UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

DOMEN TROBEC

INFLUENCE OF CORPORATE ENVIRONMENTALISM AND INDEBTEDNESS ON OPERATIONS OF SLOVENIAN COMPANIES

DOCTORAL DISSERTATION

LJUBLJANA, 2012

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INFLUENCE OF CORPORATE ENVIRONMENTALISM AND INDEBTEDNESS ON OPERATIONS OF SLOVENIAN COMPANIES

(VPLIV KORPORATIVNEGA OKOLJEVARSTVA IN ZADOLŽENOSTI NA POSLOVANJE SLOVENSKIH PODJETIJ)

DOCTORAL DISSERTATION

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AUTHORSHIP STATEMENT

The undersigned Domen Trobec, a student at the University of Ljubljana, Faculty of Economics, (hereafter: FELU), declare that I am the author of the doctoral dissertation entitled Influence of corporate environmentalism and indebtedness on operations of slovenian companies (vpliv korporativnega okoljevarstva in zadolženosti na poslovanje slovenskih podjetij), written under supervision of prof. dr. Janez Prašnikar.

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VPLIV KORPORATIVNEGA OKOLJEVARSTVA IN ZADOLŽENOSTI NA POSLOVANJE SLOVENSKIH PODJETIJ

POVZETEK

V zadnjem desetletju je na poslovno okolje vplivalo več dejavnikov, ki so vodili njegovo preobrazbo. V disertaciji se osredotočam na tri – korporativno okoljevarstvo (1), proces kopičenja dolgov (2) ter globalno gospodarsko in finančno krizo (3). Nanje se osredotočam, ker so odločilno vplivali na slovensko gospodarstvo. Korporativno okoljevarstvo je pridobilo na pomenu z globalno okoljevarstveno ozaveščenostjo še pred izbruhom globalne gospodarske in finančne krize. Spodbujeno je bilo tako na globalni kot lokalni ravni, prodrlo pa je tudi na trg proizvodov in storitev, kar je na več industrijskih področjih po svetu povzročilo preobrat v poslovanju in investicijskih odločitvah. Posledično je bila to neizogibna in poglavitna tema za gospodarstva in podjetja vse do izbruha krize. Čeprav je kriza gospodarstva in še posebej podjetja prisilila, da se osredotočijo na strategije za preživetje, je okoljevarstvo ostalo pomemben dejavnik poslovanja. Z izbruhom krize so v podjetjih na dan privreli specifični problemi. V slovenskem gospodarstvu je zadolženost igrala (in še vedno igra) ključno vlogo v investicijskih odločitvah in dejavnostih podjetij. To je povzročilo preobrat v določanju prioritet in postavilo določene cilje (korporativno okoljevarstvo) na stran ter naredilo prostor bolj pomembnim »preživetvenim« temam. Zato se osredotočam na vprašanje, kako je proces kopičenja dolgov in posledično okuženost z nelikvidnostjo postal najbolj pereča tema v slovenskem gospodarstvu.

V prvem delu disertacije predlagam in uvedem celosten pristop h korporativnemu okoljevarstvu. Celostni model razloži ne samo motivacijo in izvor korporativnega okoljevarstva, temveč tudi način in hitrost njegove uvedbe. Široka paleta identificiranih dimenzij korporativnega okoljevarstva pomaga pri opisu karakteristik petih temeljnih skupin podjetij, za katere predlagam, da se imenujejo: "kršitelji", "sledilci zakonov", "deklarativni okoljevarstveniki", "postopni inovatorji" in "radikalni inovatorji". Nato empirično preverjam smiselnost predlagane celostne tipologije z raziskavo večjega vzorca slovenskih proizvodnih podjetij. V raziskovalnem delu so bili uporabljeni metoda probit cenilke največjega verjetja (maximum likelihood probit estimation), pojasnjevalna faktorska analiza (exploratory factor analysis), metoda razvrščanja v skupine (cluster analysis) in binarno logistično modeliranje (binary logistic modelling). Poglavitna zaključka sta: (1) celostni pristop h korporativnemu okoljevarstvu dobro deluje v okviru manjših odprtih tranzicijskih gospodarstev (model dobro razlikuje med različnimi skupinami podjetij). (2) Med slovenskimi podjetji ni radikalnih inovatorjev in manj kot tretjina podjetij aktivno razmišlja in deluje v skladu z okolju prijaznimi procesi in izdelki. To ugotovitev lahko delno razložimo z dejstvom, da ima slovensko gospodarstvo še vedno nekatere tranzicijske značilnosti.

V drugem delu dizertacije sem nadalje razvil teoretični model, ki so ga uvedli Bernanke, Gertler in Gilchrist (1999), da bi sledil finančnim specifičnostim različnih vrst investicijskih projektov in skupin podjetij, ki so pomembne za analizo slovenskega obdobja vzpona in

padca (2005−2010). Poglavitna zaključka analize sta: (1) ves čas opazovanega obdobja so se finančni dolgovi opazovanih podjetij po celotni razporeditvi povečevali približno v enaki meri. Vsako posamezno podjetje je hitro spreminjalo svoj relativni položaj v razporeditvi kopičenja dolgov in zadolženost posameznih podjetij se je neenakomerno in naključno povečevala; (2) Podjetja z "nestabilnim" lastništvom (v trgovalnih portfeljih holdingov in menedžerski odkupi) so dosti bolj agresivno in širše (v vseh sektorjih gospodarstva) vlagala v portfeljske naložbe in osnovno dejavnost kot podjetja iz drugih skupin lastništva, ki so večinoma vlagala v osnovno dejavnost v lastnem sektorju.

V tretjem delu disertacije raziskujem vlogo kolateralov in okuženosti z nelikvidnostjo kot ojačevalnih mehanizmov v času krize bilanc v Sloveniji. Do znatnega zmanjšanja bančnega kreditiranja nefinančnim sektorjem je pripeljala povečana zahteva po kolateralizaciji in omejevanju kreditiranja. Ta proces je ogrozil celo običajno zmanjševanje dolgov v podjetjih s pozitivnimi denarnimi tokovi iz trenutnega poslovanja, pri čemer niti ne omenjam obnavljanja posojil. To je popolnoma zadušilo gospodarsko rast. Manjša podjetja so tako najbolj ranljiva zaradi hitro rastoče kolateralizacije posojil. Ogrožanje tovrstnih podjetij z višjo stopnjo kolateralizacije posledično prizadane tudi druge – njihove dobavitelje in kupce. Posledica tega je kolaps denarnih tokov podjetij s pozitivnim poslovanjem. V tem delu zato obravnavam tudi mehanizem okužbe z nelikvidnostjo. Dokazano je, da je drastična zaostritev kreditnih pogojev s strani bank znatno vplivala na likvidnost celotnega gospodarstva.

Ključne besede: korporativno okoljevarstvo, celostna analiza, okoljski certifikati, zadolženost, naložbe, ključne poslovne dejavnosti, zavarovanja, okužba z nelikvidnostjo, varčnost, kriza

INFLUENCE OF CORPORATE ENVIRONMENTALISM AND INDEBTEDNESS ON OPERATIONS OF SLOVENIAN COMPANIES

ABSTRACT

In recent decades the business environment has been substantially influenced by many factors that have driven its transformation. In my dissertation I focus on three of these factors: (1) corporate environmentalism; (2) the debt accumulation process; and (3) the global economic and financial crisis. I concentrate on these factors as they have crucially influenced the Slovenian economy in specific ways. Corporate environmentalism generally grew in importance along with global environmental awareness before the global economic and financial crisis broke out. It was stimulated on the global and local levels and penetrated goods and services markets to a substantial degree, causing a shift in operations and investment activities in many industries across the globe. As such, it was an unavoidable and dominating topic for economies and companies up until the crisis. Although the crisis has forced economies and companies in particular to focus more on survival strategies, it has remained an important objective. The onset of the crisis triggered the emergence of companies' specific problems. In the Slovenian economy indebtedness played (and still does) a crucial role in companies' investment activities and operations. This has caused a shift in their focus and pushed certain objectives (corporate environmentalism) to one side to make space for more important "survival" issues. Therefore, I focus on how the process of debt accumulation and consequently illiquidity has become the most important issue in the Slovenian economy.

In the first part of the dissertation, I propose and implement an integral approach to corporate environmentalism. The integral model accounts not only for the motivation and conception of corporate environmentalism but also for its mode and speed of implementation. A broad range of identified corporate environmentalism dimensions helps characterize five basic groups of companies I propose naming them "non-compliers," "legalistic incrementalists," "greenwashers," "incremental innovators," and "radical innovators." I then seek to empirically verify the soundness of the proposed integral typology by surveying a large sample of Slovenian manufacturing companies. Maximum likelihood probit estimation, exploratory factor analysis, cluster analysis and binary logistic modeling are used in the empirical analysis. There are two main conclusions: (1) the integral approach to corporate environmentalism works; in the framework of a small open transitional economy the model differentiates well the different groups of companies; and (2) there are no radical innovators among Slovenian companies and less than one-third of companies are actively thinking and acting in line with environment-friendly processes and products. This finding can be partially explained by the fact that the Slovenian economy still has some transitional characteristics.

In the second part of the dissertation, I further develop the theoretical model of Bernanke, Gertler and Gilchrist. (1999) to enable the tracking of the financing specificities of different kinds of investment projects and groups of companies that are crucial for studying the Slovenian boom-bust episode (2005-2010). The study has two primary results: (1) throughout

the observed period, companies' financial debt increased almost uniformly across the distribution of companies. Each company was quickly changing its relative position in the debt accumulation distribution and the indebtedness of individual companies proceeded in a "random walk" manner. (2) Companies with "unstable" ownership (in the "tradable portfolio" of holdings and MBOs) invested in portfolio assets and own core activities much more aggressively and broadly (across all sectors of the economy) than companies from other groups which chiefly invested in core activities and in the sector to which they belong.

In the third part of the dissertation, I examine the role of collateral and contagion as amplification mechanisms in times of a balance sheet crisis in Slovenia. I show that the considerable reduction of banks' credit to nonfinancial sectors has been driven by the increased collateralization and rationing of credits. This process has jeopardized even the normal deleveraging of companies with a positive cash flow from current operations, not to mention the rolling over of credits. This has completely stifled the economy's growth. I find that small service companies are the most vulnerable because of the quickly increasing collateralization of their credits. By jeopardizing such companies with higher collateralization, they subsequently affect others – their suppliers. This resulted in a positive-feedback-driven process of the endogenous collapsing of companies' cash flows. This section therefore also addresses the mechanism of illiquidity contagion. It shows that a drastic increase in the sharpness of the credit policy of banks has had a considerable effect on the liquidity of the overall economy.

Key words: corporate environmentalism, integral analysis, environmental certificate, indebtedness, investments, core business activities, collateral, illiquidity contagion, austerity, crisis

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1 INTRODUCTION

1.1 MOTIVATION

In the past few years, a lot of academic attention has focused on the unstable and risky group of countries (Greece, Italy, Portugal and Spain) on one side as representatives of high and unsustainable levels of public and private debt and slow growth, and France and Germany as the cornerstones of the European economy on the other. The latter two countries have also suffered from the crisis but their situation is clearly better than that of their "risky group" counterparts. On the contrary, much less attention has been paid to the countries of the Western Balkans, although they are strategically important and the economic crisis has hit them more than other comparable economies in the world. In most of these countries, there have been drastic declines in economic growth, reductions in foreign trade, increases in unemployment, and weakened inflows of external finance. Generally, these countries have increased their government deficits and external debt (Sanfey, 2011). Among these countries, Slovenia is a special case. Following the dissolution of Yugoslavia in 1991, Slovenia was for a long time considered one of the most successful transition economies (Domadenik, Prašnikar & Svejnar, 2008). In 2004, Slovenia entered the European Union (hereinafter: EU) and in 2007 it adopted the euro (lost exchange rate risk and perceived long term cheap financing). In 2007 it recorded a growth rate of 6.9%. However, in 2009 growth plummeted to -8%, namely, one of the deepest declines in the EU. As Bole, Prašnikar and Trobec (2011) show, Slovenia's seemingly solid macroeconomic performance was based on the shaky grounds of a few strong and competitive exporters, together with significant amounts of hidden mis-investment (especially in the financial and real estate sectors).

Such unfavorable economic circumstances call for research focused on the financing and investment activities of companies. The current "crisis" offers an opportunity to research and analyze Slovenian companies and the obstacles on their paths to recovery. These paths were largely determined by the pre-crisis era of large-scale investment activities which in many cases were dominated by an increasingly dominant and important environmental perspective and financed with substantial financial leverage. Therefore, corporate environmentalism as such played an important role in companies' performances in the pre-crisis era coupled with increasing indebtedness which has had an influential impact on companies' performances following the onset of the crisis. Such an approach to research in different scientific areas can offer a unique holistic scientific contribution and pose many challenges to be discovered in the future.

1.2 INFLUENCE OF CORPORATE ENVIRONMENTALISM AND INDEBTEDNESS ON OPERATIONS OF SLOVENIAN COMPANIES

The multidimensionality of the human-created climate change problem is accentuated by the variety of levels at which both discussion and action takes place. Thus, the four stakeholder

groups which are the most involved in these discussions and actions include managers, company owners, governments, and workers/consumers. I deal with the company level and managers, company owners and workers as stakeholders, where a number of issues arise: To what degree do companies truly behave responsibly towards the environment? To what extent are their efforts merely declarative as opposed to intense and innovative? Where and to what extent do environmental solutions become integrated and implemented into strategy and daily operations? Which are the central barriers to their integration and implementation as perceived by company managers?

An integral typology is developed to answer these questions. The typology accounts not only for the motivation and conception of corporate environmentalism, but also for its mode and speed of implementation. A broad range of identified corporate environmentalism dimensions helps determine groups of companies distinctively described by the characteristics of their corporate environmentalism. Such a grouping of companies also enables further research on the environmental leverage nurtured and developed by the companies to help them compete in the market.

Corporate environmentalism is largely dependent and defined by companies' investment activities as they influence companies' operations in the future. Therefore, an equally important focus encompasses elements which influence companies' investment decisions. These decisions were and are especially distinctive in times leading up to and after the outbreak of the current global economic and financial crisis.

Moreover, the global economic and financial crisis has revealed the vulnerability of companies' balance sheets which has caused a significant shift in their investment activities and strategic behavior in general (also of corporate environmentalism as part of this behavior). The burden of indebtedness in Slovenian companies is thus even bigger because companies are highly leveraged (Valentinčič, Marinšek, Mally Buh & Simoneti, 2010). Vulnerability in the companies' balance sheets, due to the high levels of financial leverage, will not only cause problems in financing investments but will also constrain the necessary increases in funding operating assets for regular production during periods of accelerated growth (Bole, 2009). A special issue that has also emerged during the crisis is how companies' credit collateral and their borrowing behavior have endogenously amplified the crisis and made the Slovenian economy suffer even more and at the same time hindered the recovery processes. Therefore, the indebtedness of companies and the institutional environment (especially banking sector regulators) will play a big role in the recovery process and in future behavior regarding environmental issues.

1.3   PURPOSE AND GOALS

There are three broadly defined research areas in this dissertation and they have the following titles: An integral approach to corporate environmentalism and its application to a country in transition; Accumulated financial debt of companies as an obstacle to companies'

investments; and Collateralization and contagion as crisis amplification mechanisms in Slovenia.

The main objectives of dissertation are to analyze companies' environmental behavior related to corporate environmentalism and the impact of the debt accumulation process and institutional environment after the outbreak of the crisis. That is done on the sample companies' financial position data and its change in the period 2006–2011 and survey collected data for the corporate environmentalism part of the dissertation. Awareness of the need to fulfill and self-impose environmental demands is not yet developed in Slovenia and many former socialist and communist economies. An analysis of changes in financial indebtedness is crucial for understanding and avoiding mistakes made in Slovenia in the pre- and post-crisis eras. The analysis is based on companies' ownership structures and activity and how the related changes can influence investment activities which are direct and indirect drivers of corporate environmentalism in companies' environmental behavior.

Managing the environmental impact of companies has become a global trend in recent decades. The broader concept of sustainable development has found its place in corporate value systems, strategic planning processes, and business operations (Korhonen, 2003). However, when it comes to corporate adherence to environmental impact regulation policies, which directly influence companies' level of implementation of environmental protection measures, there is much heterogeneity.

The focus of my research is on Slovenian manufacturing companies as to which some empirical evidence on their achieved level of corporate environmentalism is already available. Prašnikar, Ograjenšek, Pahor and Bajde (2010) show that Slovenian companies are lagging behind the so-called "radical innovators" characterized by a fully advanced corporate environmentalism level. Radical innovators engage in a holistic system approach, the broad implementation of environmental protection measures across the whole value chain and beyond it, and a proactive drive aimed at adding value and establishing competitive advantages via green initiatives. None of the company clusters identified by the proposed integral approach typology to corporate environmentalism exhibits these qualities. In such circumstances, regulatory pressures and top management's personal preferences play a major role in motivating corporate green initiatives. These empirical results are based on a large survey of manufacturing companies carried out in summer 2008, just before the beginning of the current economic crisis. Heuristically speaking, it could be that the green behavior of Slovenian manufacturing companies has been further deteriorating in the post-2008 negative economic situation.

In spite of the negative economic situation, I try to: (1) identify the effects of internal and external factors influencing companies' scale of inputs in environmental leverage; (2) develop and implement an integral typology to corporate environmentalism; (3) show the effects of companies' changes in their indebtedness in relation to their ownership structure

and its influence on investment activities; and (4) identify the drivers amplifying the crisis in Slovenia which have caused the disastrous effects for the economy.

1.4 RESEARCH FOCUS

In the first part, the dissertation focuses on an integral typology for corporate environmentalism. The analysis, development and implementation of the typology is based on a broad range of identified corporate environmentalism dimensions which characterize distinctively different groups of companies with respect to their environmental behavior and its influence on the economic performance of these companies. It further discusses and defines the companies' incentives and objectives for environmentally friendly activities and which companies (with respect to their relationship towards the environment) are more likely to undertake such actions.

