ** significant at 5%; *** significant at 1%.

	7.	8.	9.	10.	11.
NUMBENT				0.0019*** ⁴⁹ (0.0003)	
R ²	0.052	0.0404	0.0286	0.4534	0.4483
Adjusted R ²	-0.4272	-0.447	-0.1676	0.3391	0.3343
P-value(F)	1.0000	1.0000	1.0000	1.56e-74	4.38e-73
F (318, 629)	0.1086				
F (316, 622)		0.083			
F (317, 1569)			0.1458		
F (326, 1560)				3.9687	
F(323, 1563)					3.9319
Durbin-Watson	1.4799	1.6509	1.6639	1.8222	1.8207
Observations	948	939	1887	1887	1887
Cross-sectional units	316	313	316	316	316
Time-series length	3	3	minimum 3, maximum 6	minimum 3, maximum 6	minimum 3, maximum 6

During the period of 2009 – 2011, volatility of ISK index and annual inflation decreased significantly, which reduced uncertainties associated with the short term contracts. An extra liquidity does not create returns, only costs (therefore, revenues would be decreasing). As a result, increasing liquidity affected ROA negatively. The eighth model supports that statement: an increase in LIQUID by 1% decreases ROA by 0.08%.

Debt ratio is associated with internal long-term transaction costs of “good” firm, because the cost of equity is higher than the cost of debt. During the expansion, increasing domestic demand affected GDP growth positively. As a result of it, there was a great number of investment opportunities for Icelandic firms. They were partially financed with debt. Therefore, debt invested in new profitable project increased ROA. Estimated model supports that statement: an increase in DEBTR by 1% increases ROA by

⁴⁹ * significant at 10%; ** significant at 5%; *** significant at 1%.

2.35%. During the recession, domestic demand and GDP decreased significantly. As a result of it, corporate operations and their long-term financing were reduced in many firms. Therefore, debt ratio became irrelevant for corporate performance.

Older CEO is more conservative with the financial side of corporation (less risky business model), which affects ROA positively in long run. The proof of that is possible to see in sample's mean of DEBTR: it is approximately by 10% lower than the average of debt ratio for small and medium firms worldwide. Same time, he/she is more conservative with new products/markets development (new investment opportunities), which affects ROA negatively. Therefore during the expansion, selection of conservative line of operations had greatly negative impact on corporate performance: an increase in CEOAGE by 1 year decreases ROA by 6.27%. However, this negative impact was lower during the recession, because CEO's conservatism with the financial side of corporation became more important during downturns in internal financial markets. According to results, an increase in CEOAGE by 1 year decreases ROA by 0.45%.

Another possible explanation of CEOAGE negative impact on ROA can be that some sectors are old with low growth and low profit – other sectors are new with high profit and are led by young people.

Accountant's review is representing agency costs and is associated with explicit monitoring expenditures. It is used to decrease management team's divergences from shareholders' interests and to limit their undesirable actions. However, agency costs are minimized in the "great" corporation. Therefore, any monitoring expenditures are negatively correlated with corporate performance (especially, when resources are limited). According to estimated model: the existence of ACCOUN for a firm decreases ROA by 2.91%, during the recession. And, they were irrelevant for ROA, during the expansion.

Solvency is associated with external transaction costs, which can be affected by bounded rationality of decision-maker. The inefficient level of it may increase external costs (for example, interest payments), may decrease firm's revenue or even may lead to firm's bankruptcy. Therefore, an increase in solvency ratio is associated with "greater" corporate performance, during the downturn in economic activities. Estimated model supports that statement: an increase in SOLVEN by 1% increases ROA by 0.0012%.

During the full period, organizational determinants of corporate performance in Iceland were debt ratio and liquidity. These determinants are statistically significant at 1% level of significance level. Because agency costs are minimized in “great” performing company; they were irrelevant for ROA.

According to the ninth model, estimated for the period of 2005 – 2011, only long-term and short-term transaction costs are associated with “great” performance. An increase in LIQUID by 1% increases ROA by 2.77%, and an increase in DEBTR by 1% increases ROA by 1.82%. In other words, only funding of operations and new investments is important for corporate performance, if do not take into consideration the development of economic activities.

During the full period, determinants of corporate performance in the integrated model were all described macro- and micro- economic variables (an exception was average profitability of industry) at 1% of significance level; transaction costs: liquidity and solvency, and age of CEO at 1% of significance level; debt ratio and the size of Board of Directors at 5% of significance level; and leverage at 10% of significance level. Accountant’s review and annual report were irrelevant for “great” corporate performance.

If to take into consideration long-term and all possible determinants of corporate performance – the big picture, growth of private consumption has a negative impact on corporate performance in the sample since it is an indicator of growing imbalances in the economy, which leads to higher interest rates, inflation and even appreciation of the currency. Thus, annual volatilities of ISK index and long-term interest rates, and annual inflation are substitute-variables for growth of private consumption.

The tenth and the eleventh models indicates that: an increase in INTERVOL by 1% increases ROA by 7.44%, an increase in INFL by 1% increases ROA by 7.08%, an increase in ISKVOL by 1% decreases ROA by 19.16% and an increase in PRIVCON by 1% decreases ROA by 10.39%.

Micro-variables have same impact on corporate performance as they did in the economic model for full research period: increasing competition within an industry and competitive advantage increases ROA. Therefore, an increase in FSIZE by 1% increases ROA by 4.72% and an increase in NUMBENT by 10 enterprises increases ROA by 1.9%.

Variables associated with transaction costs have a positive impact on ROA. They represent planning, organizing and enforcing firm's input or/and output contracts of production process. It means that an increase in transaction costs (associated with market making activities) leads to greater corporate performance. Estimated models support it: an increase in LIQUID by 1% increases ROA by 2.77% – 2.89% (depending on the model), an increase in SOLVEN by 1% increases ROA by 0.07% and an increase in DEBTR by 1% increases ROA by 1.42% – 1.19% (depending on the model).