As mentioned, the structural changes in companies' balance sheets substantially influence their investment and core business activities which also include their ability to engage in or their predisposition to adopt corporate environmentalism practices. The unavoidable crisis that hit the world economy at the end of 2008 is definitely an important driver of all of the companies' operations and, as such, is one of the key issues specifically marking corporate environmentalism.

Therefore, in the second part I discuss the debt accumulation process in Slovenia. Based on the literature on asymmetric information and agency costs in lending relationships, Bernanke et al. (1999) developed a dynamic general equilibrium model which explains the role of credit market frictions in cyclical fluctuations. The model is further developed, applied to and tested on the sample companies from the Slovenian manufacturing sector. This part of the dissertation includes an analysis of structural changes in the balance sheets of Slovenian manufacturing companies before and during the economic crisis. Companies increased their debts during the period 2005–2009 (Bole, Prašnikar & Trobec, 2012a). An essential part of these increases is the increase in the financing of non-core activities. During the current economic crisis, Slovenian companies have thus been hit from two sides – the fall in (domestic and foreign) demand and the high level of financial indebtedness. I focus on how these changes have influenced (and vice versa) the possibilities of investments (especially as investments influence current and future corporate environmentalism) required for regular production during the recovery. The research concentrates on differences between the groups of companies based on the NACE 2 classification and their ownership structure and whether some have been affected more than others.

The last part builds on the second part of the dissertation. It examines the role of collateral as an amplification mechanism in times of a balance sheet crisis in Slovenia. The importance of credit insurance namely increases in times of crisis because commercial banks lose information capital on the functioning of companies. If in such circumstances banks ration credits to companies and enforce either non-selective deleveraging or higher collateral for

credits, their contribution to reducing the volume of credits could be significant (a credit crunch). Deleveraging in foreign wholesale markets and the capital adequacy enforced on banks by the central bank have increased in a very short period, which has drastically squeezed credit support for the Slovenian economy. This credit squeeze has been implemented through the increased collateralization and rationing of credits. I identify which segments of companies are the most endangered by the quickly increasing collateralization of credits. By jeopardizing companies with higher collateralization, these companies subsequently affect other companies – their suppliers and their buyers. Therefore, I also demonstrate the mechanism of illiquidity contagion and show that the reduction in bank loans to companies stifled the fragile recovery in Slovenia in 2010.

1.4.1 RESEARCH QUESTIONS

The research questions posed in the three articles of the dissertation follow the described scientific areas. Hypotheses tested in the dissertation are derived and constructed from these questions.

Differences in companies' actions and strategies and environmental focuses provide good grounds for grouping them based on the level of their environmental awareness. Each of the currently reviewed typologies of corporate environmentalism remains partial because it fails to fully consider the complex multidimensionality of corporate environmentalism. However, the typologies are not irreconcilable. I therefore propose synthesizing the principal threads underlying the existing typologies and creating an integral typology. In this way I can account for the motivation and conception of corporate environmentalism (manifested in practice as a company's corporate environmentalism orientation) and the mode and speed of its implementation (manifested in practice as a level of integration of corporate environmentalism into a company's value chain and beyond). Consequently, such an integral model of corporate environmentalism involves a wide range of dimensions that need to be considered when observing corporate environmentalism in practice. These dimensions help characterize the basic groups of companies. The question that arises is whether any of these company types actually exists in practice.

The hypotheses tested in this part of the dissertation that developed, implemented and described the integral typology for corporate environmentalism are:

- H1: Companies which are part of an international supply chain are more deeply engaged in environment-friendly activities and have a more prominent external ecological focus

- H2: Larger companies exhibit greater environmental activity/awareness.

- H3: Companies with an environmental certification are more environmentally aware.

- H4: Companies with a higher return on assets tend to be more environmentally conscious.

As the process of debt accumulation impacts companies' corporate environmentalism stances, the second and third parts of the dissertation test hypotheses that reveal the role of debt accumulation and the impact of the crisis on Slovenian companies. There is strong motivation to research how financial debt has fluctuated under different types of ownership and organizational structures, and to research which assets have increased financial debt and vice versa. In trying to explain the possible causes and sources of the increased or decreased financial debt of Slovenian manufacturing companies, I analyze movements in the aggregate values of financial debt, investments in fixed assets, profits or losses, stocks, portfolio real estate investments, long-term and short-term financial investments, and companies' long-term lending. Heuristically speaking, these variables reflect factors that most likely underpin the movement of financial debt. Accordingly, the questions that arise here are whether a shift in financial debt is correlated with the above mentioned balance sheet assets and, if they are, with which assets and in what direction does the correlation go. A separate analysis is also made based on different types/groups of ownership structures of the companies.

The hypotheses for that part of the dissertation focusing on the influence of changes in companies' indebtedness (and build on collateralization and contagion as an amplification mechanism for the crisis in the last part of the dissertation) which are tested are:

- H5: Companies increase their financial debt in order to invest in three kinds of projects: to extend their core (productive) business activities, to increase their portfolio investments in real estate, and to increase their long-term financial investments.

- H6: Companies in different industries borrow according to specific expected discounted capital returns; such borrowing policy results in additive industry specificities.

- H7: Groups of companies with more stable ownership, companies with foreign owners and companies in state ownership increase their financial debt less than groups of companies with more unstable ownership.

- H8: Before the emergence of the economic crisis, financial investments dominated portfolio investments in real estate in terms of generating the long-term financial debt of companies.

- H9: The indebtedness of companies in the different debt-increasing clusters is increasing uniformly.

- H10: The composition of companies in the debt-increasing clusters is changing substantially within short periods of time.

- H11: In boom economic conditions, the borrowing of companies proceeds in a "random walk" manner – increments in company debt do not depend on the previously accumulated stock of debt. There is, therefore, no endogenous self-correcting, negative feedback, or effect of the high debt of companies on the further progress of their debt accumulation.

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- H12: Since the crisis emerged, higher levels of financial debt have made companies much more vulnerable when financing core and non-core activities.

1.4.2   POSSIBLE CONTRIBUTION TO SCIENCE

The current economic crisis can be seen as an opportunity to finally bridge the gaps between legislative requirements, self-imposed industry standards, environmental management systems, and the idea of self-sufficient production. All company actions (both obligatory and self-imposed) that result in either a neutral or positive environmental impact can be seen as actions that are building environmental leverage for the creation of companies' (green or not) competitive advantage. This is in line with the concept of intangible assets being created by investments in sustainable development and environmental protection as understood by Burritt and Schaltegger (2001), Guenster, Koedijk, Derwall, Kees and Bauer (2005), Khan, Sadiq and Veitch (2004) and Korhoen (2004) as well as with Orsato's (2006) competitive environmental strategies.

Udayasankar (2008) suggests that it is not only large companies that are more environmentally responsive. The author argues that, in terms of their visibility, resource access and operating scale, very small and very large companies are equally motivated to participate in corporate social responsibility (hereinafter: CSR). However, the motivational bases for CSR participation are likely to differ. Medium-sized companies are the least motivated. I research how different financial positions of companies and companies' attitudes to environmental issues influence their performances and, with respect to, this implement an integral typology for corporate environmentalism. The scientific contribution is reflected in the developed integral typology of corporate environmentalism and the way it consequently shows how it can be improved amongst companies.

The dissertation also contributes to the methodology of the debt accumulation process by enhancing and further developing the Bernanke et al. (1999) model of a dynamic general equilibrium which explains the role of credit market frictions in cyclical fluctuations. Thus, a new way is proposed for analyzing how the investment decisions of companies (with 'decision' meaning either financial, real estate or core business activity investment) influence the debt accumulation of companies.

The last part of the dissertation provides evidence of how collateralization and contagion acted as amplification mechanisms of the crisis and sets out important insights for institutions (especially banking regulators) to help them better cope with the credit crunch and apply policies to accelerate the recovery process.

1.5   DATA AND METHODOLOGY

The methodology of the first part of the dissertation focusing on an integral approach to corporate environmentalism consists firstly of using exploratory factor analysis with which

several measurement scales which show appropriate variability are defined. These measurement scales are then classified into the previously identified major corporate environmentalism dimensions: primary motives for corporate environmentalism, environmental orientation, level of strategic integration, scope and degree of implementation, level of systemic integration, and barriers to deployment of the environmental strategy. Since there are several factors that are linear combinations of original items in the framework of each of the five identified topics, the scale validity of these is verified by calculating Cronbach's alpha coefficients.

In the second phase of defining the groups of companies based on the proposed typology for corporate environmentalism, the identified measurement scales are used to cluster the industrial companies into groups. Initial clustering is hierarchical using Ward's method with squared Euclidean distances. In the next step, the K-Means procedure is used to fine-tune the results of the hierarchical procedure. These are then matched to the hypothesized basic groups of companies.

In the third phase of the integral approach to corporate environmentalism part of the dissertation which determines the relationship between the environmental performance of companies and company size, their financial situation, and a company's commitment to fulfill environmental standards, as represented by different environmental certificates, an ordinal distribution of the identified groups of companies is assumed and a binary logistic regression is applied. Due to the relatively small sample, a bootstrap procedure is used when estimating the parameters of the logistic regression in order to obtain more reliable estimates for the parameters and their standard errors.

Appropriate scientific methods are used for the different research questions. For the second part of the dissertation where I research the debt accumulation process of companies and investment restraint issues, the following methods are used. Firstly, simple OLS and fixed-effects (within) regression are applied to selected variables from balance sheet and income statement data. Due to possible endogeneity problems, the final version is also estimated using an instrumental variable panel regression. For the same specification of the model and instruments, instrumental 2SLS, instrumental G2SLS random effects and instrumental G2SLS fixed effects versions of the model are estimated. All estimations are made with first differences of variables.

The instruments are constructed from the available explanatory variables. The procedure of constructing the instruments is as follows. First, sector panel data are constructed. Data for every explanatory variable are aggregated in NACE 2 three-digit sectors, separately for every ownership group and year. Instrumental variables are calculated for these NACE 2 sectors. Heuristically speaking, for every explanatory variable, every ownership group, every sector and year the average value across other ownership groups (except the group to which the average value pertains) and sectors is used as a value of the corresponding instrument for the

sector panel. These sector instruments are then assigned to companies according to their group and sector.

Two sets of instruments are constructed for the sector panel data. For every explanatory variable two instruments are constructed. In the first set, for every NACE 2 sector, year and ownership group the aggregate value of variables are calculated as aggregate values across all other groups except their own, separately for every explanatory variable. In the second set, for every NACE 2 sector and ownership group aggregate, aggregate values across all other groups except a pair of groups (which includes the own group to which the averages pertain), for every explanatory variable are calculated. Average values (normalized instruments) are calculated by dividing the aggregate values by the aggregated number of the number of employees. Instruments in the first set are denoted as "non_group" and in the second as "non-_pair_of_group" instruments.

The constructed normalized sector instruments are assigned to companies according to their group and sector. As a final step in constructing the instruments, assigned normalized instruments are multiplied by the number of employees in the corresponding company and year.

If $_sX_i$ is an explanatory variable for ownership group i in sector panel (vector of year*sectors dimension) then the corresponding ("non_group" and "non_pair_of_groups") instruments for every company from group i are calculated by

$n(\sum_{j\ (j\neq i)}\ _sX_j\ )/(\ \sum_{j\ (j\neq i)}\ _sN_j\ )$ and

$n(\sum_{j\ (j\neq i,k)}\ _sX_j\ )/(\ \sum_{j\ (j\neq k)}\ _sN_j\ )$ for ownership group (i,k).

The number of employees in companies is denoted by n.

The constructed instruments from the "non_group" are used in the levels and differences while those from the "non_pair_of_groups" only in the differences. Instrument quality tests (Anderson canonical correlation LM test for under-identification and Sargan Hansen test for over-identification) are conducted for IV 2SLS, G2SLS IV and for fixed effects an IV regression.

For the empirical part, the model by Bernanke et al. (1999) (the dynamic general equilibrium model) will be upgraded and further developed as described in Chapter 3.3 (Extended theoretical framework of the financial accelerator and testing the hypotheses).

Chapter 4 of the dissertation discusses the topic of collateralization and contagion as crisis amplification mechanisms in Slovenia and for the model of contagion mechanism the dependent variable (increment in contagion) - net working capital is defined as increment of the absolute value of the difference between short-term operating liabilities and receivables plus inventories. The independent variables are: increment in credits, cash flow from current business; variables are calculated per unit of the balance sheet sum and the model is

estimated by instruments (GMM method). The instruments used are current and lagged values of fixed collateral and employment.

1.6   LIMITATIONS

The dissertation offers new findings on several important issues such as the scope and scale of corporate environmentalism in Slovenia and why there is a lack of it, an explanation of the debt accumulation process and its substantial influence on companies' performances and consequently the crisis contagion mechanism and its impact on the Slovenian economy.

However, each part of dissertation has several limitations that in turn call for further research to be done. The most significant limitations derive from the data availability and accessibility; however the data collected proved to be very reliable and rich.

Focusing on the first part of the dissertation (corporate environmentalism), the data collected could be considerably enriched by identifying what companies actually spend on specific environmental activities and by expanding the sample to service sector companies. This would allow a more detailed analysis based on industry specifics and reveal the residual causes of the achieved degree of corporate environmentalism.

Since a lot of the difference in a firm behavior might be driven by their ownership (for example more resources available in large multinational companies), an ownership "dummies" would enrich the explanatory value of the analysis. A similar issue is the industry sector dummies since some industries have bounding stricter legal restraints which are closely related to environmental issues. A country analysis would also add significant value since it would show whether the proposed typology of corporate environmentalism is uniform across countries. However, companies are reluctant to reveal such data and, since the survey was carried out using a questionnaire in Slovenia, the gathering of such data in other countries represents a possible avenue for future research.

The second part of the dissertation has similar limitations since the analysis of the debt accumulation process was carried out on Slovenian manufacturing companies and lacks an international comparison that would enable a further test of the robustness of the proposed model and show if the model can cater to the different pre- and post-crisis macroeconomic setups amongst countries. The cross country comparison could be done on each country company level data similarily as for Slovenia. Three-dimensional modeling approach could be applied to show the effect of the country.

As mentioned, the data sample only encompasses the manufacturing sector which consequently means that the industry analysis is limited solely to the manufacturing sector. Adding the service sector and construction sector which were crucial parts of the current crisis and consequences in Slovenia would also enhance the significance of the analysis and results. This limitation is partially solved in the third part of the dissertation (Chapter 4) where an analysis of the crisis and illiquidity contagion is made on the whole population of

Slovenian companies. This analysis builds on the findings of the debt accumulation process and further shows and explains the amplification mechanisms of the crisis involving collateralization.

To summarize, most of the mentioned limitations are correlated with the data gathering and focus on Slovenia which brings a certain lack of breadth of the analyses in contrast to studies across countries. Some other limitations are mentioned in each chapter of the dissertation. Nevertheless, the analyses conducted in all three parts of the dissertation have a powerful explanatory value and demonstrate significant results.

1.7 STRUCTURE OF THE DOCTORAL DISSERTATION

The dissertation has three major parts which follow the topics of corporate environmentalism, the debt accumulation process, and crisis and illiquidity contagion. At the end, some concluding remarks on all three major topics are presented in Chapter 5.

The first part of the dissertation (Chapter 2) attempts to propose an integral approach to corporate environmentalism through a literature review of existing models and further builds on research based on Slovenian companies. It thus shows how Slovenian companies cluster into the proposed groups of corporate environmentalism based on their activities and management awareness about the environment. The main distinction amongst the groups is based on the incorporation of corporate environmentalism into the companies' strategies and their performances.

The second part (Chapter 3) continues with the analysis of the debt accumulation process and presents it as a key obstacle to companies' performance and their investment activities. The debt accumulation process is presented through a model that is built upon the Bernanke et al. (1999) dynamic general equilibrium model which is upgraded and further developed. The model is then empirically tested on a sample of Slovenian manufacturing companies after controlling for ownership and industry-specific effects. This presentation of the indebtedness of Slovenian manufacturing companies shows key issues concerning the effects of the crisis on the Slovenian economy and obstacles to the companies' investment activities. Environmental concern is shown to be one of the key determinants of new investment decisions and is thus substantially influenced (diminished) in times of economic crisis.

The third part of the dissertation (Chapter 4) concentrates on the role of collateral as an amplification mechanism in times of a balance sheet crisis in Slovenia. This part builds on the second part of the dissertation (the debt accumulation process). It reveals the most endangered segments of companies due to the increasing collateralization of their credits. It also shows the mechanism of illiquidity contagion which, when coupled with the credit crunch, is crucial to the post-crisis recovery in Slovenia.

Even though each part of the dissertation is independent and thus includes its own introduction and conclusions, the last part of the dissertation (Chapter 5) summarizes the

main findings of the dissertation. At the end (after the references and appendices), the dissertation also includes a longer abstract in the Slovenian language.

2 AN INTEGRAL APPROACH TO CORPORATE ENVIRONMENTALISM AND ITS APPLICATION TO A COUNTRY IN TRANSITION[1]

2.1 INTRODUCTION

The multidimensionality of the man-created climate change problem is accentuated by a variety of levels at which both discussion and action take place: at the level of the mainstream paradigm in economic and business sciences; in the process of international coordination of environment-friendly activities; when implementing measures for a more efficient use of energy resources and against increased greenhouse gas emissions at the country level; at the level of companies' strategic deliberations followed by their decision-making processes; and, finally, at the individual worker/consumer level. Consequently, four "planetary" stakeholder groups include managers, company owners, governments, and workers/consumers.

In this chapter I deal with the company level and managers, company owners and workers as stakeholders, and raise a number of issues: To what degree do companies truly behave responsibly towards the environment? To what extent are their efforts merely declarative as opposed to sincere and innovative? Where and to what extent do environmental solutions become integrated and implemented into strategy and daily operations? What are the central barriers to their integration and implementation as perceived by company managers?

In trying to answer these questions, I first developed an integral typology which accounts not only for corporate environmentalism motivation and conception (manifested in practice as a company's corporate environmentalism orientation), but also for a corporate environmentalism mode and speed of implementation (manifested in practice as the level of corporate environmentalism integration into a company's value chain and beyond). A broad range of identified corporate environmentalism dimensions helps characterize five basic groups of companies I propose to name "non-compliers," "legalistic incrementalists," "greenwashers," "incremental innovators," and "radical innovators."