Explicit monitoring expenditures are irrelevant for corporate performance, in long-run. Implicit monitoring expenditures are represented by a number of members in the Board of Directors. The volume of such expenditures is proportional to a number of members. Therefore, it is not surprising that an increase in them would reduce corporate performance. According to estimated models, an increase in MSIZE by 1 member reduces ROA by 24.2% – 22.79% (depending on the model). In another words, the big Board of Directors has significantly negative impact on corporate performance, as it symbolizes increasing agent-principle problem within a corporation.

As before, increasing conservatism of CEO has a negative impact on ROA: an increase in CEOAGE by 1 year reduces ROA by 4.5% – 5.17% (depending on the model). Conservatism in corporate operations has greatly negative impact on corporate performance in rapidly changing business environment. Corporate operations need to be adapted to these changes, as well.

As was explained earlier, equity financing increases the agent-principle problem. And, debt financing decreases it. Same time, increasing debt serves as a punishment mechanism for inefficient actions of management team. However, it is not a case here. Here are two possible explanations: debt is at the less than efficient level because of high degree of conservatism; or interests of equity holders are more important than creditors' rights in Icelandic legal system. Therefore, an increase in LEVER by 1% increases ROA by 0.00003%, according to the integrated model.

Taken into consideration changes in goodness-of-fit (R^2), it is possible to see that the importance of macro- and micro- variables for corporate performance in small Icelandic economy is significantly greater (14.42% – 49.14%) than the importance of organizational variables (4.04% – 5.2%), independently from the economic environment. This result is absolutely opposite to results of similar analysis for big

economies. It means that corporate performance in Iceland is greatly affected by external variables, which are outside of corporation's control, does not matter how great it is.

As well, goodness-of-fit is greater during the expansion for both models: organizational and economic. And R^2 values are decreasing for models estimated for recession period. It means that during the expansion, corporate performance is highly dependent on economic variables, but during the recession some other determinants (which had not been used in my analysis) have greater effect. Surprisingly, the importance of organizational variables is not increasing during the recession, if something – it is decreasing even further.

9 Discussion

Over all, if compare results for the expansion and the recession, two macro-economic variables are affecting corporate performance the most: ISK and interest rates volatilities. However, in an open economy they have greatly negative effect on ROA and in closed economy they have small and positive effect. It can be explained by levels of market power and an ability to pass through increasing uncertainties (volatilities). In an open economy, market power of firms in the sample was diminishing; and in closed economy, market power of firms in the sample was increasing. It was measured indirectly, through impact of annual inflation on ROA (due to limited data, the variable for market power of firms was not included in the research).

On another hand, growth of private consumption has a negative impact on corporate performance independently from the state of economy. In an open economy, it was directly decreasing ROA through increasing consumer power; and in closed economy, it was (and still is) indirectly decreasing ROA through decreasing level of investments.

Highly negative impact of private consumption growth on ROA, during the expansion, suggests that domestic demand/export sectors are no longer clear cut decision. Increasing use of internet by consumers, cheap international flights and EU regulations made many services (retail trade, construction and etc.) to become tradable, dependently on the level of ISK. As well, it suggests that involvement of non-tradable sector in tradable sector's production is great.

Indirect negative impact of private consumption growth on corporate performance, in closed economy, is impossible to deny. Based on statistical data from Statistics Iceland, 2012 GDP's growth was supported by growth in private consumption, which resulted in 13% negative growth in investment. Here are only two solutions for this problem: to open the economy or to reduce private consumption to efficient levels by promoting savings with credible announcements of government's future policies.

Increasing competition within an industry affects corporate performance in the sample positively. Schumpeterian theory is coming in to mind. It states that in the presence of competition, monopolistic/oligopolistic corporation looks for more efficient

ways of production, discover new technologies, products and markets. All these activities result in greater corporate performance. However, the different pattern is possible to see for an industry as a whole, in Figures 11 and 12. Increasing number of corporations in many industries leads to a decrease in industries' profitability. It suggests that different description is more appropriate for Icelandic industries. There are the small number of dominant firms with the price-leadership and the competitive fringe, which consists from a great number of following firms. That competitive fringe behaves like perfectly competitive firms and takes a price, which is set by dominant firms. Same time, dominant corporations have an ability to maximize their profit, which results in "great" corporate performance.

Growth of firm's size (competitive advantage) has a positive impact on ROA, independently from economic environment. However, that effect is significantly greater during the expansion. And, it is only one determinant in the economic model, which can separate "great" companies from "good" ones in the open Icelandic economy, when corporate market power is decreasing. But, it has very small impact on ROA during the recession.

In other words, in the open Icelandic economy, great corporate performance is achievable only through increasing levels of competitive advantage. And, in closed economy, it is achievable through the combination of increasing competitive advantage, greater market power and its sustainability by a firm.

Taken into consideration full research period, a positive impact of increasing competition on ROA supports statement that many "great" Icelandic corporations have a dominant position in their industries. And, the combination of competitive advantage growth, market power and its sustainability are insuring great performance for a firm. Same time, growth of private consumption creates imbalances in the Icelandic economy, which are affecting ROA negatively, independently from the state of economy. Moreover, even a firm with some level of market power is not able to pass ISK volatility into prices at significant enough level to insure great performance. Therefore, it is safe to say that ISK volatility has devastating and long-lasting impact on all corporations in Iceland. A proof of that is possible to see in the difference between ROA means for recession and expansion. Recession mean is a double size that it was during the expansion (which is kind of absurd for any other economy). It suggests that

many companies, which did not take a part in booming risky activities during the expansion, were in trouble because of high ISK volatility.