While it is safe to assume that even companies from the most developed economies do not simply progress linearly towards the ultimate phase of environmental evolution (i.e., corporate environmentalism as an opportunity for break-through innovation in search of added value and competitive advantage), both diversity and nuance to practical aspects of corporate environmentalism implementation are more pronounced in developing and transitional countries.

Based on the analysis of annual reports published by the leading companies in Organisation for Economic Co-operation and Development (herinafter: OECD) and developing countries, Baskin (2006) found no differences in their emphasis on the importance of environmental

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[1] This chapter of the dissertation is paper published with Prašnikar, Ograjenšek, Pahor, Bajde and Trobec (2012).

issues. In practice, however, environmental responsibility in developing markets is less embedded in corporate strategies, less pervasive, and less politicaly rooted than in most high income OECD countries. In the context of transitional countries, this can also be attributed to the predominant stance of the socialist times which managed to outlive socialism: that environmental concerns are primarily the government domain. Consequently, corporate environmentalism is to function in compliance with the legal and regulatory environment of a given state (Steurer & Konrad, 2009).

Proposed model of corporate environmentalism is used to analyze the practical aspects of corporate environmentalism implementation in Slovenia. The country is a case of a small open economy which recently joined the EU, but is still at odds with its socialist heritage in some areas (including corporate environmentalism) and can thus be labelled 'transitional'. Relatively few companies actively nurture the culture of innovation and encourage as well as empower their employees to act in the area of corporate environmentalism. As noted by Damjan, Polanec and Prašnikar (2007) as well as Rajkovič and Prašnikar (2011), companies that have been involved in the international trade for a longer period of time and those more integrated in international supply chains posess a competitive advantage over other Slovenian companies.

My working hypothesis is therefore as follows: Companies which are part of an international supply chain are more deeply integrated in environment-friendly activities and have a more prominent external ecological focus (H1). Consequently, their environmental orientation, as shown in environmental focus and general environmental protection strategy, is stronger. The same goes for the level of strategic integration. While a number of other companies are active in corporate environmentalism because of legislation, the rest are lagging behind their declarative statements or completely lack ecological focus.

The introductory section of this chapter is followed by a critical overview of existing corporate environmentalism typologies, proposition of an integral model, and description of methodology and results of empirical analysis. I conclude by proposing an agenda for future research.

2.2   LITERATURE REVIEW

Banerjee, Iyer and Kashyap (2003) define corporate environmentalism as "the recognition of the importance of environmental issues facing the company and the integration of those issues into the company's strategic plans." This definition emphasizes the multifaceted nature of corporate environmentalism involving a company's overall orientation towards the environment and its more specific strategies and implementation practices. The orientation dimension subsumes the company's general awareness of environmental issues facing the company and its commitment to resolving these issues (Menon & Menon, 1997). However, orientation alone does not warrant change if it is not integrated into the company's strategy (at the level of various functions) and implemented in its day-to-day operations.

Although extensive studies of the interaction between business activities and the natural environment are fairly recent (Banerjee et al., 2003), corporate environmentalism has evolved through various stages and transitions. Peattie (2001) also distinguishes between three ages and describes progression from the 1960s and 1970s as having a narrow focus on "problematic" industries and severe cases of pollution, incremental end-of-pipe solutions, and perceptions of environmentalism as a restrictive and costly burden. In the 1980s and 1990s a more holistic understanding was adopted and environmentalism became an opportunity for innovation in search of added value and competitive advantages (Stone & Wakefield, 2000). Currently, the era of "sustainable environmentalism" based on the realization that action across the entire value chain and radical changes are inevitable, is on the way. Hart (1997) makes similar claims, differentiating among the earlier pollution prevention phase, the product stewardship phase, and the current clean technology phase.

Of course the dynamic of corporate environmentalism is in reality much more complex, and companies do not simply progress linearly towards the "ultimate" phase of environmental evolution (i.e., corporate environmentalism as an opportunity for innovation in search of added value and competitive advantage). Instead, there is much diversity and nuance to corporate environmentalism in practice.

Ghobadian, Viney, James and Liu (1995) define three general types of corporate behaviors in a business environment, where resources are becoming more scarce and expensive, and environmental concerns are becoming more prominent. Companies that are merely abiding by the current regulatory environmental requirements are pursuing the so-called re-active strategy. At the other end of the spectrum, companies adopt the so-called pro-active strategy with a strong focus on the future and a prevailing belief that environmental strategies can produce competitive advantage; consequently their entire product development cycle (from research, to production and recycling) is determined by long-term sustainable production. The remaining group of companies is in-between these two extremes. These companies follow the legislation and strictly adhere to industry standards and norms, but are only pro-active when it comes to foreseeing future legislative changes, which they try to implement upfront.

Hart (2005) extends this typology by identifying what he calls a "sustainability portfolio" of strategies that are divided across the today-tomorrow and the internal-external axis. Companies implementing the so-called Internal and Today Strategies are improving their internal operations with continuous process improvements related to sustainability: employee involvement, waste reduction, energy conservation, emission control, and so forth. Companies implementing the so-called External and Today Strategies are improving extended supply chains: analysis of upstream supply chains to make trade-offs in the choice of materials and processes, closed-loop supply chains for remanufacturing, and safe disposal. Companies implementing the so-called Internal and Tomorrow Strategies are investing in specific capabilities: recovery of pollution-causing chemicals during intermediate stages of manufacturing so they do not become a part of emissions; development of substitutes for non-

renewable inputs; and redesign of products for lower material content, lower energy consumption in manufacturing, or lower energy consumption in use. Lastly, companies implementing the so-called External and Tomorrow Strategies are developing dynamic core capabilities in products, processes and operations, and supply chains for long-term sustainability, and pursuing a corporate strategy and culture that would facilitate long-term sustainability.

Hart's (2005) typology thus broadens Ghobadian et al.'s (1995) reactive-proactive spectrum by adding a temporal dimension (short-term vs. long-term) and scope dimension (internal vs. external). But other typologies exist that address specific management styles in relation to corporate environmentalism. Based on the company's degree of compliance with regulatory requirements, scanning for environmental information and opportunities, responsiveness to regulators and environmental activists, and development of reliable implementation routines for environmental policies, Kagan, Gunningham and Thornton (2003) identify five management types with a progressive commitment to the environment: environmental laggards, reluctant compliers, committed compliers, environmental strategists, and true believers. The importance of integration and implementation of environmentalism into strategic planning and daily operations is further emphasized by Menon and Menon (1997) who distinguish between strategic, quasi-strategic, and tactical corporate environmentalism. While quasi-strategic corporate environmentalism is restricted to existing business strategy, strategic environmentalism relies on an innovative organization-wide corporate environmentalism strategy. In contrast, tactical corporate environmentalism is limited to the functional level and is subject to achieving specific, short-term functional objectives.

Each of the aforementioned typologies remains partial because it fails to fully consider the complex multidimensionality of corporate environmentalism. However, the typologies are not irreconcilable. I therefore propose to synthesize principal threads underlying the existing typologies and create an integral typology. This way I can account not only for corporate environmentalism motivation and conception (manifested in practice as a company's corporate environmentalism orientation), but also for corporate environmentalism mode and speed of implementation (manifested in practice as a level of corporate environmentalism integration into a company's value chain and beyond).

Consequently, such an integral model of corporate environmentalism yields a wide range of dimensions that need to be considered when observing corporate environmentalism in practice. These include: the motives for corporate environmentalism (e.g., regulation, top management commitment, public concern, competitive advantage), the company's general environmental orientation, the level of strategic integration of environmental issues (e.g., organization-wide vs. isolated functional strategies), the level of systemic integration (e.g., partial internal initiatives vs. broader engagement across the value chain), the temporal orientation and the openness to change (today vs. tomorrow, incremental vs. innovative), and the scope and degree of implementation (narrow vs. broad; declarative vs. genuine). These dimensions help characterize five basic groups of companies I propose to name "non-

compliers," "legalistic incrementalists," "greenwashers," "incremental innovators," and "radical innovators" (see Table 1).

Table 1: An integral model of corporate environmentalism with proposed dimensions and groups of companies

Dimension *Group*	Primary motives for corporate environme-ntalism	Environ-mental orientation	Level of strategic integration	Scope & degree of implement-tation	Level of systemic integration	Temporal orientation & openness to change
Non-compliers	None	Very weak	Very low	None	None	Today
Legalistic incrementalists	Regulation	Weak or moderate	Low – isolated functional strategies	Dependent on regulation	Low- internal green islands	Today, reactive only
Greenwashers	Economic & public concern	Moderate	Moderate	Narrow and often declarative only	Moderate	Today, change if compensated
Incremental innovators	Economic	Strong	High – environmental strategists	Broad and genuine	High – internal and external	Today, Proactive
Radical innovators	Economic, Top management commitment	Very strong	Very high – true believers	Broad and genuine	Very high – strong external orientation	Tomorrow, radically innovative

The question I deal with next is whether any of these company types actually exist in practice. To find out, I surveyed a sample of large Slovenian export-oriented manufacturing companies.

2.3 METHODOLOGY

There are 434 manufacturing companies with at least 50 employees in Slovenia. All of them received a questionnaire in a mail survey process that took place between July and September of 2008. 138 returned the filled-in questionnaires; response rate is thus 31.8%, with respondents ranging from Chief Executive Officers and managers responsible for environmental protection, to heads of different functional departments. Given that sample's demographic characteristics resemble those of the total population in all important aspects, it is safe to conclude that self-selection bias is not present.

Four companies with missing values are only included in the descriptive analysis. Additionally, I could not match survey to financial data for these four companies, so they are excluded in the multivariate analysis and the "financial" comparison for which 130 full company datasets are used.

Final sample includes 73.5% of small and medium sized companies (up to and including 250 employees) and 26.5% of large companies (with more than 250 employees). The average total revenue in 2008 for sample companies is 35.4 million EUR, while the average total assets on December 31, 2008 amount to 10.6 million EUR. The average return on assets for surveyed companies is 5.1%.

A maximum likelihood probit estimation with sample selection is performed for the group membership, using company size (log of number of employees and turnover) as selection variables. Results are non-significant (for the chi-square overall test and both coefficients, the minimum significance is 0.202), indicating that I cannot reject the hypothesis that the companies in the sample were selected at random.

Questionnaire consisted of almost 100 different attitudinal items (see the Appendix). To measure motives for environmental strategies I rely on Banerjee et al.'s (2003) scales for regulatory forces, public concern, expected competitive advantage, and top management commitment. The same goes for statements about the corporate-level environmental strategy. For measurement of marketing environmental strategies I use the multi-item scales developed by Banerjee (2001) and Banerjee et al. (2003), whereas to measure the results of environmental strategies I adapt scales on company performance from Jap (1999), Hoffman (2000) and Sun (2007).

Respondents evaluated each item on a 1 to 5 scale (1 = absolutely not true; 2 = not true; 3 = indifferent; 4 = true; 5 = absolutely true). When evaluating scope and level of strategy implementation and the level of systemic integration, the following scale was used: 1 = not at all relevant; 2 = relevant but not part of our activities; 3 = I have only just started dealing with this area; 4 = I have been dealing with this area but have not found all solutions yet; 5 = I have all relevant solutions.

2.4   EMPIRICAL RESEARCH AND DISCUSSION

2.4.1   CORPORATE ENVIRONMENTALISM DIMENSIONS IN PRACTICE

Given that standard scales on corporate environmentalism cannot be found in the literature I decided to develop a measurement instrument. For this purpose exploratory factor analysis on the correlation matrix was applied, using maximum likelihood method of extraction and improving the solution by the varimax rotation with Keiser optimization. In the process I manage to identify 17 measurement scales which show appropriate variability and can be classified into the previously identified five major corporate environmentalism dimensions: primary motives for corporate environmentalism, environmental orientation, level of strategic integration, scope and degree of implementation, level of systemic integration, and barriers to environmental strategy deployment (see Table 2).

In the framework of each of the five identified dimensions there are several factors that are linear combinations of original items. For these the scale validity is verified by calculating

Cronbach's alpha coefficient. All have high alpha values of at least 0.7, the majority even above 0.8, which is rated as adequate (George & Mallery, 2003). Topics, scale items, and relevant values of Cronbach's alpha coefficient are given in the Appendix. I also checked several relevant aspects of validity. Using factor analysis insures discriminant validity, while ex-post matching the scales with the theoretical assumptions indicates construct validity of the scales.

The first four empirically identified areas correspond with dimensions described in the previous section. While temporal orientation remains implicit in the general environmental orientation and strategy integration dimensions, I identify an additional dimension containing barriers to implementation.

Table 2: Strategy of environment protection (arithmetic means and a 95-percent confidence interval)

Area	*Scale*	*Mean*	*St.dev.*	*95% confidence interval*	
Primary motives for corporate environmentalism	Market opportunities	3.14	1.51	2.89	3.39
	Legislation	3.22	1.56	2.96	3.48
	Management vision	3.56	1.77	3.26	3.86
Environmental orientation	Environmental focus	3.59	1.57	3.32	3.85
	General environmental protection strategy	3.77	1.67	3.49	4.05
Level of strategic integration	Environmental strategy in production and marketing	3.35	1.61	3.08	3.62
	Environmental strategy in HRM	3.14	1.63	2.87	3.41
Scope & degree of implementation	Customer related activities	3.01	1.57	2.75	3.27
	Ecological activities in transport	2.56	2.21	2.19	2.94
	Eco-friendly product and process development	3.23	1.72	2.94	3.52
	Production process enhancement	3.84	1.59	3.57	4.11
	Waste and emissions management	3.33	2.21	2.96	3.7
Level of systemic integration	Activities in the supply chain	3.00	1.27	2.79	3.22
	Ecological focus outside of the company	2.18	1.84	1.86	2.49
Barriers to environmental strategy deployment	Costs/owners	3.07	1.52	2.81	3.32
	Problems in supply chain	2.89	1.41	2.65	3.13
	Limited technology supply	3.46	1.65	3.19	3.74

Source: Survey of manufacturing companies, 2009; own calculations.

The existing literature (Harrison and Freeman, 1999; Henriques and Sadorsky, 1999; Banerjee et al., 2003) discusses four broad groups of motives for environmental concerns: regulation, public concern, expected competitive advantage, and top management's commitment.

As shown in Table 2, the statistically most important motive for environment-friendly companies' engagement seems to be management vision. Both legislation and market opportunities are close to the neutral value, yet still important when it comes to differentiating among identified clusters of industrial companies. Although public concern is an important motive for environment-friendly companies' engagement (see e.g. Čater, Prašnikar and Čater, B., 2009), this particular scale does not have any weight when researching the companies differences in the framework of my research.

Next, I analyze to what degree eco-strategies are incorporated into general and functional strategies, i.e. what is the company's environmental orientation and level of strategic integration. Corporate environmental strategies at the highest organizational level deal with environmental issues in the balance of a company's strategic business units and the links among these units and, therefore, address environmental questions on starting new businesses, technology choices, plant locations, and research and development investments (Theyel, 2000; Banerjee, 2001). On the other hand, functional environmental strategies show how environmental concerns are included in long-term plans within such business functions as purchasing, production, marketing, and personnel (Peattie & Crane, 2005; Theyel, 2000; Ghobadian et al., 1995).

In line with the above, Table 2 displays, in the area of environmental orientation, two relevant factors: environmental focus and presence of a general environmental protection strategy. On average the companies in the sample have quite a well-developed environmental orientation with both factors significantly above the indifference value of 3. The level of strategic integration mostly exceeds the indifference level as well, with the first strategic dimension (environmental strategy in production and marketing) slightly above 3, and the second one (environmental strategy in HRM) practically reaching the value 3 (indifferent). Other functional strategies do not have weights of enough importance to differentiate the companies in this research.

A connection between production and marketing function is related to the idea of complementary capabilities and competences discussed in other works (Prašnikar et al., 2008; Rajkovič & Prašnikar, 2011). Slovenian companies seem to differ in their ability to implement complementary capabilities and competences (e.g. to implement technological capabilities and competences that are market-driven, as well as to implement market capabilities and competences that make incremental innovations possible). Although the functional strategy – HRM averages only slightly above the value 3 (indifferent), this dimension also seems to be important when trying to differentiate among the companies. As Perez et al. (2007) explain, there are numerous differences among companies when it comes to the development of embedded mechanisms for change and their influence on critical intangible assets that foster the environmental protection process.

Among the identified areas of corporate environmentalism strategy implementation, only one area, the production process enhancement, has an average value significantly above the

neutral point, which again demonstrates the importance of incremental innovation in Slovenian companies in reality (see also Čater et al., 2009). Within the production process it is energy and water consumption management that seems to merit the most attention. Additionally, it should be noted that companies only engage in the development of environment-friendly products if active customer demand or high danger of activism attack exists.

I then move on to investigate the level of systemic integration of environmental concerns across the whole value chain and beyond. The two dimensions, ecological focus outside the companies with the average value slightly above 2 (relevant but not part of our activities), as well as activities focused on the supply chain (3 = I have only just started dealing with this area), both score relatively low. The average Slovenian industrial company is thus, as far as the level of systemic integration is concerned, obviously giving more priority to internal issues.

Finally, when it comes to barriers to environmental strategy deployment, limited technology supply is key among the barriers to environmental strategy implementation (see Table 2), followed by the high cost of environment-friendly activities paired with the lack of owner support and understanding. The least important among the barriers for the companies that participate in the research seem to be problems with customers and suppliers.

2.4.2 GROUPS OF COMPANIES IN PRACTICE

2.4.2.1 Identification of clusters and description of cluster characteristics

In the second phase I use the identified 17 measurement scales to cluster the industrial companies into groups. Initial clustering is hierarchical using the Ward method with squared Euclidean distances. I end up with an optimal four-group solution. In the next step I use a K-Means procedure to fine-tune the results of the hierarchical procedure. These can be matched to four of the five hypothesized basic groups of companies: although I cannot not find any radical innovators, I manage to identify the "non-compliers," "legalistic incrementalists," "greenwashers," and "incremental innovators."