Comparison of descriptive statistics in Tables 7 and 8 indicates that total debt decreased across firms in the sample, during the recession. However, it was done through a decrease in the long term debt, because data indicates that changes in the short term debt were insignificant. As well, the short term assets increased significantly, during the period of 2009 – 2011. An increase in the short term assets is a danger sign, in my opinion; because, firms with too high short term assets may have difficulties with collecting them, if partners will not pay.

Conservatism is high in “great” performing corporations; the mean of DEBTR for “outstanding” corporations is a proof of that. Therefore, it is not surprising that younger CEO is associated with greater performance. It is more relevant when investment opportunities are present.

Another possible explanation can be that high-growth new industries, especially those with intangible investments, use less debt financing and are led by younger CEOs.

As well, great corporate performance is associated with transaction costs. However, the relevance of transaction costs changes dependently on levels of economic activities and economic stability. An extra liquidity is important for corporate performance only when the level of uncertainties is high; however it reduces ROA if volatility of ISK and annual inflation are in-check.

Liquidity importance may be reviewed from capital structure’s perspective, as well. Short term debt with a low cost will lead to higher performance. However, increasing cost of it will reduce ROA. Therefore, industries, which operate with low levels of short term debt, may perform better than others, during the recession. Bigger and older firms may perform better than others, during recession, as well; because maturity of debt is higher in such firms.

Higher level of solvency is associated with greater performance in the downturn of economic activities. Therefore, industries, which operate with high levels of short term assets or/and low levels of short term debt, may perform better than others, during the recession.

An increase in long- term transaction costs (debt ratio) is important for ROA only during the expansion. The positive relationship between corporate performance and

debt ratio differs from results of other researchers. It suggests that increasing debt do not service as a punishment mechanism for inefficient decisions of management team, in Icelandic corporations. Here exist two possible explanations of that. Because of high level of conservatism, debt ratio is less than optimal in “great” Icelandic corporations. Therefore, in the presence of highly profitable opportunities increasing debt ratio would increase ROA. Or, interests of equity holders in “great” Icelandic corporations are more dominant than interests of creditors, especially when a turbulent moment is present. In my opinion, both statements are relevant for this research.

Based on the comparison of Figures 12 and 14, a different rule holds for the competitive fringe. There, increasing debt is associated with decreasing profitability in an industry as a whole. It suggests that my previous assumption is right.

According to results of organizational model, agency costs are minimized in great performing company. Therefore, any external monitoring expenditure is reducing corporate performance, independently from research period.

Minimized agency costs in the presence of low debt ratio suggest that shareholders take an active part in governance of “great” corporation.

Moreover, in the long run only an increase in short- and long- term transaction costs is associated with great ROA. In other words, big firms in conventional industries with an access to credit facilities perform better than others in turbulent Icelandic economy.

Taken in consideration all possible factors determining corporate performance, “great” ROA is associated with increasing transaction costs, decreasing agency monitoring expenditures (conservative policies are dominant already), younger CEO, small Board of Directors, increasing market power and competitive advantage of corporation. However, it does not matter if some corporation fits all these conditions; it still cannot reduce greatly negative impact of ISK volatility on its corporate performance. As well, greater growth of private consumption is creating imbalances in the economy, which complicate for corporate Iceland adaptation and reorganization of their activities.

Once again, Icelandic small economy is an exception from rules. Corporate performance in Iceland is highly dependent on macro-economic variables. It means, it does not matter how great management team is, it can do very little to increase ROA. The main determinant of “great” performance (controlled by a firm) in Iceland is an

ability of firm to establish greater level of market power through competitive advantage or some other variable (which was not been used in this research).

In Iceland, ISKVOL has a great importance for corporate performance. Even great performing corporation, based in Iceland, cannot escape a negative impact of its volatility. That impact was greater for corporate performance in an open economy, when ISKVOL was high. It suggests that impact of ISKVOL is non-linear, to be precise – exponential: greater volatility creates greater negative impact on ROA.

At present, the open economy is the ultimate goal for any Icelandic decision-maker; they just differ in opinion when it should happen. Therefore, Icelandic corporations are in a great need of new policy, which would insure stable currency in the open economy; so, that “great” corporate performance would be achievable for as many corporations in Iceland, as possible. As well, such policy would encourage Icelandic corporations to promote and to increase their competitive advantage, because in such environment it would be the main factor of “great” performance. As well, the importance of organizational variables would increase significantly: ROA dependence on the quality of management team and other internal factors. Such factors may be controlled and reorganized by corporation on its one.

Talking about ISK volatility, it was impossible for me to ignore almost perfect positive correlation between ISK volatility and annual inflation in the open Icelandic economy. It means that higher volatility of ISK creates higher inflation. Now, CBI goal is a stable inflation rate, around 2.5%. Preliminary data suggests (further research needed) that approximately 2% volatility in ISK index leads to 1% of inflation. Volatility of ISK index depends on the balance between inflows and outflows in the open Icelandic economy (because financial markets are very shallow, here is no need of very big difference in inflows and outflows to create volatility). Therefore, if annual volatility of ISK index passes 8% volatility mark; annual inflation would pass allowance bounds. Based on these thoughts, here is a question: does CBI has an ability and resources in the open economy (in the presence of such problems as asymmetric information and limited resources) to balance these capital flows efficiently enough? If it is not able to do that, then it is just doing “Don Quixote job” by trying to control inflation.

Individual effects are responsible for 15% - 20% increase in R^2 . Therefore, they would increase goodness-of-fit for all estimated models significantly. However, the presence of

individual effects would not allow me to resolve autocorrelation and heteroskedasticity problems.

For future researchers, further research is needed for estimation of corporate performance determinants during the recession. I would assume that education and skills/experience variables within each corporation may be responsible for models shortcomings.

10 Conclusion

The most significant importance for corporate performance in Icelandic turbulent economic environment lies with macro- and micro- variables.