Table 3: Selected cluster indicators in 2008

Indicator	Non-compliers	Legalistic incrementalists	Greenwashers	Incremental innovators
N	31	39	19	41
Number of employees (mean)	123.2	231.0	277.3	319.7
Debt to assets (mean, %)	67.4	64.7	65.2	61.1
ROA (mean, %)	3.2	5.3	2.4	7.4
Share of exports in total sales (mean, %)	43.9	56.9	60.4	74.8
Percentage with ISO 14001	6.5	44.7	36.8	57.9

Source: Survey of manufacturing companies, 2009; own calculations.

Table 3 shows a selection of interesting indicators such as number of employees, debt to assets ratio, ROA, share of exports in total sales, and ISO 14001 certificate possession, describing the identified four clusters of "non-compliers," "legalistic incrementalists," "greenwashers," and "incremental innovators." The smallest companies can be found among "non-compliers," and the most successful Slovenian companies among "incremental innovators." This is in line with Kagan et al. (2003) and Thornton et al. (2009) who report that larger and more successful companies have better environmental performance. On average, "incremental innovators" export the most (nearly three quarters of all sales, mostly to the EU countries) while "non-compliers" on average export less than half of their sales. Almost two-thirds of "incremental innovators" are ISO 14001 certificate holders, while only 6.5% of "non-compliers" hold an ISO 14001 certificate.

For the most part, "incremental innovators" come from manufacturing of electrical equipment; a relatively high%age can also be found in manufacturing of chemicals, chemical products, and rubber (see Table 4). The latter industry is also well represented in the group of "legalistic incrementalists," which is not surprising due to very strict regulation. Companies from manufacturing of textiles, wearing apparel, and shoes can mostly be found among "greenwashers," whereas those from manufacturing of wood and paper, as well as many of their counterparts from manufacturing of metal products and machinery, classify among the "non-compliers".

Table 4: Cluster structure by main company's activity, in percent

Industry	Non-compliers	Legalistic incrementalists	Greenwashers	Incremental innovators
Mining and quarrying	0.0	2.6	0.0	10.0
Manufacturing of food and beverages	6.5	15.4	0.0	2.5
Manufacturing of textiles, wearing apparel, and shoes	3.2	5.1	26.3	2.5
Manufacturing of wood and paper	25.8	12.8	0.0	5.0
Manufacturing of chemicals and rubber	3.2	23.1	10.5	17.5
Manufacturing of metal products and machinery	32.3	20.5	26.3	20.0
Manufacturing of electrical equipment	22.6	20.5	31.6	42.5
Construction	6.5	0.0	5.3	0.0
Total	100.0	100.0	100.0	100.0

Source: Survey of manufacturing companies, 2009; own calculations.

As shown in Table 5, "incremental innovators" are the more advanced companies with a well-developed general environment-protection strategy and well-developed functional strategies covering marketing, production, and human resources. These companies try to optimize their production processes, pay great attention to waste and emissions management, and, to a lesser degree, also focus on transport and ecological activities outside the company.

The main motive for this group seems to be the vision of their top management; however, the importance of market opportunities should also not be overlooked. Among the barriers, these companies most vehemently point towards limited technology supply.

Table 5: Group comparison on measurement scales – 95% confidence intervals

Topic		Non-compliers		Legalistic incrementalists		Greenwashers		Incremental innovators	
Primary motives for corporate environmentalism	Market opportunities	2.12	- 2.61	2.84	- 3.25	3.22	- 3.60	3.55	- 3.86
	Legislation	2.69	- 3.44	3.16	- 3.78	2.91	- 3.32	3.00	- 3.39
	Management vision	2.50	- 2.98	3.09	- 3.76	3.76	- 4.17	3.89	- 4.39
Environmental orientation	Environmental focus	2.38	- 2.82	3.43	- 3.92	3.71	- 4.11	3.98	- 4.23
	General environmental protection strategy	2.47	- 2.92	3.63	- 4.07	3.99	- 4.39	4.14	- 4.46
Level of strategic integration	Environmental strategy in production and marketing	2.11	- 2.54	3.21	- 3.64	3.49	- 3.85	3.72	- 4.07
	Environmental strategy in HRM	2.02	- 2.50	2.89	- 3.47	3.18	- 3.54	3.48	- 3.89
Scope & degree of implementation	Customer related activities	1.88	- 2.34	2.73	- 3.17	3.17	- 3.55	3.45	- 3.75
	Ecological activities in transport	1.54	- 1.99	3.13	- 3.92	1.72	- 2.23	2.21	- 2.86
	Production process enhancement	3.03	- 3.72	3.67	- 4.65	3.25	- 3.54	3.97	- 4.26
	Waste and emission management	2.27	- 2.94	3.60	- 4.06	1.57	- 2.04	3.88	- 4.29
	Eco-friendly product and process development	2.05	- 2.56	2.91	- 3.50	3.30	- 3.70	3.72	- 4.04
Level of systemic integration	Activities in the supply chain	2.08	- 2.43	2.87	- 3.30	3.06	- 3.32	3.28	- 3.58
	Ecological focus outside the company	1.25	- 1.59	2.28	- 2.88	1.60	- 2.09	2.20	- 2.84
Barriers to environmental strategy deployment	Costs/owners	3.38	- 3.89	2.66	- 3.24	2.62	- 3.10	2.65	- 3.07
	Problems with customers/suppliers	2.61	- 3.17	2.82	- 3.20	2.51	- 3.02	2.62	- 3.00
	Limited technology supply	3.16	- 3.78	3.17	- 3.71	2.95	- 3.47	3.35	- 3.89

Source: Survey of manufacturing companies, 2009; own calculations.

"Greenwashers" are very bold when it comes to verbally stating their initiatives and goals concerning environment protection (these are supposed to reflect both top management vision and market opportunities). In the phase of actual implementation of these strategies, however, they seem to lack the drive and ambition they verbally display in such a prominent manner although – rather paradoxically - they do not identify any important barriers to environmental strategy deployment. In the long term, this might have severe consequences for the public image of these companies on one hand, and consumer trust in their activities on the other hand. Crane (2000) argues that corporate environmentalism has become increasingly

characterized by a consumer backlash against green marketing, fuelled by perceived problems with green product performance and dishonest corporate claims made in the 1980s and 1990s. "Greenwashers" contribute toward the continuation of this trend by jeopardizing their own reputation as well as the general standing of corporate environmentalism. As a result, the backlash effect increases the popularity of reactive strategies (passive greening), defensively oriented incremental strategies (muted greening), and narrow strategies focused solely on the green niche (niche greening). On a more positive note, Crane (2000, p. 289) concludes that the backlash effect also strengthens the realization that "solitary approaches by individual companies might have only limited potential in providing an effective strategic route forward," thus stimulating "collaborative greening."

The group of companies named "legalistic incrementalists" emphasizes legislation as the primary motive of environmental activities. Compared to other groups they are not particularly emphasizing either ecological focus or the integration of eco-strategies in their functional strategies. However, they are much stronger when it comes to implementation of ecological issues in production processes, waste and emissions management, as well as ecological activities in transport. The latter eventually proofs why they claim the strongest ecological focus outside the company among all studied groups of companies. Their activity is limited by existing technology.

"Non-compliers," those companies that are systematically ignoring environmental concerns, form the last group. They do not integrate the eco-strategy either in general or functional strategies. Their environment-friendly activities are very limited and mostly induced by their adherence to legislative requirements (especially in the area of production). In their opinion, owners are the key barriers to environmental strategy deployment because they perceive the strategy as too costly.

2.4.2.2 Binary logistic modeling of cluster differences

In the final phase of the research I try to determine the relationship between the environmental performance of companies and company size, their financial situation, and company's commitment to fulfill environmental standards, presented by different environmental certificates (testing H2, H3 and H4). Sales, return on assets, debt to assets, and ISO 14001 certificate possession, were used as explanatory variables.

Given that larger companies (majority of them exporters) have both more resources (which means they can dedicate some of their resources to environmental innovations) and a larger portfolio of products and services (to which they can apply such innovations), a hypothesis that there is a positive relationship between size and environmental activity/awareness (H2) seems justified and is corroborated by Ahmed, Montagno and Firenze (1998), Baylis, Conell and Flynn (1998), Stanwick and Stanwick (1998), as well as Bowen (2000).

Return on assets (ROA) is measured as earnings before interest and taxation in total assets,

roughly measuring the cash flow from operations. A positive relation with environmental activity/awareness is hypothesized here as well (H4), since companies with larger ROA have more resources that can be allocated to discretionary spending like environmental innovations. This hypothesis is derived out of my extended corporate environmentalism dimensions based on Hart's (2005) and Ghobadian et al.'s (1995) assumption that companies in the most aware, passionate and/or innovative corporate environmentalism groups are more likely to outperform their competitors in the future.

The ratio of debt to assets indicates financial leverage. A negative relation is expected here because companies with lower leverage put less emphasis on cash flow and can allocate more resources to innovations.

A positive impact is expected should a company possess an ISO 14001 certificate (H3) since this is not only an indication of a company's environmental concerns but also a pre-condition for companies doing business in foreign markets, especially if they want to become part of a global supply chain. Nawrocka, Brorson and Lindhqvist (2009) show that foreign customers generally form a significant stakeholder group encouraging the adoption of ISO 14001 and that suppliers wishing to access environmentally conscious markets can obtain an advantage with ISO 14001 certification.

Finally, industrial dummies for eight industries (listed in Table 4) are also added to account for industry dynamics.

I assume an ordinal distribution of the identified four groups of companies; from the most environmentally aware to the least ("incremental innovators" being at the top of the hierarchy, followed by "legalistic incrementalists," "greenwashers," and "non-compliers") and apply binary logistic regression. Due to a rather small sample, a bootstrap procedure is used when estimating the parameters of the logistic regression in order to obtain more reliable estimates for the parameters and their standard errors. I test three models:

- In the first model, "incremental innovators" are set opposite to "legalistic incrementalists," "greenwashers," and "non-compliers" – i.e. I am comparing companies that act in the field of environmental innovation because of their own drive and desire with the rest of the companies.

- In the second model, "incremental innovators" and "legalistic incrementalists" are set opposite to "greenwashers" and "non-compliers"– i.e. I am comparing companies that are active in the area of environment protection with those companies that are not.

- In the third model, "incremental innovators," "legalistic incrementalists," and "greenwashers" are set opposite to "non-compliers" – i.e. I am comparing companies that are passively or actively aware of environmental innovation with the companies that display no such awareness.

In all three models presented in Table 6, industry dynamics does not seem to account for any

differences, whereas the effect of ISO 14001 certificate possession seems to be the strongest (correlation). Companies having this certificate are more aware of environmental issues and, consequently, are more proactive (confirms H3). Further influential factors are a company's size and return on assets. Larger companies and companies with higher return on assets also tend to be more environmentally conscious (H2 and H4 confirmed). Further interesting insights can be obtained by a closer look at Models 1 and 2.

Table 6: Results of binary logistic estimation

Model 1	Incremental Innovators vs. Legalistic Incrementalists, Greenwashers, and Non-Compliers				
Variable	**b**	**exp. B**	**S.E.**	**Sig.**	
Return on assets	3.026	20.605	3.946		**Nagelkerke R Square**
Debt to assets	1.625	5.079	1.227		
Total sales (log)	0.45	1.568	0.267	*	0.402
ISO 14001	2.515	12.362	0.824	***	**Percentage Correct**
Industry	Yes				
Constant	-4.495	0.011	3325.733		80.0
Model 2	**Incremental Innovators & Legalistic Incrementalists vs. Greenwashers & Non-Compliers**				
Return on assets	7.076	1183.804	3.648	**	**Nagelkerke R Square**
Debt to assets	1.135	3.112	1.06		
Total sales (log)	0.337	1.401	0.207	*	0.336
ISO 14001	1.482	4.402	0.515	***	**Percentage Correct**
Industry	Yes				
Constant	-3.293	0.037	3387.129		74.4
Model 3	**Incremental Innovators, Greenwashers & Legalistic Incrementalists vs. Non-Compliers**				
Return on assets	5.77	320.389	3.513	*	**Nagelkerke R Square**
Debt to assets	-0.577	0.562	1.085		
Total sales (log)	0.203	1.225	0.198		0.197
ISO 14001	0.97	2.638	0.475	**	**Percentage Correct**
Industry	Yes				
Constant	-4.22	0.015	3.047		74.4

*** Coefficient is significant with a level of risk of less than 1%

** Coefficient is significant with a level of risk of less than 5% and more than 1%

* Coefficient is significant with a level of risk of less than 10 and more than 5%

Source: Survey of manufacturing companies, 2009; own calculations.

In Model 1 I compare a group of "incremental innovators" to a group of "legalistic incrementalists," "greenwashers," and "non-compliers." In this model explanatory variables explain the highest differences between two groups of companies – the pseudo R-square is 0.402. ISO 14001 certificate possession is the main factor of differentiation between the two groups. Given that it is a pre-condition should the company want to become part of a global supply chain, the possession of an ISO 14001 certificate certainly increases the involvement

of these companies in international relations. In addition, the group of "incremental innovators" is bigger in size. Looking at Table 5, this group of companies has in all aspects the best environment-related performance results. Limited technology supply is the main barrier to environmental strategy deployment.

In Model 2 I compare a group of "incremental innovators" and "legalistic incrementalists" to a group of "greenwashers" and "non-compliers." The possession of ISO 14001 certificate, return on assets and total sales explain the highest differences between two groups of companies. As shown in Table 5, the scope and degree of implementation of ecological activities are much more pronounced in the case of "incremental innovators" and "legalistic incrementalists" as opposed to "greenwashers" and "non-compliers" (H3 confirmed). The former are also more often a subject of systemic integration. While "incremental innovators" are more actively involved in supply chains, "legalistic incrementalists" build ecological focus primarily through ecological activities in transport.

2.5   CONCLUSIONS

With presented approach to corporate environmentalism analysis I extend the existing body of literature on corporate environmentalism dimensions, typical company clusters and corporate environmentalism dynamics. Development, testing and application of a comprehensive survey measurement instrument classify such approach as an original one and open wide possibilities for its replication. So does the proposed typology of companies whose profiles are composed on the basis of globally-relevant profiling variables such as selected business indicators, possession of ISO 14000 certificate, etc.

Based on the empirical research conclusions are twofold: (1) The proposed integral approach to corporate environmentalism works: in the framework of a small open transitional economy the model identifies distinct company clusters, thus accentuating the need to approach corporate environmentalism as a complex, multidimensional phenomenon. (2) There are no radical innovators among Slovenian companies, and less than one third of companies are actively thinking and acting in line of environment-friendly processes and products. Both results should serve as important impulses for policy makers in the areas of environment protection, industrial policy and foreign investment policy, as well as for decision makers at a company level when identifying new sources of competitive advantage:

(1) Firstly, the results indicate that an average Slovenian industrial company is paying less attention to a systemic integration of environmental concerns across the value chain and beyond: the utmost priority is given internal issues. Furthermore, the majority of companies does not rate environmental legislation as the most important behavioral motive: there seem to be no significant differences among the identified company clusters (the »legalistic incrementalists« are being only slighlty more positive in their evaulation than the other three identified company clusters). This is in line with the predominant stance in transition countries that environmental concerns are primarily the government domain and that,

consequently, corporate environmentalism is to function in compliance with the legal and regulatory eniviroment of a given state. While the relevant environmental legislation exists in Slovenia, resources and mechanisms to effectively enforce it are missing.

(2) Secondly, I manage to confirm my working hypothesis (H1): companies, which are part of an international supply chain, are more deeply integrated in environment-friendly activities and have a more prominent external ecological focus. The environmental orientation of these companies, as shown in their environmental focus and general environmental protection strategy, is stronger. The same goes for their level of strategic integration. This finding should inform both Slovenian industrial and foreign investment policy because it showcases the importance of company exposure on international markets, along with peer pressure within an international supply chain, for corporate environmentalism dynamics.

(3) Thirdly, the results indirectly indicate that sound environmental strategies could be a source of competitive advantage. As shown in Damijan et al. (2007), more productive Slovenian companies are also more internationalized, while according to my research a sound environmental strategy serves as a pre-condition for company's inclusion in an international supply chain. This should lead both economic policy makers and decision makers at a company level to consider environmental innovation as a potential source of growth. Among the several existent deficiencies and obstacles of corporate environmentalism, a myopic narrowing of corporate environmentalism to internal company issues and a limited technology supply were found to be especially prominent. This indicates the need for managers and policy makers to adopt a more holistic and systemic approach to corporate environmentalism (thinking of value chains and systems rather than individual companies), and the need to approach environmental technologies not only as a vital resource, but also as a market opportunity. In both cases broad and intense collaboration is an essential prerequisite for progress and radical innovation.

(4) Despite the rising threat of consumer backlash (Crane, 2000) a far from negligible segment of companies continues to engage in the greenwashing tactics. The approach seems to be especially prominent in (but not limited to) the textile, apparel and shoes manufacturing industry. Seeing that »greenwashers« have been found to most significantly underperform when it comes to waste, emissions and transport management, the public and regulators would do well to turn a more critical eye to these areas of operation in order to encourage (if not force) »greenwashers« to live up to their environmental promises.

The main limitation of this research is the application of the integral approach to corporate environmentalism in the framework of a small open transitional economy. It is therefore natural that questions about its validity and generalizability arise. The future research challenge therefore lies in implementation and validation of this approach in: (1) economies of similar size and development level, (2) larger economies, and (3) more developed as well as less developed economies to support the general validity of this approach.

3 DEBT ACCUMULATION: DYNAMICS, STRUCTURE AND MECHANISMS[2]

3.1 INTRODUCTION

The current global economic crisis will undoubtedly preoccupy economic theorists and practitioners for decades to come. They will be looking for more specific answers to why it occurred, was the global response appropriate, and what institutional measures should have been taken to avoid the reoccurrence of the crisis. In addition, each country must check the extent of the intensities of the crisis in the local environment caused by policy-induced frictions before the crisis.