Volatility of ISK index and growth of private consumption create unbalances and complicate for corporate Iceland adaptation and reorganization of their activities. Therefore, passing these uncertainties into output prices is one way for corporations to achieve “good” ROA in Iceland. As a result, market power is the necessary condition for the successful company in the volatile Icelandic economic environment. Another way to achieve “good” ROA is to increase competitive advantage through costs leadership strategy. Combination of these two ways will lead to great performance. Sustainability of these factors in the presence of increasing competition is very important for corporate performance in the long run.

Agency costs are minimized by shareholders involvement in the management. The level of conservatism is high, which is not necessary a good thing because interests of shareholders in great corporations exhibit greater importance than interests of creditors under Icelandic legal system. On another hand, any increase in transaction costs is associated with greater performance. A positive impact of liquidity on ROA shows that the great level of uncertainties, associated with ISK and CPI, is always present in the Icelandic economy. Solvency impact is supporting that statement.

According to the integrated model, the “great” corporation in Iceland has some degree of market power and competitive advantage, and is able to sustain them; it maximizes transaction costs and minimizes agency costs, has small Board of Directors and younger CEO.

Bibliography

- Ayyagari, M., Demirgüç-Kunt, A., Maksimovic, V. (2005, September). *How well do institutional theories explain firms' perceptions of property rights?* The World Bank, the Policy Research Working Paper No. 3709. Retrieved July 12, 2013, from Google.com:
<http://elibrary.worldbank.org/docserver/download/3709.pdf?expires=1372517202&id=id&accname=guest&checksum=7E7CB3A7ADED8526A33B40D9BE236F92>
- Beck, T., Demirguc -Kunt, A., Vojislav Maksimovic, V. (2005, February). *Financial and legal constraints to growth: does firm size matter?* The Journal of Finance, Vol. LX, 2005, No. 1, pp. 137 – 177. Retrieved July 12, 2013, from Google.com:
<http://www.rhsmith.umd.edu/faculty/vmax/Papers/JF2005.pdf>
- Bourne, M., Neely, A., Mills, J., Platts, K. (2003). *Implementing performance measurement systems: a literature review*. International Journal of Business Performance Management, Vol. 5, No. 1, pp. 1 – 24. Published by: Inderscience Enterprises Ltd. Retrieved July 12, 2013, from Google.com:
http://www.tlog.lth.se/fileadmin/tlog/Utbildning/Kurser/Logistik_i_foersoerjningskedjor/Artiklar/Perf_Meas._Neely.pdf
- Boyd, J. H., Levine, R., Smith, B. D. (2000, February). *The impact of inflation on financial sector performance*. Retrieved July 12, 2013, from Google.com:
http://faculty.haas.berkeley.edu/ross_levine/Papers/2001_JME_Inflation%20Fin%20Sector.pdf
- Carvalho, M. T., Gomes, M. A., Gomes, M. E. (2013, May). *Family involvement, agency cost of debt financing, and small firm performance: research agenda*. Revista de Empresa Familiar, 2013, Vol. 3, No. 1, pp. 21 – 30. Retrieved July 12, 2013, from Google.com:
http://www.google.is/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&sqi=2&ved=0CDgQFjAD&url=http%3A%2F%2Fwww.catedraempresafamiliar.uma.es%2Fois223%2Findex.php%2Frevistaempresafamiliar%2Farticle%2Fdownload%2F42%2F60&ei=w6bYUdyvDYLM0QWNwYGgDw&usg=AFQjCNHQu5niLZ39NvibhB_ZGYpR3UoqkQ&bvm=bv.48705608,d.d2k
- Costea, V. (2012). *Determinants of corporate financial performance*. Retrieved July 12, 2013, from Google.com: <http://www.dafi.ase.ro/revista/6/Costea%20Valentin.pdf>
- Danielsson, A., Zoega, G. (2009, February) *Hagkerfi biður skipbrot*. Retrieved July 12, 2013, from Google.com:
http://www.hi.is/files/skjol/felagsvisindasvid/deildir/hagfraedi/2008_2009/Hagkerfi_ur_skipbrot.pdf

- Duysters, G., Hagedoorn, J. (2000). *Core competences and company Performance in the world-wide Computer industry*. The Journal of High Technology Management Research, 2000, Vol. 11, No. 1, pp. 75 – 91. Published by: Elsevier Science Inc. Retrieved July 12, 2013, from Google.com: <http://arno.unimaas.nl/show.cgi?fid=2465>
- Gonzalez, V. M. (2013, January). *Leverage and corporate performance: International evidence*. International Review of Economics & Finance, Vol. 25, 2013, pp. 169 – 184. Published by: Elsevier Science Inc. Retrieved July 12, 2013, from Google.com: <http://www.sciencedirect.com/science/article/pii/S1059056012000652>
- Foss, N. J., Knudsen, C. (1996). *Towards a competence theory of the firm*. Pp. 54 – 74. Printed by Intype London Ltd. Retrieved July 12, 2013, from Google.com: <http://books.google.is/books?id=UmU75p1BqkMC&pg=PA54&lpg=PA54&dq=competence+theory&source=bl&ots=DI kr-BQHP&sig=rO1ardx1C8MWH Fd7l2GclJ8-kc&hl=is&sa=X&ei=0g3WUffcGgTK0QWJy4DwDg&ved=0CCsQ6AEwATgK>
- Easterly, W., Levine, R. (1997, April). *Africa's growth tragedy: policies and ethnic divisions*. Retrieved July 12, 2013, from Google.com: http://williameasterly.files.wordpress.com/2010/08/17_easterly_levine_africasgrowthtragedy_prp.pdf
- Hanh, B. L. T. (2009, May). *Impact of Financial variables on the production efficiency of Pangasius farms in An Giang province, Vietnam*. The Norwegian College of Fishery Science University of Tromso, Norway; and Nha Trang University, Vietnam. Retrieved July 12, 2013, from Google.com: <http://munin.uit.no/bitstream/handle/10037/1982/thesis.pdf;jsessionid=5C562C6E49B66759BEDEFAB8F3DC104?sequence=2>
- Hansen, G. S., Wernerfelt, B. (1989, September – October). *Determinants of firm performance: the relative importance of economic and organizational factors*. Strategic Management Journal, Vol. 10, No. 5, 1989, pp. 399 – 411. Published by: John Wiley & Sons. Retrieved July 12, 2013, from Google.com: https://hec.unil.ch/docs/files/83/655/gary_s._hansen_and_birger_wernerfelt_1989_firm_performance.pdf
- Hill, R. C., Griffith, W. E., Lim, G. C. (2008). *Principals of econometrics*. The third edition, Chapter 15, pp. 391 – 404. Published by: John Wiley & Sons.
- Hodgson, G. M. (1998). *Evolutionary and competence-based theories of the firm*. Journal of Economic Studies, Vol. 25, No. 1, 1998, pp. 25 – 56. Published by: University Press. Retrieved July 12, 2013, from Google.com: <http://geoffrey-hodgson.info/user/image/evcomp.pdf>
- Hodgson, G. M. (1998). *Competence and contract in the theory of the firm*. Journal of Economic Behavior & Organization, Vol. 35, 1998, pp. 179 – 201. Retrieved July 12, 2013, from Google.com: <http://www.cua.uam.mx/biblio/ueaarticulos/Competenceandcontract.pdf>

Já.is. Retrieved July 12, 2013, from Google.com:

<http://ja.is/kort/?x=420815&y=388949&z=1&type=map&from=101&to=900>

Jensen, M. C., Meckling, W. H. (1976, October). *Theory of the firm: managerial behavior, agency costs and ownership structure*. Journal of Financial Economics, 1976, Vol. 3, No. 4, pp. 305 – 360. Retrieved July 12, 2013, from Google.com:

<http://www.sfu.ca/~wainwrig/Econ400/jensen-meckling.pdf>

Johnson, H. T. (1972). *Early cost accounting for internal management control: Lyman Mills in the 1850's*. The Business History Review, Vol. 46, No. 4, 1972, pp. 466 – 474. Published by: The President and Fellows of Harvard College. Retrieved July 12, 2013, from Google.com:

<http://www.jstor.org/discover/10.2307/3113343?uid=3738288&uid=2134&uid=2&uid=70&uid=4&sid=21102382888617>

Johnson, H. T. (1981). *Towards an understanding of nineteenth century cost accounting*. The Accounting Review, Vol. LVI, No. 3, 1981, pp.510 – 518. Retrieved July 12, 2013, from Google.com:

<http://www.jstor.org/discover/10.2307/246912?uid=3738288&uid=2134&uid=2&uid=70&uid=4&sid=21102382888617>

Johnson, P. (2004, April). *Cross sectional time series: the normal model and panel corrected standard errors*. Retrieved July 12, 2013, from Google.com:

<http://pj.freefaculty.org/guides/stat/Regression/TimeSeries-Longitudinal-CXTS/CXTS-PCSE.pdf>

Landsbankinn. Retrieved July 12, 2013, from Google.com:

<http://www.landsbankinn.is/markadir/gjaldmidlar/gengisthroun/#/A/01-01-2005/31-12-2011/GVT-ISK/>

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R. (1998). *Investor Protection and Corporate Valuation*. Retrieved July 12, 2013, from Google.com:

<http://www.google.is/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fciteseerx.ist.psu.edu%2Fviewdoc%2Fdownload%3Fdoi%3D10.1.1.197.4580%26rep%3Drep1%26type%3Dpdf&ei=J4fNUfXxPInDPNDageAE&usq=AFQjCNHGoiCu81aQ6PsC5BJvaSrLo3QV6Q&bvm=bv.48572450,d.ZWU>

Linda Björk Bryndsardottir. (2011, June). *Ekki er allt sem sýnist. Mat á þjóðhagslegri arðsemi íslensks sjávarútvegs*. The University of Iceland, BS thesis, pp. 24.

Retrieved July 12, 2013, from Google.com:

http://skemman.is/stream/get/1946/8189/21677/1/Bs_%C3%BEjodhagslegardsemisjavarutvegs.pdf

Maditinos, D. I., Šević, Ž., Theriou, N. G. (2005, July). Performance measures: traditional accounting measures versus modern value-based measures. The case of earnings and EVA in the Athens Stock Exchange (ASE). 3rd International Conference on Accounting and Finance in Transition (ICAFT), 2005. Retrieved July 12, 2013, from Google.com: http://abd.teikav.edu.gr/articles/ICAFT_05_EVA_EPS_Greenwich.pdf