In this chapter I show that overheating process that ended in a sudden stop had disastrous consequences for Slovenia. It was mainly the result of endogenous processes and was triggered with the "landing process" after joining European Exchange Rate Mechanism (hereinafter: ERMII) and euro area, when economy actually operated in a "policy vacuum." In this study I follow the seminal work of Bernarke et. al. (1999) which presents how the financial accelerator drives the endogenous development in credit markets which results in strong propagation and amplification of the (external) macroeconomic shocks. I modified the financial accelerator part of the model – so that its key mechanism lies in the link between (low) external finance premium and increasing of the net worth of the potential borrowers through the flourishing real economy and assets markets, especially the real estate market. In such an environment, the borrower's net worth and the external finance premium enhance the swings in borrowing and thus investments, spending and production. Both, therefore, amplify and propagate exogenous (policy-makers tolerated) shocks to the economy.

Using a complete database of companies with more than 100 employees in the Slovenian manufacturing sector in the period 2005–2009, I uncovered the mechanism of the amplification and propagation of shocks to the economy. Several results of the study are important. First, I show that companies have substantially increased their financial debt, which was intended for financing core and non-core business activities. Second, I find that investments in core (productive) business activities have been the main drivers of the increasing financial debt of companies throughout the observed period. Third, financial investments (investments in equities of foreign companies and management buyouts) have strongly influenced company's indebtedness in the whole period, while indebting for real estate investments is seen in 2007 and 2008. Fourth, crucial segments of the debt accumulation mechanism were financial accelerator and heavy collateralization of loans (using companies' assets), whose values were growing due to the overheated economy. Because the stock market was growing through the whole period and the real property market peaked just before the global crisis erupted, both, financial accelerator and collateralization amplified external shocks. Fifth, throughout the observed period, company financial debt

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[2] This chapter of the dissertation has been presented as working paper on several conferences and is pending for publication as Bole et al. (2012a).

increased almost uniformly across the distribution of companies. In the process of company's financial debt accumulation, each individual company was quickly changing its relative position in the debt accumulation distribution of companies. Sixth, the indebtedness of individual companies proceeded in a random "walk" manner that is in every year the increase in debt didn't depend on the stock of the debt from the previous year. Seventh, companies with unstable ownership (in "tradable portfolio" of holdings and MBOs) increased their financial debt more than companies with more stable ownership (all other companies).

To my knowledge, this study is the first to use such detailed data on companies' borrowing in the periods before and after the crisis. I was able to examine systematically the effects of different sorts of companies' investment on indebtedness as well as the effects of different groups of companies according to ownership and organizational structures. This is a novelty, an issue that received high attention in the general discussion, but was not yet proved by data. The data collected also enables to follow the effects of the crisis.

This chapter is also important because of lessons that could be learned by other countries and regions facing similar economic conditions. Consider, for example, countries of the Western Balkans that were once a part of the former Yugoslavia. Although they differ in their present statuses, they do have something important in common. In the decade before the crisis they had rather high growth, which was accompanied by increased banking borrowing abroad and high company indebtedness.[3] Similar processes of company's indebtedness through the banking system could be observed also in other developing economies, such as China.[4] Slovenia's experience that neglecting macroeconomic stability in favour of microeconomic efficiency and growth could have immediate bad consequences is an important lesson also for new entrants to the euro area. In this sense this study valuably contributes to the ongoing debate on policy measures preventing crisis eruption as well as on the best policies for exiting the crisis.

The chapter structure is as follows. Section 2 outlines the motivation for the paper. In Section 3 I show a modified model of financial accelerator, which incorporates factors behind the increased debt of Slovenian companies. Section 4 describes the data and variables that I use. In Section 5 I present the results of empirical tests, and conclude in section 6.

3.2   THE MOTIVATION BEHIND THE STUDY

While the proponents of the standard macroeconomics theory see economic science as not doing a poor job and blame the present crisis on bad economic management, the opponents are asking for a fundamental re-examination of the crucial mainstream models.[5] In this context, revealing the role of financial accelerator in amplification and propagation of

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[3] See Koman, Lakičević and Prašnikar (2011) for a description of a company's debt increase in Montenegro. Similar evidence can also be found in other countries in the region.
[4] See, for example, Deng, Morck, Wu and Yeung (2011).
[5] See, Stiglitz (2011).

external shocks during the crisis could be very important. Slovenia before the crisis is an example of such endogenous financial amplification in action. In this section I first explain the basic meaning of the concept of the financial accelerator as is it shown in the work of Bernanke et al. (1999), and why this concept should be applied to the Slovenian economy. In the second part I present different forms of organizational and ownership changes that were active during the research period as a result of privatization (especially unfinished acquisition-concentration) process of previously socially owned companies. This is necessary in order to understand the extension of theoretical framework of financial accelerator and developed hypotheses, which I provide in the following section.

3.2.1   FINANCIAL ACCELERATOR AT WORK: A PERFECT FIT IN SLOVENIA

Based on the literature on asymmetric information and agency costs in lending relationship Bernanke et al. (1999) developed a dynamic general equilibrium model which explains the role of credit market frictions in cyclical fluctuations. The basic structure of the model is as follows. There are three types of agents: households, entrepreneurs, and retailers. For inducing the effect of the financial accelerator, entrepreneurs play the key role in the model. These entrepreneurs are assumed to be risk-neutral. In each period t, they acquire physical capital which is used in combination with hired labor to produce output in period t + 1. Acquisitions of capital are financed by entrepreneurial wealth, or "net worth", and borrowing. The net worth of entrepreneurs comes from two sources: profits (including capital gains) accumulated from previous capital investment and income from supplying labor. With capital market frictions present, net worth matters because a borrower's financial position is a key determinant of his cost of external finance. Higher levels of net worth allow increased self-financing, mitigating the agency problems associated with external finance and reducing the external finance premium. By embedding these relationships in an otherwise conventional Dynamic New Keynesian model (hereinafter: DNK model) it is then shown how fluctuations in borrowers' net worth (due to, for example, the movement in asset prices) can act to amplify macroeconomic variables. An unanticipated rise in asset prices raises net worth more than proportionately, which stimulates investment and, in turn, raises prices even further (the so called financial accelerator).

The model also allows for the incorporation of different shocks to the macro economy, including unanticipated exogenous movement in the short-term interest rate and government expenditures shock. In both cases the amplifications are much stronger due to the work of financial accelerator. The unanticipated decline in the funds rate stimulates the demand for capital, which in turn raises investment and the price of capital. The unanticipated increase in asset prices raises net worth and potential collateralization potential, forcing down the external finance premium, which in turn further stimulates investment. A kind of multiplier effect arises, since the burst in investment raises asset prices and net worth, further pushing up investment. Entrepreneurial net worth reverts to trend as companies leave the market, but the effect is slow in "booming" conditions. This persistence in net worth and the external

finance premium provide the additional source of dynamics. The same mechanism is applied to demand shocks (specifically a shock to government expenditures).

The model is appropriate for the Slovenian economy, since capital market imperfections prevailed over the whole period after secession from Yugoslavia in 1991 and even earlier.[6] However, macroeconomic equilibriums were the main targets of the policy makers. Even before Slovenia entered the EU and ERMII in 2004, Slovenia already had the economic performance policies crucial for entering the euro zone under control. Actually, inflation, debt, interest rates, and the deficit were already inside the targeted area formally necessary to fulfil Maastricht criteria (Bole & Mramor, 2006). Controlling the variability of the exchange rate in the predetermined bands was, therefore, the only ability of the policy makers (and the economy) that had to be additionally tested when Slovenia was in the ERMII.

Entering the ERMII caused an important change in the financial intermediation sector. Because exchange rates would not be used anymore for closing uncovered interest parity, (Slovenian tolar) interest rates started to converge (fall) towards foreign interest rates (adjusted for risk premium) on otherwise equal instruments. The nominal convergence (falling) of interest rates triggered migration of household bank deposits to (foreign) capital market instruments, so that net portfolio outflows significantly increased. At the same time the abundant supply of (cheap) credit also stimulated the acceleration of (credit financed) outward direct investments. Both portfolio and investments flows were in net terms outward flows. These outflows of funds were financed predominantly by large net inflows of loans to banks.

In the real sector, two changes were crucial after entering the EU (and ERMII) period: considerable acceleration of the final demand and reformation of the tax system. Economic activity was driven by export's demand. The inflow of foreign capital was triggered by a drop in sovereign risk after entering the EU, and domestic investments, with crucial contribution of the government investments (particularly roads construction) and housing investment, accelerated by the cheap and abundant supply of credits. Tax system reform resulted in a significant drop in government revenues from income and payroll tax without any cut in cyclically adjusted government spending. That significantly aggravated the cyclically adjusted fiscal stance and, at the same time, strongly stimulated (over 2% of GDP) an already overheated economy (policy makers completely overlooked both effects and corresponding warnings).

The nominal convergence (falling) of interest rates and fast growth of the booming capital and real estate markets (increase the volume of potential collaterals) pushed credits to financial corporations' growth to over 25% per year; in final stage of the economic boom, when government prematurely redeemed its domestic debt by increasing foreign debt (to cut

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[6] See, Prašnikar and Svejnar (1988) for describing capital market imperfections in the ex-Yugoslav episode, Bole (2004) for showing earlier developments of capital markets in Slovenia, and Bole and Mramor (2006) for presenting capital markets characteristics in Slovenia before entering EU and EMRII.

already small costs of interest and completely neglecting effects on macro stability), credit to nonfinancial corporations skyrocketed to over 35% per year.[7] The described process increased the credit to deposit ratio by over 60% after 2004 (at the crisis eruption it already exceeded 1.6) and made bank credit activity vulnerable to any risk in the process of accessing (refinancing on) the wholesale loans market. At the same time the rapid growth of credits to nonfinancial corporations, to finance core and non-core activities, doubled their debt per GDP ratio in the period 2005–2008 (at the crisis eruption nonfinancial corporations' debt attained almost 90% of GDP) and made nonfinancial corporations vulnerable to any risk of refinancing the stock of credits (possible fall in the value of collaterals or bank credit cut). Both risks materialized when the foreign financial crisis brought the wholesale market of loans to a standstill, and external market demand collapsed in the second half of 2008 (Bole, 2009).

High growth of the external demand, nominal convergence interest rates, and acceleration of (procyclical) government spending and tax policy pushed economic growth considerably over 5% per year in 2006–2007. An overheated economy was the main factor behind current account deterioration, inflation acceleration, and a drop in foreign competitiveness when commodities prices skyrocketed and a tight labor market pushed labor costs up, in 2007–2008 (Bole, 2008).

As observed above, the Slovenian situation differs from the study of Agosin and Huaita (2011), explaining the Sudden Stop mechanism in developing countries with capital surges that occur due to inadequate policies in the regulation of capital inflows, particularly components that are not part of FDI, when countries are joining the (opening to the) international financial markets. Slovenia implemented the Tobin tax on speculative capital quite successfully in the nineties, when it had its own currency (Bole & Mramor, 2006). In contrast, capital surges in Slovenia in 2005–2008 were not based on chartist strategies of foreign investors. This period was rather characterized by free access of banks (and other economic units) to external resources, that is, using a Miller and Stiglitz (2010) expression, by free access to financial "deep pockets" investors. Abundant supply of cheap loans, therefore, enabled financial accelerator to propagate and amplify the effects of external shocks, the decreasing interest rates and pro-cyclical fiscal stance of the Slovenian government after entering the EU and a mechanism of ERMII.

3.2.2 ORGANIZATIONAL AND OWNERSHIP FORMS AMONG SLOVENIAN COMPANIES BEFORE THE CRISIS

In Slovenia the privatization of social capital formally begun with the adoption of the Law on ownership transformation (1992), which was based on a combination of voucher

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[7] In several sectors (e.g. construction), this credit acceleration pushed credit growth to over 60% per year, after 2006 (Bank of Slovenia, 2009).

privatization, distribution of shares to state funds (Capital Fund and Restitution Fund), and buy-out processes by managers and workers. The law applied to companies in virtually all sectors of the economy and required them to allocate 20% of their shares to insiders (employees), 20% to a Development Fund that auctioned the shares to investment funds, 10% to a National Pension Fund, and 10% to a Restitution Fund. In addition, in each company the workers council or the board of directors (if it existed) was empowered to allocate the remaining 40% of shares for sale to insiders (employees) or outsiders (through a public tender). A large proportion of many companies were therefore at the first glance owned by state-related entities, investment funds and insiders and the initial ownership structure was quite diverse.

As shown by Domadenik et al. (2008) a process of concentration of ownership rights was gradually taking place in companies during the nineties. However, as the privatization of large and medium-sized companies had not finished, a booming macro environment at the beginning of the first decade of new century gave additional incentive and opportunity for leverage buyouts - an often-used tool for concentration and acquisitions. These buyouts were done in many different forms. In some cases holding companies were established, using funds borrowed from banks to finance acquisitions of unrelated businesses. Holding companies sometimes have concentrated and disclosed owners or other times they have dispersed owners, or in some cases even unknown owners due to defaults or unsuccessful (previously made) leverage buyout privatization.[8] In a number of companies, a group of managers privatized a company in a typical management buyout process. This is especially observed in industries where technology does not require high capital intensity. Common characteristics of both above mentioned groups of companies was their unsettled organizational and ownership structure.

In what follows these companies will be denoted briefly as companies with "unstable" ownership. Affluent supply of loans in the booming period of 2004–2008 therefore triggered in these companies much more general (intra and inter sectoral) investments in non-core business activities, that is in long term financial instruments (equities) and portfolio real estate assets.

The above group of companies should be compared to the other group of companies with "stable" ownership encompassing de-novo companies dominated by large investors representing domestic entrepreneurs or family-owned companies, or companies that experienced management buy-outs at the beginning of the transition by owners (managers), companies with dispersed ownership and so-called companies with "cap ownership structure". The later companies usually consist by related businesses where the entire group is controlled by a parent company that is owned by a wider management group or, in few cases, even workers. Since these companies are highly involved in international business operations

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[8] Banks seized the shares of these companies, as holding companies were not able to repay the loans accumulated mostly for privatization purposes. Holding companies' were largely dependant on ther portfolio companies' cash flows.

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and their capital intensity is large, it is reasonable to expect that ownership consolidation was a parallel process, not endangering the competitive positions of companies, and was therefore progressing slowly. The parent companies are usually financed by distribution of dividends of their constituencies that are partially owned by workers or managers receiving ownership in the initial phase of privatization in Slovenia. I consider companies with "stable" ownership to be more inclined to invest in core investments. Similar truth holds for two additional groups of companies: companies controlled by foreign owners and companies with direct or indirect state control.

3.3 EXTENDED THEORETICAL FRAMEWORK OF FINANCIAL ACCELERATOR AND TESTING HYPOTHESES

3.3.1 MODEL FRAMEWORK

In the partial equilibrium costly-state verification model of optimal contract between entrepreneur and lender,[9] financial accelerator endogenously drives (amplifies) effects of exogenous shocks to expected capital return through relation

$$Q_t K_{t+1}^j = \Psi(s_t) N_{t+1}^j \qquad \Psi(1) = 1 \qquad \Psi'(.) \geq 0 \tag{1}$$

Where j indicates particular entrepreneur, Q_t is price and K_{t+1}^j volume of capital invested, N_{t+1}^j net worth of entrepreneur invested in the project and Ψ increasing function of expected discounted return to capital. If R_{t+1}^k is average (gross) capital return and R_{t+1} riskless rate (opportunity cost for banks-lenders) than expected discounted return to capital is defined by

$$s_t = E\left(\frac{R_{t+1}^k}{R_{t+1}}\right) \tag{2}$$

Taking explicitly into account that an investment project is financed by borrowing and net worth (previously accumulated), supply function for external investment finance could be written (normalizing on borrowing) as

$$B_{t+1}^j = Q_t K_{t+1}^j \left(1 - \frac{1}{\Psi(s_{0t})}\right) \tag{3}$$

Discounted capital return of particular company could not deviate from average discounted capital return of the whole economy only for idiosyncratic disturbance to company. Relative economic activity (and therefore capital return) could considerably vary between industries, cross section, if effects of specific macroeconomic conditions to a large extent differ among

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[9] See, Bernanke et al. (1999).

industries.[10] In appropriately modified original (referenced) model idiosyncratic disturbance to company modifies its discounted capital return relative to the discounted capital return of the sector company belongs to. In the model (3) it is denoted by s_0. Because function of discounted return (for a given year) Ψ is the same, and only expected discounted capital returns vary among industries, model (3) actually incorporates such industry specific effects of the investment on company borrowing (in a given year) in discrete multiplicative industry effects. Linearizing (expanding it around average values for the whole economy), the relation (3) could be written as follows:

$$B_{t+1}^{j} = \left(Q_t K_{t+1}^{j} - \overline{Q_t K_{t+1}}\right)\left(1 - \frac{1}{\Psi}\right) + \frac{1}{\Psi^2}\left(\frac{1}{\Psi} - \frac{1}{\Psi(s_{0t})}\right)\overline{Q_t K_{t+1}} + \overline{Q_t K_{t+1}}\left(1 - \frac{1}{\Psi}\right) \qquad (4)$$

s_{0t} denotes expected discounted capital return of an industry to which particular company j belongs to. The first term in (4) presents the effect of investment of particular company (behaving optimally) on its borrowing, the second term reveals industries additive effects (industry dummies) and the third term gives calibration effect of the whole economy (constant in corresponding regression model).

To enrich information in the simple model of investment finance (equation 4) (or equation (3), in the multiplicative version) it would be worthwhile to explicitly distinguish borrowing effects of three kinds of investment: productive capital formation, investment in real estate, and financial investment (including acquisition).[11] Factors influencing discounted returns of these investments normally differ considerably. In Slovenia after crisis eruption, for example, the effects of shocks in discounted capital returns didn't differ only in their size but also in their sign. Having only aggregate investment in the model could, therefore, significantly weaken its analytical power.