- Maher, M., Andersson, T. (1999). *Corporate governance: effects on firm performance and economic growth*. Organization For Economic Co-Operation And Development. Retrieved July 12, 2013, from Google.com: <http://www.oecd.org/sti/ind/2090569.pdf>
- Ministry of Finance of Iceland. (2003, January). *The macro-economic impact of the construction of power plants and aluminum smelters*. Nr. 1. Retrieved July 12, 2013, from Google.com: http://eng.fjarmalaraduneyti.is/media/Utgefin_rit/SK_enskaal_0301.pdf
- Miyagishima, C., Ineke, J. (2006). *Investment grade credit. Icelandic banks: chill out*. Morgan Stanley fixed income research. Retrieved July 12, 2013, from Google.com: http://notendur.hi.is/ajonsson/kennsla2006/morgan_stanley.pdf
- Nase, K., Mokhtar, M. Z. (2004, July). *Determinants of corporate performance of Malaysian companies*. Presentation at the Fourth Asia Pacific Interdisciplinary Research in Accounting Conference, 4 to 6 July 2004. Retrieved July 12, 2013, from Google.com: <http://www2.smu.edu.sg/events/apira/2004/Final%20Papers/1203-Mokhtar.pdf>
- Neely, A. (1999). *The performance measurement revolution: why now and what next?* International Journal of Operations & Production Management, Vol. 19, No. 2, 1999, pp. 205 – 228. Published by: MCB University Press. Retrieved July 12, 2013, from Google.com: http://bc.msu.ac.th/staff/veerawat/1/research/resources/neerly_1999_the_pm_r_evolution.pdf
- Neely, A., Bourne, M., Kennerley, M. (2000). *Performance measurement system design: developing and testing a process-based approach*. International Journal of Operations & Production Management, Vol. 20, No. 10, 2000, pp. 1119 – 1145. Published by: MCB University Press. Retrieved July 12, 2013, from Google.com: <http://www.som.cranfield.ac.uk/som/dinamic-content/research/cbp/IJOPM2010.pdf>
- Olafsson, Þ. T. (2009, September). *Endurskipulagning skulda heimila og fyrirtæk í kjölfar kerfislægrar fjármálakreppu*. Seðlabanki Íslands. Retrieved July 12, 2013, from Google.com: <http://www.seðlabanki.is/lisalib/getfile.aspx?itemid=7306>
- Olokoyo, F. O. (2012, December). *The effect of the industrial sector on firms' performance in a multi-cultural economy*. International Journal of Economics, Finance and Management, Vol. 1, 2012, No. 1, pp. 26 – 32. Retrieved July 12, 2013, from Google.com: http://www.ejournalofbusiness.org/archive/vol1no1/vol1no1_4.pdf
- Porter, M. (1985). *Competitive Advantage*. The first edition, chapter 1, pp. 5 – 15. Published by: The Free Press, New York.
- Prasetyantoko, A., Parmono, R. (2008, January). *Determinants of corporate performance of listed companies in Indonesia*. Munich Personal RePEc Archive, Paper No. 6777,

- posted 17. January 2008 05:51 UTC. Retrieved July 12, 2013, from Google.com:
http://mpira.ub.uni-muenchen.de/6777/1/MPRA_paper_6777.pdf
- Rajan, R. G., Zingales, L. (2003). *The great reversals: the politics of financial development in the twentieth century*. Journal of Financial Economics, No. 69, 2003, pp. 5 – 50. Published by: Elsevier Science B.V. Retrieved July 12, 2013, from Google.com:
<http://faculty.chicagobooth.edu/luigi.zingales/papers/research/JFEreversal.pdf>
- Rán Tryggvadóttir, Thordis Ingadóttir. (2007, February). *Researching Icelandic Law*. Icelandic Human Rights Center. Retrieved July 12, 2013, from Google.com:
<http://www.humanrights.is/english/laws/icelandic-law/>
- Robb, A., Seamans, R. (2011, June). *Entrepreneurial finance and performance: a transaction cost economics approach*. Retrieved July 12, 2013, from Google.com:
http://sites.kauffman.org/wep/resources/robb_seamans_062311.pdf
- Romer, D. (2006). *Advanced macroeconomics*. The third edition, chapter 3, pp. 144 – 154. Published by: McGraw-Hill/Irwin, New York.
- Striteska, M., Spickova, M. (2012). *Review and comparison of performance measurement systems*. Journal of Organizational Management Studies, Vol. 2012, 2012, Article ID 114900, pp. 1 – 13. Published by: IBIMA Publishing. Retrieved July 12, 2013, from Google.com:
<http://www.ibimapublishing.com/journals/JOMS/2012/114900/114900.pdf>
- Statistics Iceland. *Ársreikningar fyrirtækja*. Retrieved July 12, 2013, from Google.com:
<http://www.hagstofa.is/?PageID=2595&src=https://rannsokn.hagstofa.is/pxis/Dialog/varval.asp?ma=FYR07613%26ti=Rekstraryfirlit+eftir+deildum%2C+%F6ll+fyrirt%ED+safni+2008+og+2009+%26path=../Database/fyrirtaeki/afk0809/%26lang=3%26units=Millj%F3nir%20kr%F3na>
- Statistics Iceland. *ÍSAT 2008*. Retrieved July 12, 2013, from Google.com:
<http://www.hagstofa.is/Pages/1830>
- Sokoloff, K. L., Engerman, S. L. (2000). *History lessons institutions, factor endowments, and paths of development in the new world*. Journal of Economic Perspectives, Volume 14, No. 3, 2000, pp. 217 – 232. Retrieved July 12, 2013, from Google.com:
<http://www.nyu.edu/econ/user/debrai/Courses/Readings/SokoloffEngerman.pdf>
- The Central Bank of Iceland. Retrieved July 12, 2013, from Google.com:
<http://www.sedlabanki.is/vextir/>
- The Central Bank of Iceland. Retrieved July 12, 2013, from Google.com:
<http://www.sedlabanki.is/peningastefna/verdlagsthroun/>
- The Centre for Business Performance, Cranfield School of Management. (2005). *Literature review on performance measurement and management*. Retrieved July 12, 2013, from Google.com:
<http://www.ftms.edu.my/pdf/Download/UndergraduateStudent/IOP%20STUDEN>

[T%20ARTICLES/performance%20measurement%20and%20management%20literature%20review.pdf](#)

The World Bank. Retrieved July 12, 2013, from Google.com:

<http://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD/countries/IS?display=graph>

Weiner, N., Mahoney, T. A. (1981, September). *A model of corporate performance as a function of environment, organizational, and leadership influences*. Academy of Management Journal, 1981, Vol. 24, No. 3; pp. 453 – 470. Retrieved July 12, 2013, from Google.com:

<http://gegdir.hosted.exlibrisgroup.com/hvar?sid=google&auinit=N&aulast=Weiner&atitle=A+Model+of+Corporate+Performance+as+a+Function+of+Environmental,+Organizational,+and+Leadership+Influences.&id=doi:10.2307/255568&title=Academy+of+Management+journal&volume=24&issue=3&date=1981&spage=453&isn=0001-4273>

Appendix 1: Comparison of ISAT 1995 and ISAT 2008⁵⁰

In 2008, ISAT 1995 was replaced by ISAT 2008. Therefore, for research purposes I adapted and simplify changes in new ISAT (industries' classification) to old ISAT.

Table 19. Comparison of ISAT 1995 and ISAT 2008.

ISAT 1995	ISAT 2008
01. Agriculture, hunting and related service activities.	01. Crop and animal production, hunting and related service activities.
05. Fish hatcheries and fish farms.	03.12. – 03.2. Freshwater fishing and aquaculture.
05. Fishing excl. fish hatcheries and fish farms.	03.11.1. Operation fishing boats smaller than 15 GT. 03.11.2. Operation of fishing vessels larger than 15 GT.
14. Other mining and quarrying.	05. – 09. Mining and quarrying.
15. Processing of fish and fish products.	10.20.1. Freezing of fish, fish fillets, crustaceans and mollusks. 10.20.2. Drying and salting of fish, crustaceans and mollusks. 10.20.3. – 10.20.9. Processing and preserving of fish and fish products i.e.
15. Manufacture of food products and beverages excl. processing of fish.	10.1. Processing and preserving of meat and production of meat products. 10.3. Processing and preserving of fruit and vegetables. 10.4. – 10.5. Manufacture of vegetable and animal oils and fats; manufacture of dairy products. 10.6. – 10.7. Manufacture of grain mill products, starches and starch products; manufacture of bakery and farinaceous products. 10.8. and 10.9. Manufacture of prepared animal feeds. 11. Manufacture of other food products and beverages.

⁵⁰ Based on description of ÍSAT 2008 by Statistics Iceland: *ÍSAT 2008*.

ISAT 1995	ISAT 2008
17. Manufacture of textiles.	13. Manufacture of textiles.
22. Publishing, printing and reproduction of recorded media.	18. Printing and reproduction of recorded media.
24. Manufacture of chemicals and chemical products.	58. Publishing activities.
25. Manufacture of rubber and plastic products.	20. – 21. Manufacture of chemicals and chemical products, basic pharmaceutical products and pharmaceutical preparations.
26. Manufacture of other non-metallic mineral products.	22. Manufacture of rubber and plastic products.
28. Manufacture of fabricated metal products, except machinery and equipment.	23. Manufacture of other non-metallic mineral products.
29. Manufacture of machinery and equipment i.e.	25. Manufacture of fabricated metal products, except machinery and equipment.
31. Manufacture of electrical machinery and apparatus i.e.	28. Manufacture of machinery and equipment i.e.
32. Manufacture of radio, television and communication equipment and apparatus.	33. Repair and installation of machinery and equipment.
34. Manufacture of motor vehicles, trailers and semi-trailer.	27. Manufacture of electrical equipment.
35. Manufacture of other transport equipment.	26. Manufacture of computer, electronic and optical products.
36. Manufacture of furniture and other manufacturing.	29. Manufacture of motor vehicles, trailers and semi-trailers.
37. Recycling.	30. Manufacture of other transport equipment.
90. Sewage and refuse disposal, sanitation and similar activities.	31. Manufacture of furniture.
	32. Other manufacturing.
	37. – 39. Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services.

ISAT 1995	ISAT 2008
40. Electricity, gas steam and hot water supply.	35. Electricity, gas, steam and air conditioning supply.
45. Construction.	41. Construction of buildings.
	42. Civil engineering.
	43. Specialized construction activities.
50. Sale, maintenance and repair of motor vehicles and motorcycles.	45. Sale of motor vehicles.
51. Wholesale trade and commission trade, except of motor vehicles and motorcycles.	46. Wholesale trade, except of motor vehicles and motorcycles.
52. Retail trade, except of motor vehicles and motorcycles.	47. Retail trade, except of motor vehicles and motorcycles.
55. Hotels and restaurants.	55. Accommodation.
	56. Food and beverage service activities.
60. Land transport.	49. – 50. Land and water transport.
61. Water transport.	
62. Air transport.	51. Air transport.
63. Supporting and auxiliary transport activities; activities of travel agencies.	52. Warehousing and support activities for transportation.
	79. Travel agency, tour operator and other reservation service and related activities.
64. Post and telecommunications.	53. Postal and courier activities.
	61. Telecommunications.
70. Real estate activities.	68. Real estate activities.
71. Renting of machinery and equipment without operator and of personal and household goods.	77. Rental and leasing activities.
72. Computer and related activities.	62. Computer programming, consultancy and related activities.
	95. Repair of computers and personal and household

ISAT 1995	ISAT 2008
73. Research and development.	goods.
74. Other business activities.	63. Information service activities.
	59. – 60. Motion picture, video and television shows' production, sound recording and music publishing activities; programming and broadcasting activities.
	69. Legal and accounting activities.
	70. Starfsemi höfuðstöðva, starfsemi við rekstrarráðgjöf.
	71. Architectural and engineering activities; technical testing and analysis.
	73. Advertising and market research.
	74. Other professional, scientific and technical activities.
	81. Services to buildings and landscape activities.
	82. Skrifstofuþjónusta og önnur þjónusta við atvinnurekstur.
80. Education.	85. Education.
85. Health and social work.	86. Human health activities.
	87. Residential care activities.
	88. Social work activities without accommodation.