To disaggregate investment effects in the model (3) (or (4)) it is necessary to extend the theory behind the model of investment finance (equation 1).[12]

Let us take that at the beginning of period $t+1$ an entrepreneur has a net worth of N_{t+1}^{j}. Suppose, he intends to allocate net worth to three different projects $_1N_{t+1}^{j}, _2N_{t+1}^{j}, _3N_{t+1}^{j}$, where

$$_1N_{t+1}^{j} + _2N_{t+1}^{j} + _3N_{t+1}^{j} \leq N_{t+1}^{j}$$

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[10] In Slovenia, industries faced considerably different macro conditions in the period 2004-2008, when economy accelerated to overheating. Because of the state road construction program and cheap flat credits investment in buildings and roads flourished and construction sky rocketed; foreign markets also rose, therefore export and manufacturing accelerated too, but considerably less than construction; investment in equipment accelerated also but with a lag, because it was mainly driven by strong export demand; domestic »household« services (retail trade, tourism) accelerated with even larger lag, because they were mainly induced by accelerated household spending.

[11] Speaking on long term financial investments of Slovenian companies, it should be mentioned that in the observed period companies accelerated outward FDI particularly to countries of the former Yugoslavia and Former Soviet Union (Damijan et al., 2007). However, as discussed earlier, an important part of financial investments in Slovenian companies belongs to the leveraged management buyouts.

[12] See Appendix (A1) in Bernanke et al. (1999).

The first project is a productive capital formation, the second is a real estate investment and the last project is a financial investment. For every project he also borrows funds from bank according to the optimal finance plan given in the equation (1), taking into account, however, that discounted capital returns (of corresponding projects) differ.

$$_1S_t = E\left(\frac{_1R^k_{t+1}}{R_{t+1}}\right) \qquad _2S_t = E\left(\frac{_2R^k_{t+1}}{R_{t+1}}\right) \qquad _3S_t = E\left(\frac{_3R^k_{t+1}}{R_{t+1}}\right) \tag{5}$$

If $\Gamma(\omega)$ is expected gross share of profits going to the lender, than expected entrepreneur's profit from all three projects is equal to:

$(1- \Gamma(\omega_1)\ E(_1R^k_{t+1})/R_{t+1}\ _1Q_t\ _1K_{t+1} + (1- \Gamma(\omega_2)\ E(_2R^k_{t+1})\ /R_{t+1}\ _2Q_t\ _2K_{t+1} + (1- \Gamma(\omega_3)\ E(_3R^k_{t+1})\ /R_{t+1}\ _3Q_t\ _3K_{t+1}$

where $\Gamma(\omega_i)$, $E(_iR^k_{t+1})$, $_iQ_t$, $_iK_{t+1}$ pertain to the project indexed by i, for $i=1,2,3$! Optimal values for (default determining) cut off values ω_1, ω_2, ω_3 depend on different values of discounted capital returns, namely

$s_i = E(_iR^k_{t+1})\ /R_{t+1}$ for investment projects $i=1,2,3$

Cut off values are determined by discounted capital returns through function: $s_i = \rho(\omega_i)$ for $i=1,2,3$[13]

A rational entrepreneur (company) j would structure projects (allocate net worth) so that total profit going to him would be the largest possible for given size of the total (invested) net worth N^j_{t+1}, available at the beginning of the current period and given expected capital returns of analyzed segments of potential investment projects. Hence, he would find the optimal structure of allocated net worth $_1N^j_{t+1}$, $_2N^j_{t+1}$, $_3N^j_{t+1}$ by solving following optimization problem:

$$\max\ ((1- \Gamma(\omega_1)s_1\psi\ (s_1)_1N^j_{t+1}) + (1- \Gamma(\omega_2)s_2\psi\ (s_2)_2N^j_{t+1}+ (1- \Gamma(\omega_3)s_3\psi\ (s_3)_3N^j_{t+1})) \tag{6}$$

for given constraints

$s_i = \rho\ (\omega_i)$ for $i=1,2,3$ $_1N^j_{t+1} + _2N^j_{t+1} + _3N^j_{t+1} \leq N^j_{t+1}$ $_1N^j_{t+1}\geq0, _2N^j_{t+1}\geq0, _3N^j_{t+1}\geq0$

Because the sum of allocated net worth to projects is constrained and individual items are positive, the problem has to be solved using Kuhn Tucker conditions. However, the structure of the objective function is simple and the solution is straightforward. A rational entrepreneur would put net worth in the project(s) in which discounted return to capital s_i gives the highest value of $(1- \Gamma(\omega_i)s_i\psi\ (s_i)$. If two projects have the same discounted return to capital s_i, a company could invest in both projects (proportions are not important), or in all three, if

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[13] See Appendix (A1) in Bernanke et al. (1999).

discounted capital returns of all three projects are equal (proportions are again not important).[14]

Final version of the demand function for the external investment financing, for company j belonging to the sector with discounted capital return equal s_{0t}, would be:

$$B^j_{t+1} = \sum_i {}_iQ_{t\,i}K^j_{t+1}\left(1 - \frac{1}{\Psi({}_is_{0t})}\right) \tag{7}$$

Its linearized version is as follows:

$$B^j_{t+1} = \sum_i \left({}_iQ_{t\,i}K^j_{t+1} - \overline{{}_iQ_{t\,i}K_{t+1}}\right)\left(1 - \frac{1}{\overline{\Psi({}_is_t)}}\right) + \sum_i \left(\frac{1}{\overline{\Psi({}_is_t)}} - \frac{1}{\Psi({}_is_{0t})}\right)\frac{\overline{{}_iQ_{t\,i}K_{t+1}}}{\overline{\Psi}^2({}_is_t)} + \sum_i \overline{{}_iQ_{t\,i}K_{t+1}}\left(1 - \frac{1}{\overline{\Psi({}_is_t)}}\right) \tag{8}$$

Equation (7) shows how different expected discounted capital returns affect priority of different kinds of investments and the size of company borrowing. Obviously, company's borrowing depends additively on its productive capital formation, on real estate investment, and on financial investment, with multiplicative industry-specific effects. In the linearized version of the model, company's borrowing depends on (explanatory variables in the first sum) productive capital formation, real estate investment, and financial investment (all variables are in deviation from the economy averages). In addition, the borrowing of a company depends on (explanatory variables in the second sum) industry specific discounted capital returns that correspond to industries additive (dummy) effects. Finally, the borrowing of a company depends on average investment effects of the economy (explanatory variables in the third sum, aggregated as a constant in a regression model). For every company and period, explanatory variable sums in (equation 6) consists only of those items (kinds of investment) i for which

$(1 - \Gamma(\omega_i)s_i\psi(s_i) = \max_\alpha (1 - \Gamma(\omega_\alpha)s_\alpha\psi(s_\alpha)$

in the corresponding period.

3.3.2 WORKING HYPOTHESES

This model pinpoints crucial determinants of the investment driven indebtedness process in Slovenia after 2004. Macroeconomic conditions affected the process thorough increasing investment demand as well as increasing supply of investment finance. Supply of investment finance was built up mainly through increasing of discounted capital return. Higher expected

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[14] Simple further extension of the model (6) shows that investment projects with different discounted capital returns could also take place. It is sensible to assume (especially in a small size economy, just integrating fully into world economy) that in period t company j faces available projects which are limited in size. In such a situation three additional inequalities (constraining ${}_iN^j_{t+1}$ i=1,2,3) have to be added to (6) and the mentioned result follows.

discounted capital return increased expected solvency of companies and therefore their eligibility for banks credit support. Discounted capital return was increasing through several channels. Nominal convergence (landing) in ERMII and later in euro area drove long-term basic interest rates (sovereign risk premium) down and therefore pushed discounted capital return up. Easing monetary policy grip, pro-cyclical fiscal policy and growing export markets pushed capital return and, therefore, also discounted capital return up. The real assets and stock market bubble also inflated expected discounted capital return for investment in real estate and financial instruments, including acquisitions. The menu of potential investments was, consequently, not only much larger than in the normal situation (when mostly only core business investment for sustainable growth are attractive), but also much more renewable. It could be quickly »refreshed«, as the structure of discounted capital returns (among different investments) was permanently generated (after some investment options were exhausted in the previous year).

Equation (8), thus, permits to test several hypotheses about the investment determinants of company's indebtedness in Slovenia in the period 2005–2009:

Hypothesis 5: Companies increase their financial debt in order to invest in three kinds of projects: to extend their core (productive) business activities, to increase their portfolio investments in real estate, and to increase their long-term financial investments.

Hypothesis 6: Companies in different industries borrow according to specific expected discounted capital returns; such borrowing policy results in additive industry specificities.

Hypothesis 7: Groups of companies with more stable ownership, companies with foreign owners and companies in state ownership increase their financial debt less than groups of companies with more unstable ownership.

Hypothesis 8: Before the emergence of the economic crisis, financial investments dominated portfolio investments in real estate in terms of generating the long-term financial debt of companies.

While hypotheses H5 – H6 directly resemble present discussion, hypotheses H7 – H8 require additional explanations. From the discussion in the previous section on organizational and ownership changes it can be assumed that groups of companies with "stable" ownership (e.g. dispersed owners, cap ownership, big owners), state-owned companies, and companies with foreign owners diversify their investments more equally on core and non-core and especially within their own sector projects, while companies with "unstable" ownership (financial holdings with concentrated and diversified owners, as well as MBO companies), are more inclined to non-core, especially inter-sector investments. Investments of those companies are steered by their owners according to the highest expected discounted return across all sectors, that is, instead of equation (6) those companies are actually solving following optimization problem

$$\max_j (\max ((1- \Gamma (\omega_1)s_1\psi (s_1)_1 N^j_{t+1} + (1- \Gamma (\omega_2)s_2\psi (s_2)_2 N^j_{t+1} + (1- \Gamma (\omega_3)s_3\psi (s_3)_3 N^j_{t+1}))$$

In every moment, their discounted return ladder is, therefore, shifted to the right of the "stable" ownership companies' ladders.[15] Because of that also their (potential) indebtedness is higher. That is the very mechanism how those companies are used as a vehicle for maximizing leverage of the net worth available to their owners. This explains hypothesis H7.

Hypothesis H8 relates to the fact that after the year 2004, when the cycle of macroeconomic disequilibrium started, a cheap and abundant supply of banking credits and booming macro environment stimulated a company's effective demand for financial debt, which was spent on financing core activities. Investments in fixed assets and inventories were the drivers of demand for financial debt throughout the entire phase of the expansion. This could also be said for financial investments. Later, as real estate prices accelerated, the demand for financial debt was driven by portfolio investments in real estate. They peaked in the years just before the crisis emerged.

Following four hypotheses H9-H12 are heavily motivated by financial accelerator effects, especially its amplification effects of errors in expectations of capital return.

Hypothesis 9: The indebtedness of companies in the different debt-increasing clusters is increasing uniformly.

Hypothesis 10: The composition of companies in the debt-increasing clusters is changing substantially within short periods of time.

Hypothesis 11: In boom economic conditions, the borrowing of companies proceeds in a "random walk" manner – increments in company debt do not depend on the previously accumulated stock of debt. There is, therefore, no endogenous self-correcting, negative feedback, or effect of the high debt of companies on the further progress of their debt accumulation.

Hypothesis 12: Since the crisis emerged, higher levels of financial debt have made companies much more vulnerable when financing core and non-core activities.

Possible financial accelerator effects of errors in expectations are already documented elsewhere.[16] An unexpected shift in capital return

$$U^{rk}{}_t \equiv R^k_t - E(R^k_t)$$

has strong effect on capital (V_t)

$$V_t = (U^{rk}{}_t (1 \text{-} \mu \ U^{dp}{}_t) \ Q_{t\text{-}1} K_t + E(V_t) + \text{terms in } t\text{-}1^{17},$$

where $U^{dp}{}_t$ is unexpected shift in conditional default costs. The effect is especially strong for heavily leveraged companies (economies). In overheated economy and for (standard)

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[15] Companies with foreign ownership and companies in state ownership are included.
[16] See Bernanke et al. (1999).
[17] Exact functional form of lagged terms is not important because their partial derivative on any current variable is equal to 0.

conservative expectations of capital return, elasticity of capital on unexpected shift of capital return

$$\frac{\partial V_t}{\partial U_t^{rk}} \cdot \frac{E_{t-1}\left(R_t^k\right)}{E_{t-1}\left(V_t\right)} = \frac{E_{t-1}\left(R_t^k\right)Q_{t-1}K_t}{E_{t-1}\left(V_t\right)} \geq 1 \tag{9}$$

could result in over 20% yearly increase of the net worth invested. Lenders practice of offsetting necessary net worth invested in the project by increasing collateral requirements could further amplify the effect of financial accelerator.[18]

Hypotheses H9 and H10 include estimations on the distribution of companies' indebtedness dynamics in the economy with booming (accelerating) demand and a working financial accelerator. As an economy becomes overheated, accelerating demand spills over very quickly from sector to sector. Demand spills driven increasing of expected discounted capital returns, crucial for the size of borrowing, became therefore more synchronized across sectors as well. Hence, banks are easing credit standards in steps (according to expected capital returns increases) but almost uniformly across all the sectors. At the same time, the acceleration in increasing the expected discounted capital return, that is systematic trailing of expected capital return behind actual, is quickly refreshing (changing) also companies' sectoral position regarding banks' current standards of safe indebtedness, because of the corresponding financial accelerator amplifying effects (equation 9) on net worth. Still, aggregate indebtedness is accelerating almost uniformly up.

Weak (almost negligible) impact of indebtedness in the previous year on possible borrowing in the current year, as stated in hypotheses H11, is the straightforward consequence of the relation in equation (8). It shows that fast growing optimism in the economy, when expected values of capital return trails behind actual values, drive net worth up more in more leveraged companies.

Just the opposite is the effect of the relation in equation (9) when crisis strikes. When crisis erupts, an unexpected shift in capital return $U^{rk}_{\ t} \equiv R_t^k - E(R_t^k)$ becomes negative (expected capital returns are over optimistic), so that net worth is squeezed un-proportionally more in heavily leveraged companies. That is the motivation for the hypothesis H12. The actual performance of the Slovenian economy after the eruption of the crisis confirms the importance of the described financial channel effects. As shown by Prašnikar et al. (2009) and Cirman, Koman, Prašnikar, Valentinčič and Voje (2009), for the highly indebted business sectors, the squeeze of loans was as equally important as the drop in real external demand. Banks cut financial support un-proportionally to heavily indebted companies, because net worth per unit of debt dropped (see equation (3)), which forced them into drastic shrinkage of their operational activities. Both, real and financial channels induced further decreases of companies' net worth.

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[18] In Slovenia, banks increased this practice after 2004. See Bole, Prašnikar and Trobec (2011).

After explaining the basic hypotheses, I now turn to the description of data and main variables.

3.4   DESCRIPTION OF DATA AND VARIABLES

The analyzed sample contains data for the period 2005–2009 on 203 Slovenian manufacturing companies. These are all the companies in Slovenian manufacturing sector that have more than 100 employees. I observed large and medium-sized companies from sectors 10, 11, 13-33, 36 and 45 according to NACE2 rev., which consists of the bulk of Slovenian exports. In 2008 these companies generated 18.54% of total income and employed 17.16% of all employees among the total number of companies registered in Slovenia (35% of all employees in the observed NACE2 rev. sectors in Slovenia). For these companies I have gathered data on: balance sheets and income statements, company ownership structures, type of relationships, and investments in fixed assets, which I collected from yearly reports of the companies. The ownership data was further analyzed by using Agency of the Republic of Slovenia for Public Legal Records and Related Services (hereinafter: AJPES) annual report data and GVIN.com companies' ownership web database, which allows to categorize companies in different groups by taking into account the ownership and organizational structures.

As seen from the summary statistics in Table 7, a typical company in the total sample employs 502 workers on average per year. In the observed period employment firstly increases and subsequently decreases. Companies with foreign owners are the largest group in the sample. More than one-quarter of companies belong to this group. In the above-observed group the average company employs 541 workers on average per year. According to the number of companies, the group is followed by a group of companies where managers in the observed period intended to carry out a leveraged buyout. These companies are among the smallest in the sample. Also, in many cases buyouts were carried out in a non-transparent way. A small group of current managers, usually using another company as a special purpose vehicle for privatization was found as a driving force of privatization only after a detailed analysis of the ownership structure. The remaining groups consist of a smaller number of companies. Companies with dispersed owners still resemble the initial privatization formula introduced by the privatization law in 1992, explained in section II. These are the largest Slovenian companies with a typical two-tier corporate governance structure. As already mentioned, companies belonging to financial holding companies are structured in two forms. The first group belongs to holding companies with known private owners. This group consists of the smallest companies in the sample. The second group of companies constitutes holding companies with dispersed ownership. In a few cases the banks, due to loan defaults or unsuccessful leverage buyouts, seized the shares of these companies. The typical company in this group employs 592 workers on average per year, which is a bit more than the average company in the group of cap ownership structure (553). The group named "big private owners" is quite large by number of companies, but small regarding the size of the average

company. However, employment in these companies grows year by year. There are only a few state-owned companies. The average employment in this group is 675 workers, the second largest in the sample.

Variables used in the analysis are mainly in differences. Exceptions are investments, profits/losses, and capital, which are in levels, and debt, which is used in levels and differences. Variables are normalized by a total balance sum. In the proceeding text this will be taken into account, if not mentioned specifically.

The first row of Table 7 shows the evolution of financial debt through the observed period for an average company. Debt increased from 22.3% of the total balance sheet sum in 2005 to 30.5% of the balance sheet sum in 2009. The average company increased financial debt difference in the observed period by 12.5%, or 2.9% on average per year. The average inter-temporal adjustments include an increase of the debt difference in 2006 and 2007, followed by a decrease, but still a positive difference in 2008 and a negative difference in 2009.

By adding investments in equipment and machinery to investment in inventories and subtracting profits/losses from this sum, an approximation of how much companies need to borrow to extend core business activities (assuming that ownership equity does not change). For an average company, the profit/loss variable is positive throughout the entire period. However, it declines from 2007–2009. Investments in fixed assets are shown to be positive through the whole period, being the highest among investments variables. The variable is positive even in 2009, showing that an average company did not decrease investments in fixed assets compared to 2008. Another "core business activity" variable, differences in stocks, is increasing for an average company in the years 2006–2007. In 2008 the difference decreased, but was still positive, and in 2009 the difference became negative. Altogether, differences in the core business variable were positive in the whole observed period for an average company, with an average increase of 4.2% per year. The average values for two financial investments[19] variables are positive as well. The difference in long-term financial investments for an average company is the highest in 2006 and 2007. In 2008 it became negative, and is close to zero in 2009. The difference in portfolio real estate investments for an average company is increasing in 2007 and 2008, just before the emergence of the crisis. In 2009 it became negative. The share of equity in the balance sum of the previous year decreases for an average company in the entire period.

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[19] Financial investments are investments into stocks and shares of companies, lending to other companies and investments into other financial instruments. Companies invest into financial investments for various reasons such as portfolio investments, acquiring other shares of companies for expanding or entering new businesses, etc.

Table 7: Summary Statistics for Variables Used in Estimating the Influence of Observed Factors on Financial Debt of 203 Industrial Companies in Slovenia

Variable	N	Mean	2005	2006	2007	2008	2009	Description
Bil_fdebt	200	0.264	0.223	0.235	0.259	0.294	0.305	Financial debt as a proportion of the total balance sum
Dbil_fdebt	200	0.029		0.028	0.047	0.045	-0.004	Difference in the financial debt as a proportion of the total balance sum
Dbil_stocks	200	0.006		0.023	0.024	0.014	-0.036	Difference in stocks as a proportion of the total balance sum
Bil_invinasset	198	0.076	0.1	0.075	0.080	0.070	0.054	Investments in assets as a proportion of the total balance sum
Bil_pro/loss	200	0.032	0.028	0.039	0.059	0.028	0.007	Profit/loss as a proportion of the total balance sum
Dbil_core activities	199	0.042		0.058	0.043	0.054	0.011	Difference in "core business activities" as a proportion of the balance sum
Dbil_real estate	200	0.001		0.000	0.002	0.003	-0.003	Difference in portfolio real estate investments as a proportion of the total balance sum
Dbil_fininv(lt)	200	0.003		0.009	0.006	-0.004	0.001	Difference in long-term financial investments as a proportion of the total balance sum
Bil_kap_t-1	200	0.456		0.480	0.466	0.444	0.433	Equity in period t to total balance sum in t_{-1}
n - number of employees	203	502	501	511	521	512	464	
DO	21	1040	1032	1038	1053	1062	982	Dispersed ownership
FHC	13	208	202	208	215	216	192	Fin. hol. – conc. ownership
FHD	14	592	465	629	606	565	510	Fin. hol. – disp. ownership
CAP	21	553	386	574	582	558	517	Cap ownership
MBO	46	356	341	377	376	362	314	Management buyouts
BO	25	216	188	208	231	242	223	Big private owners
STO	10	675	524	696	705	675	607	State ownership
FCO	53	541	529	553	566	557	506	Foreign conc. ownership

Note: N denominates number of companies on an average year

Source: AJPES, 2011; own calculations.

3.5 EMPIRICAL RESULTS

3.5.1 MODELING THE PROCESS OF DEBT ACCUMULATION

On the basis of the analysis of data in the previous section, and using theoretical specification (equation 8), I constructed an econometrical model in which I regressed yearly changes of financial debt (differences) on companies' core business variable (constructed by adding

investments in fixed assets to the differences on stocks and subtracting from this sum profit/loss), portfolio real estate investments variable (differences) and long-term financial investments variable (differences). The latter represents two non-core business investments variable. In accordance with specification (8) I also included dummy variables, representing groups of companies according to the ownership and organizational structures and industry dummies which control for the industry specific conditions. I augmented the set of explanatory variables by a variable Bil_kap_t-1, equity to total balance sum in the previous year, which is used as an indicator of companies' financial health.[20]

Because the debt buildup process was not stationary and that even the direction of causality could be changed, the regressions are calculated for each year separately. I used Huber robust regression to neutralize possible effects of differences in ownership, organizational and sector specifics of production on heteroscedascity. Since the most important problem in estimating such a regression is the endogeneity of the contemporaneous explanatory variables with the error term, I also used instrumental variable procedure.[21]

The estimates are presented in Table 8. In all specifications, construction of dummies assumes that companies with foreign owners (which are a separate dummy but are also considered as stable owners) serve as the base. The coefficients (of dummies) for three other types of companies hence measure the effects relative to the coefficients of this basic group rather than relative to zero (and have the effect only on the constant).

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[20] In the case, potentially available projects are constrained in size (as footnoted in the presentation of the model) total available net worth enters the model (8) also theoretically.

[21] Instruments were obtained from the available explanatory variables. Their construction is based on the idea of Hausman and Leonard (1994, 2005). Bulks of them were simple lagged values, while some of them were constructed as follows. First, sectoral panel data were constructed. Data for every explanatory variable were aggregated in NACE2 three digit sectors, separately for every ownership group and year. Instrumental variables were calculated for this NACE2 sectors. Heuristically speaking, for every explanatory variable and every ownership group and every sector, average value of the variable across other ownership groups and sectors is used as an instrument for the sectoral panel. Those sectoral instruments were then assigned to companies according to companies' ownership group and sector.

Two sets of instruments were constructed for sectoral panel data. Namely, for every explanatory variable two instrument were constructed. In the first set, for every NACE2 sector, year and ownership group the aggregate value of variables were calculated across all other groups except own, separately for every explanatory variable. In the second set, for every NACE2 sector and ownership group aggregate value is calculated across all groups except a pair of groups (which includes own group to which averages pertains), for every explanatory variable. Average values (normalized instruments) were calculated by dividing aggregate values by the aggregate of the number employed. Instruments in the first set are denoted as "non_group" and in the second as "non_pair_of_group" instruments.

Constructed normalized sectoral instruments were then assigned to companies according to their group and sector. As a final step of instrument construction, assigned normalized instruments were multiplied by the number employed in the corresponding companies and year.

Table 8: Determinants of financial debt (companies are grouped by behavioral characteristics and industries)

Variable	2006		2007		2008		2009	
	Huber regression	IV GMM regression	Huber regression	IV GMM regression	Huber regression	IV GMM regression	Huber regression	IV GMM regression
Dbil_core activities	0.0952***	0.270**	0.362***	0.346***	0.327***	-0.165	0.174***	0.511***
	(0.0258)	(0.114)	(0.0484)	(0.113)	(0.0495)	(0.162)	(0.0483)	(0.197)
Dbil_real estate	-0.0818	-0.255	3.092***	-0.393	1.513**	4.448	0.517	-0.188
	(0.445)	(1.585)	(0.940)	(1.923)	(0.584)	(2.952)	(0.460)	(0.133)
Dbil_fininv(lt)	0.434***	0.770	0.393***	0.843**	0.237***	0.430**	0.369***	0.760**
	(0.0720)	(0.548)	(0.0903)	(0.335)	(0.0681)	(0.213)	(0.114)	(0.384)
Bil_kap_t-1	-0.00174	0.0169	0.0611**	0.0610*	0.0275	0.0328	-0.00326	0.0870*
	(0.0128)	(0.0355)	(0.0253)	(0.0350)	(0.0261)	(0.0540)	(0.0283)	(0.0508)
Dispersed, cap ownership and big owners Dummy (d1)	0.00545	-0.0301**	0.0151	-0.00176	0.00768	0.0221	-0.0200	-0.0112
	(0.00937)	(0.0147)	(0.0149)	(0.0202)	(0.0128)	(0.0183)	(0.0143)	(0.0202)
Financial holding group with concentrated and dispersed owners and MBO Dummy (d2)	0.0153	-0.0119	0.0171	0.000506	0.0285**	0.0492**	-0.0209	-0.00646
	(0.00946)	(0.0183)	(0.0155)	(0.0217)	(0.0131)	(0.0210)	(0.0147)	(0.0229)
State ownership Dummy (d3)	0.0190	-0.0222	-0.0211	-0.0266	-0.0234	0.0393	0.0299	0.0154
	(0.0173)	(0.0250)	(0.0276)	(0.0276)	(0.0243)	(0.0345)	(0.0267)	(0.0291)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0218*	0.0272	-0.00552	0.0190	-0.00888	0.00166	-0.000268	-0.0578*
	(0.0126)	(0.0299)	(0.0208)	(0.0397)	(0.0182)	(0.0331)	(0.0204)	(0.0347)
Number of observations	197	189	198	193	200	195	199	196
Prob > F	0.0000		0.0000		0.0000		0.0014	
		Hansen's J chi2(13) = 13.0734 (p = 0.4422)		Hansen's J chi2(17) = 19.6764 (p = 0.2911)		Hansen's J chi2(11) = 11.5656 (p = 0.3972)		Hansen's J chi2(11) = 15.1546 (p = 0.1755)

Source: AJPES, 2011; own calculations.

In all specifications of the financial debt equation, I found coefficients on core business investments highly statistically significant and of considerable size. The only exception is IV specification in 2008. This confirms the H5 hypothesis, showing that in the observed period a substantial part of the financial debt was related to companies' core activities. Coefficients are positive and significant in 2009, which shows that companies that decreased core investments also decreased their indebtedness. Hypothesis H12 is therefore confirmed.

Coefficients on long-term financial investments variable are positive, large, and highly significant in all specification, except for IV specification in 2006. However, they show a decrease in 2008 when an average company already had a negative value of the difference in long-term financial investments. A positive and highly significant size of the coefficient in 2009 represent a decrease in financial investments due to its devaluations (or sale) which reduced financial debt of companies (difference in financial debt for an average company is negative in 2009). As financial investments serve as collateral, it is very likely that companies with higher financial debt have had more problems in renewing bank credits. Obviously, presented results on long-term financial investments also support hypotheses H5 and H12.

Coefficients on real estate investments (differences) are positive, highly significant and large in 2007 and 2008 in Huber estimations. The coefficient is positive and close to 10 –% significance in 2008 also in IV estimation. The results of the analysis, thus, reflect the discussion in previous sections and partly support hypotheses H5 and H8.

Analyzed data does not support hypothesis H6. Because there is no evidence that (sectoral) groups of companies differ according to their behavioral characteristics concerning the demand for the financial debt through the whole observed period, it could be concluded that in the analyzed years fast growth in the mature phase of booming economy already synchronized the dynamics of expected capital returns across sectors. However, some remaining differences in the sectoral dynamics of expected capital returns are visible in the positive and statistically significant coefficients for a group of companies with unstable ownership in the year 2008, which were, as discussed, the fastest sectoral capital returns "cherry pickers". At this point I have to stress that the analysis is made on manufacturing companies where privatization, especially in cases of holding companies and MBOs, was executed through special purpose vehicles which used banking finance for privatization transactions. Shares of privatized companies were used as collaterals. It is therefore very likely that in the year 2008 manufacturing companies were asked to increase their indebtedness, and higher liquidity was siphoned to special purpose vehicles in order to service their debt, which confirms the hypothesis H7. Similar processes occurred during the time when the crisis erupted more intensively in the construction industry where in the high boom the market became dominated by "Ponzi" investors, who needed to roll over not only principal but also borrow more to pay interest.

3.5.2 DYNAMICS AND STRUCTURE OF THE DEBT BUILD-UP PROCESS

So far, I have directly tested hypotheses developed in sub chapter 3.3. This relates in particularly to hypotheses H5 – H8. In the following part I will be interested in testing H9-H12 hypotheses. Moreover, the analysis allows to also go back to some already tested hypotheses.

3.5.3 EVOLUTION OF THE INDEBTEDNESS DISTRIBUTION

Since data for the analyzed sample of companies cover the 2005-2009 period, variables calculated for the period 2006 to 2009 are in increments, which corresponds to the analyzed debt accumulation period of the economy,[22] presented empirical evidence on the dynamics and structure of the debt buildup process is, therefore, also constrained (with one exception) to the period 2006-2009. Only figures on indebtedness evolution are given from 2005 onward. All presented variables are averages of individual values of the corresponding indicators.

In Figure 1 the evolution of indebtedness of the analyzed sample of companies is presented. The trajectory of the indebtedness (financial debt per total balance sheet sum) for the first, fifth, and last decile is given. In the studied period, debt increased from 20% of the total balance sheet sum in 2005 to 30% of the balance sheet sum in 2008 for companies in the fifth decile (a median company). The first decile increased much less, so distribution of indebtedness became more asymmetric toward higher values in the later phases of the debt accumulation process.

Figure 1: Evolution of Indebtedness
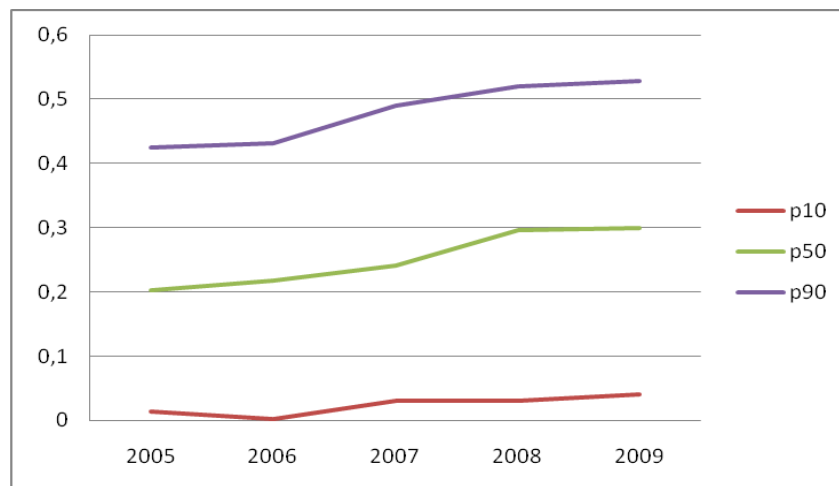
Note: Financial debt per unit of total balance sheet sum

Source: AJPES, 2011; own calculations.

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[22] In 2005 GDP increased by 4.5%, and the yearly growth rate in the last quarter was 4.6% (Statistical Office of the Republic of Slovenia).

In observing such evolution in the distribution of indebtedness, it could be assumed that in the debt buildup process the less indebted companies (from lower deciles of distribution) at the beginning of the process were more conservative; therefore, staying less indebted during the period of debt accumulation. Empirical evidence, however, does not confirm such an assumption. In Table 9 there are results of testing sub-hypothesis[23] that there is no trend in the distribution of indebtedness increments (distribution of increments in the ratio of debt per balance sheet sum) over four quartiles of distribution of companies at the beginning of the debt buildup process (distribution in the debt per balance sheet sum in 2005). With the only exception in the year 2006, in all other years presented test statistics are negative and significant at less than p=0.01. companies less indebted (more conservative) at the start of the debt buildup process (in 2005) obviously increased their indebtedness more than other companies and, therefore, migrated to higher quartiles of indebtedness distribution as the process of debt accumulation evolved. Such result obviously (or at least partly) corroborates hypotheses H9 and H10 made in the sub chapter 3.3.

The above results document that in the process of debt accumulation, increments in the financial debt (per unit of the total balance sheet sum) were higher in companies in which indebtedness at the beginning of the debt buildup period (in 2005) was lower. For the stability of the accumulation of the debt dynamics it is, however, crucial how fast such change in the indebtedness could be, that is, how strong is the persistency of the debt accumulation process at transmission from period to period. The faster the change in the indebtedness increment, the more explosive the process of the debt accumulation could be, and the shorter the process could last.

Table 9: Trend in the Distribution of Indebtedness Increments

Quartiles of the indebtedness distribution in 2005	2006		2007		2008		2009	
	N	Sum of ranks	N	Sum of ranks	N	Sum of ranks	N	Sum of ranks
1	50	5401	50	5776	50	5334	50	5525
2	48	4474	48	4952	48	5341	48	5295
3	49	4989	49	4709	49	4906	48	4395
4	50	4639	50	4066	50	3922	50	4091
Z	-1.04		-3.04		-2.65		-2.91	
Prob > |z|	0.29 9		0.00 2		0.00 8		0.00 4	

Note: H0: there is no trend in the distribution of indebtedness increments over quartiles of starting (2005) indebtedness distribution; score is equal to the number of corresponding quartile; Cuzik test procedure.

Source: AJPES, 2011; own calculations.

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[23] Generalized Wilcoxon rank-sum test, constructed by Cuzick, is used (see, Cuzick, 1985). Test statistics is approximately normally distributed.

Therefore, it is necessary to answer the heuristic question: How much does the probability distribution of the debt dynamics (increment in debt per unit of total balance sheet sum) in the current year depend on the debt dynamics (of the same company) in the previous year? In Table 10 the test results are presented for the sub-hypothesis that current year probability distributions of the debt dynamics (increment in debt per unit of total balance sheet sum) for four quartile segments of the companies do not differ (in sub chapter 3.3 the same conjecture is stated in hypotheses H10 and H11). Segments of companies are defined with four quartiles of the debt dynamics distribution in the previous year.[24] Heuristically speaking, the tested sub-hypothesis claims that distribution of the debt dynamics has "random walk" characteristics (it is non Markovian) – It does not depend on the distribution of debt dynamics in the previous year.

Table 10: Transmission of the Debt Dynamics Distribution; Effect of the Starting Debt dynamics

Quartiles of debt dynamics distribution in the previous year	2007		2008		2009	
	N	Rank sum	N	Rank sum	N	Rank sum
1	49	5042.5	50	5707	50	4476
2	50	4457.5	50	4291	52	5692
3	49	5005	51	5313	49	4697
4	53	5796	52	5395	51	5638
chi-squared	3.241 with 3 d.f.		6.044 with 3 d.f.		4.743 with 3 d.f.	
Probability	0.3559		0.1095		0.1916	

Note: H0: distributions of debt dynamics in current year do not differ between companies from different quartiles of the debt dynamics distribution in the previous year; Kruskal – Wallis test procedure.

Source: AJPES, 2011; own calculations.

Table 11: Transmission of the Debt Dynamics Distribution; Effect of the Starting Debt Level

Quartiles of the indebtedness distribution in previous year	2006		2007		2008		2009	
	N	Sum of ranks	N	Sum of ranks	N	Sum of ranks	N	Sum of ranks
1	49	4637	50	5437.5	50	4621	50	6026
2	49	4224	51	5226	51	6055	52	5491
3	50	5514	50	4792.5	51	5276	50	4309
4	49	5128	50	4845	51	4754	50	4677
Z	-1.49		-1.15		-0.37		-2.72	
Prob > |z|	0.136		0.251		0.713		0.007	

Note: H0: there is no trend in the debt dynamics distribution over quartiles of the indebtedness distribution in the previous year; score is equal to the number of corresponding quartile; Cuzik test procedure.