Appendix 2: Average net profit (per firm) after taxes

In 2008, ISAT 1995 was replaced by ISAT 2008. As a result, ISAT 1995 and ISAT 2008 were compared and adapted. Therefore, the calculation of average net profit after taxes takes into consideration that comparison.

$$\Pi_{it} = \sum_1^n \hat{\pi}_{nit}$$

Where, i – represents a specific industry;

n – represents a number of combined industries in a specific industry due to comparison of ISATs 2008 and 1995;

t – represents specific review/research year;

Π_{it} – net profits before income taxes in a specific industry, during specific review/research year;

$\hat{\pi}_{nit}$ – net profits before income taxes in combined industry, during specific review/research year.

$$T_{it} = \sum_1^n \hat{T}_{nit}$$

Where, T_{it} – income taxes in a specific industry, during specific review/research year;

\hat{T}_{nit} – income taxes in combined industry, during specific review/research year.

$$N_{it} = \sum_1^n \hat{N}_{nit}$$

Where, N_{it} – a number of firms in specific industry, during specific review/research year;

\hat{N}_{nit} – a number of firms in combined industry, during specific review/research year.

$$Net \Pi_{it} = \Pi_{it} - T_{it}$$

Where, $Net \Pi_{it}$ – net profits after income taxes in a specific industry, during specific review/research year.

$$\overline{Net \Pi}_{it} = Net \Pi_{it} / N_{it}$$

Where, $\overline{Net \Pi}_{it}$ – average net profits (per firm) after income taxes in a specific industry, during specific review/research year.

Appendix 3: Weighted debt ratio

In 2008, ISAT 1995 was replaced by ISAT 2008. As a result, ISAT 1995 and ISAT 2008 were compared and adapted. Therefore, the calculation of debt ratio takes into consideration that comparison. Debt ratio depends on the volume of debt and total assets in an industry. Therefore, I have chosen to use total assets of combined industries as main determinants of weights in a specified industry.

$$A_{it} = \sum_1^n \hat{A}_{nit}$$

Where, i – represents a specific industry;

n – represents a number of combined industries in a specific industry due to comparison of ISATs 2008 and 1995;

t – represents specific review/research year;

A_{it} – total assets in a specific industry, during specific review/research year;

\hat{A}_{nit} – total assets in combined industry, during specific review/research year.

$$w_{nit} = \hat{A}_{nit} / A_{it}$$

Where, w_{nit} – weight of combined industry in a specific industry, during specific review/research year.

$$ER_{it} = \sum_1^n (ER_{nit} * w_{nit})$$

Where, ER_{it} – weighted equity ratio for a specific industry, during specific review/research year;

ER_{nit} – equity ratio of combined industry, during specific review/research year.

$$DR_{it} = 1 - ER_{it}$$

Where, DR_{it} – weighted debt ratio for a specific industry, during specific review/research year.

Appendix 4: The conversion of value from another currency to ISK

In the sample, 15 companies out of 316 had converted their annual reports from ISK into foreign currency at some point of research period. Therefore, for the purposes of estimating firm's size their total assets (others variables were not affected, because they were estimated as ratios) were converted back into ISK. It was done, as follows:

$$Total\ Assets_{it} = Total\ Assets^{\circ}_{it} * E^{\circ}_{it}$$

Where, $Total\ Assets_{it}$ – total assets of given firm on a given year denominated in ISK;

$Total\ Assets^{\circ}_{it}$ – total assets of given firm on a given year denominated in the given foreign currency;

E°_{it} – the exchange rate of given foreign currency (denominated in ISK) on a given year⁵¹.

⁵¹ The last day of open market in December, at Landsbankinn sale price.

Appendix 5: Bootstrapping of CPI

Before 2008, CPI was based on prices, which were collected during the two first days of month. However, from January 2008 and onwards the index is based on prices collected for at least one week period in the middle of reference month.

Therefore, for the correct calculation of annual inflation I used bootstrapping for CPI's data, which was measured during 2008 – 2011 period. In finance, bootstrapping is a method for constructing missing data.

I adapted new CPI to the two first days of the month, as follows:

Bootstrapped CPI for January, 2008 (next research year):

$$N_t = 2/3 * N_{t-1} + 1/3 * N_{t+1}$$

Where, N_{t-1} – CPI, measured in December, 2007;

N_{t+1} – CPI, measured in January, 2008.

Onwards bootstrapped CPIs for January of next research year:

$$N_t = 1/2 * (N_{t-1} + N_{t+1})$$

Where, N_{t-1} – CPI, measured in December of given research year;

N_{t+1} – CPI, measured in January of next research year.

Appendix 6: The description of variables and their measurement scales

Table 20. The description of variables.

Variable	Description	Measurement scale	Measurement unit	Decimals
PERFORM	The rate of return on assets (ROA)	Ratio, %	Real number	4
INFL	Annual inflation	%	Real number	4
ISKVOL	Annual volatility of coupon rates on non-indexed corporate bonds	%	Real number	4
INTERVOL	Annual volatility of ISK index	%	Real number	4
PRIVCON	Growth of private consumption	ln (millions, ISK)	Real number	4
FSIZE	Growth of firm's size (at constant prices, 2005 = 100)	ln (thousands, ISK)	Real number	4
AVERPROF	Average industry profit	Millions, ISK	Real number	4
NUMBENT	A number of firms in an industry		Natural number	0
LEVER	Leverage	Ratio, %	Real number	4
LIQUID	Liquidity	Ratio, %	Real number	4
SOLVEN	Solvency	Ratio, %	Real number	4
DEBTR	Debt ratio	Ratio, %	Real number	4
ANNUREP	Annual report's admission	Dummy variable	if yes = 1, if no = 0	0
ACCOUN	Accountant's review	Dummy variable	if yes = 1, if no = 0	0
CEOAGE	Age of CEO		Natural number	0
MSIZE	The size of Board of Directors		Natural number	0