Source: AJPES (2011), own calculations

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[24] Results of Kruskal-Wallis test are given; corresponding test statistics is distributed according to χ^2 (N-1), where N is number of distributions compared.

The presented test values are not significant for any year in the period 2007-2009, even at significance of 0.1. Empirical evidence, therefore, shows that probability distribution of the debt dynamics in the current year does not depend on the debt dynamics (of the same company) in the previous year.

It could be documented that "random walk" characterizes the studied debt accumulation process even more profoundly. Not only the increment (dynamics) of debt but also the level of debt in the previous year doesn't have any effect on the increment (dynamics) of debt in the current year. In the sub chapter 3.3 this stylized conjecture is stated as hypothesis H11. If the economic system had been endogenously self-correcting, negative feedback effect would have been expected (at least banks would have had to take into account the indebtedness level of clients). Corresponding evidence is presented in the Table 11, where trend wise effect of the indebtedness level (at the end of the previous year) on the debt dynamics distribution in the current year is tested. Obviously, for the period of debt accumulation, sub-hypothesis of no trend effect couldn't be rejected for any year. This confirms the hypothesis H11. Moreover, only in 2009 when the process of debt accumulation was exogenously interrupted by the crisis, the negative feedback effect on the debt dynamics distribution is observable. Exogenous interruption (predominantly drop in value of collateral) forces highly leveraged companies to decrease their financial debt more, which also confirms hypothesis H12.

Such a lack of persistency in (and such a high flexibility of) dynamics of the debt accumulation process in the booming years 2006–2008 documents high endogenous instability of the process of debt accumulation. That means only macro policy measures could and had to tame the process.

3.5.4   OWNERSHIP EFFECTS ON EVOLUTION OF DEBT ACCUMULATION

Incentive for controlling and effectively controlling a company's behavior in the process of debt accumulation could considerably depend on the company's ownership and organizational structure. In analyzing possible effects of ownership on the distribution of debt dynamics, four groups of ownership are explicitly studied: a group of companies with stable ownership (dispersed ownership, big owners and cap ownership), unstable ownership (of financial holdings or MBO's), state ownership, and foreign ownership.

Ownership groups of companies could have different debt accumulation process if their owners behave differently or if they coincide with specific (technological) sectors (equation (3) effects). The first effect was stated as a hypothesis H7 in sub chapter 3.3. Theory based conjecture was made that companies with unstable ownership have the fastest dynamics of debt accumulation per unit of balance sheet. Theoretically investments of companies from unstable ownership group are steered (by their owners) according to the highest sectoral expected discounted return and, therefore, the debt increment would have to be (equation (3)) also the largest per unit of invested net worth (capital) among ownership groups. In boom years, however, because of synchronization of sector dynamics, this effect could disappear

altogether, as I already noticed when studying ownership effects in the model of debt accumulation process.

In Figure 2 the evolution of the debt dynamics distribution is illustrated for different groups of ownership in the debt accumulation period 2006–2009. The approach, similar to that applied in constructing Wilcoxon statistics, is used to encompass possible modification (in position or asymmetry) of the debt dynamics distribution, relative to the ownership and/or organizational structure. For every year and ownership group, an average value of the companies' debt dynamics ranks (in distribution of the debt dynamics for whole sample of analyzed companies) is given.

Figure 2: Ownership Effects on the Distribution of Debt Dynamics
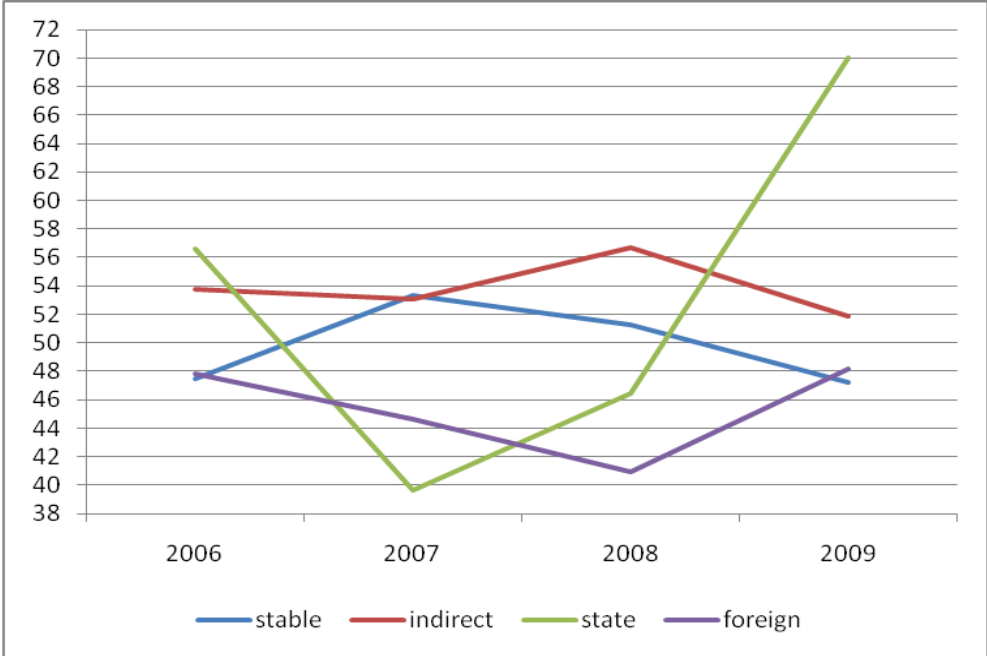
Note: Average rank in the ownership group; ranks are calculated for all companies in specific year and presented in centiles.

Source: AJPES, 2011; own calculations.

Effects of the ownership (organization) was the smallest in 2006, when the effect of the ownership on modification of the debt dynamics distribution was less than 8 centiles of the debt dynamics distribution of all companies. In booming years, 2007–2008, the ownership effect on distribution of the debt dynamics increased to only around one decile and half of total distribution of companies. It means that in years when debt dynamics in the economy was the highest, in every ownership group at least 70% of companies had the same dynamics of debt accumulation no matter the ownership structure.

In companies with unstable ownership, distribution of the debt dynamics in boom years 2007 and 2008 was modified (translated, asymmetric) toward higher values the most. Nevertheless,

in both years only 15% of companies with unstable ownership had faster debt accumulation process than state owned or foreign companies, which had the slowest debt accumulation process in the years 2007 and 2008.

Whether modification (translation, asymmetry) of the debt dynamics distribution, illustrated in Figure 2, is also statistically significant, is tested in Table 12, for all years of the analyzed period 2006–2009. The tested sub-hypothesis claims that there is no trend in the debt dynamics distribution over ownership structure, that is, debt dynamics distributions for segments of companies with different ownership structure are not trend wise modifications of the debt dynamics distribution.[25]

Table 12: Trend in Ownership Effects on Distribution of Debt Dynamics

2006	Average rank	Score	N.	Sum of ranks
Stable	47.5	475	65	6085
Foreign	47.8	478	53	4996
Unstable	53.8	538	69	6258
State	56.6	566	10	1115
Z	1.56			
Prob > |z|	0.118			
2007	**Average rank**	**Score**	**N.**	**Sum of ranks**
State	39.4	396	10	792.5
Foreign	44.6	446	53	4729
Unstable	53.1	531	70	7432.5
Stable	53.3	533	67	7146
Z	2.19			
Prob > |z|	0.029			
2008	**Average rank**	**Score**	**N.**	**Sum of ranks**
Foreign	41.0	410	53	4385
State	46.5	465	10	939
Stable	51.3	513	67	6938
Unstable	56.7	567	72	8241
Z	3.04			
Prob > |z|	0.002			
2009	**Average rank**	**Score**	**N.**	**Sum of ranks**
Stable	47.2	472	67	6362
Foreign	48.2	482	53	5135
Unstable	51.8	518	71	7396
State	70.0	700	10	1408
Z	2.43			
Prob > |z|	0.015			

Note: H0: there is no trend in distributions of debt dynamics for ownership groups ordered by average company rank; in the Cuzik test procedure, score values are equal to the average company rank, calculated for specific ownership group and year and given in centiles.
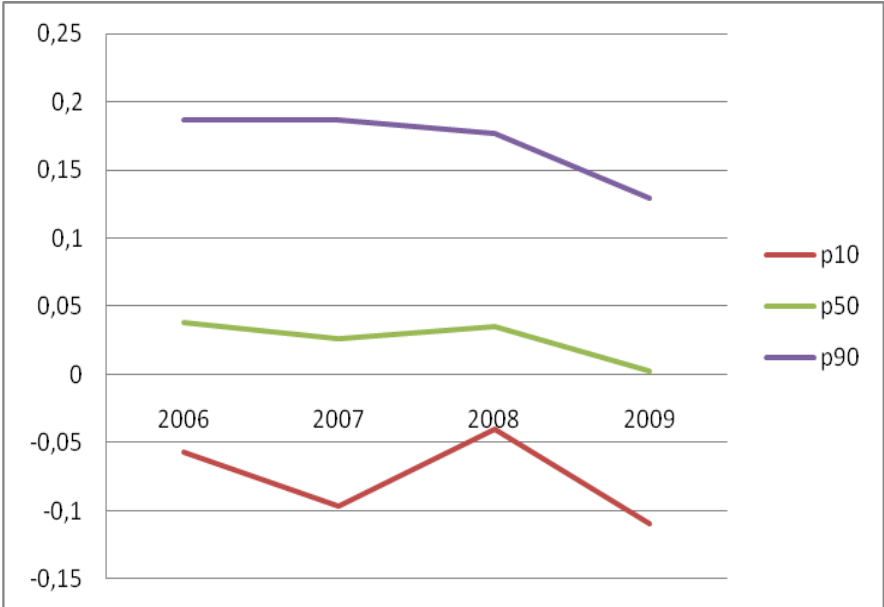
Source: AJPES, 2011; own calculations.

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[25] Generalized Wilcoxon rank-sum test, constructed by Cuzick, is used. Test statistics is approximately normally distributed. For every year separately, scores for ownership groups are defined by the values presented on the Figure 3 (average rank values).

Results in Table 12 document that sub-hypothesis of no trend can be rejected for any year 2007-2009, at less than 0.05 significance. Only in 2006 are ownership specific distributions of the debt dynamics not statistically discernible. These results confirm the hypothesis H7 only partly. Ownership and\or organizational structure discernibly (statistical significantly) influenced the debt dynamics. But only foreign and unstable ownership have systematical effect on debt accumulation process; the first has the lowest and the last the highest effect. However, empirical evidence is not strong due to the fact that effects were only statistically significant on the short term (per single year), but not in the total debt buildup cycle.

3.5.5   EVOLUTION OF THE DEBT DRIVER DISTRIBUTION

As already mentioned, potential drivers of the debt accumulation process could be aggregated in three drivers: core activity, financial investments, and portfolio real estate investments. Their dynamics is illustrated in Figure 3, Figure 4 and Figure 5. The trajectory of the first, fifth, and last decile are presented for every debt driver.

Figure 3: Dynamics of the Core Activity Impulses

Note: Core activity impulse is defined as an increment in inventories plus investments in equipment and machinery less balance of income statement, and divided by the total balance sheet sum.

Source: AJPES, 2011; own calculations.

Figure 4: Dynamics of the Portfolio Real Estate Investments Impulses
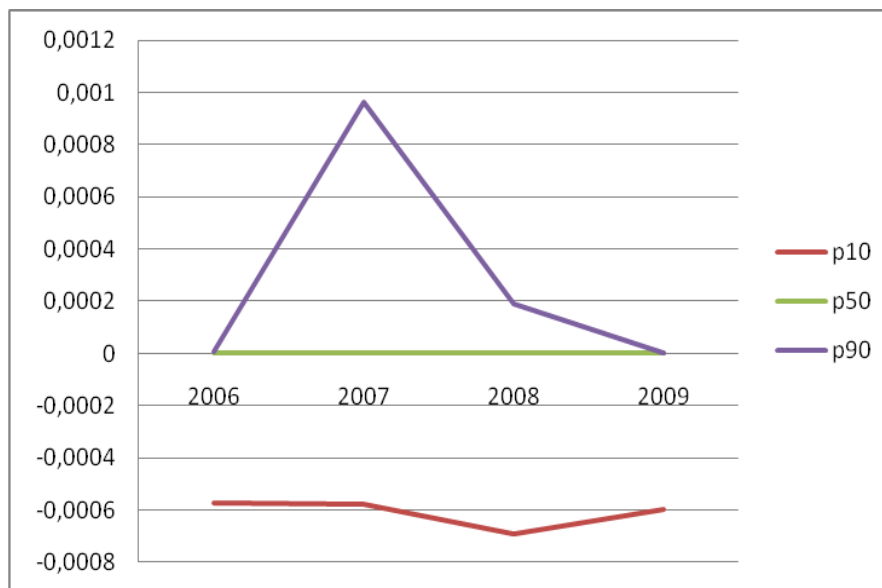
Note: Increment in the portfolio real estate investments per unit of the total balance sheet sum.

Source: AJPES, 2011; own calculations.

Figure 5: Dynamics of the Investments in Financial Assets Impulses
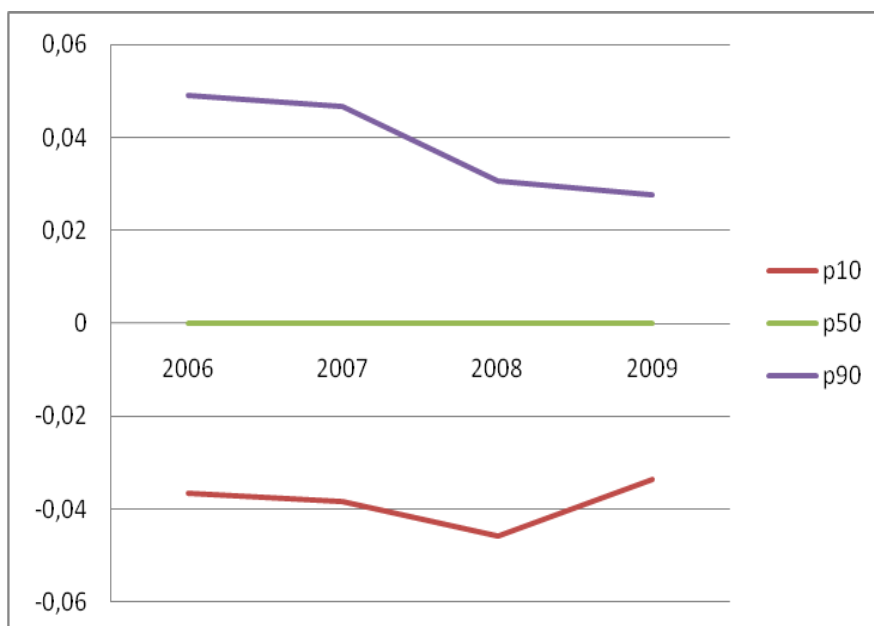
Note: Increment in the financial investments per unit of the total balance sheet sum.

Source: AJPES, 2011; own calculations.

Dynamics of the core activity impulses to debt is presented in Figure 3. Impulses to debt increment from core activity (defined as an increment in inventories plus investments in fixed assets less profit/loss, and divided by the total balance sheet sum) were strong in the period 2006–2008, and much weaker in 2009. In the years of overheating, core activity impulses to

(additional) financing needs attained at least 4% of the total balance sheet sum per year. In 2009, when the crisis erupted, core activity impulses to debt accumulation fell significantly, and core activity effects of median companies dropped to zero.

Differences between the debt impulses of the core activity of companies in the highest and lowest deciles were considerable. In booming years, yearly increment in core activity impulses attained almost 20% of the total balance sheet sum in the highest decile, and even -5% in the lowest decile. Obviously, the financing needs generated by core activity of companies in the first deciles of (core activity impulses) distribution were even falling in the period of economy overheating.

Dynamics of company distribution for portfolio real estate and financial investments are documented in Figure 4 and Figure 5.

Portfolio real estate investments impulses to debt were significantly lower than impulses from investments in financial assets in the studied period. While core activity impulses drove debt increments up with almost the same intensity during the entire period 2006–2008, impulses to debt from financial and portfolio real estate investments were much shorter and concentrated only on the small part (the highest and lowest decile) of company's distribution; their combined impulse attained its peak in 2007. However, debt effects of both (portfolio real estate and financial investments) debt drivers were negligible for companies near median in the entire analyzed period

The debt impulse of portfolio investments in real estate was the largest in 2007, but it was truly important for less than 10% of companies. The size of investments in the financial assets impulse to debt attained the highest values in years 2006–2007, when companies from the last decile every year invested in financial assets almost 5% of the total balance sheet sum. Still, it is necessary to reiterate that investments in financial assets, like portfolio investments in real estate, had important impulse to debt only for companies at the margins of distribution, and for companies near the median it had negligible effect for the process of debt accumulation. This makes the H8 hypothesis less pursuing.

3.6 CONCLUSIONS

The "policy vacuum" in the boom-bust (2005–2010) period in Slovenia revealed not only the impotence of regulation and institutional setup to prevent disastrous effects of the external shocks, but also the existence of the endogenous mechanism which considerably amplified effects of the external shocks on economic performances. It was the mechanism of financial accelerator, which endogenously drove the amplification and propagation of the process of company's debt accumulation, triggered by external shocks. In part of dissertation this mechanism is specified and empirically tested.

To study the financial accelerator mechanism, the theoretical model of Bernanke et al. (1999) is enriched to enable tracking financing specificities of different kinds of investment projects

and groups of companies, crucial for studying the Slovenian boom-bust episode. Among investment projects the modified model explicitly distinguishes investments in the core activities and (portfolio) investments in the long term financial and real estate assets. The groups of companies, disentangled by the model, are aggregated according to their technological, ownership and organizational characteristics.

Empirical tests carried out on all companies, with over 100 employees in the manufacturing sector in Slovenia in the period 2006–2009 suggest that in the boom (2005–2008) period companies have substantially increased (doubled) their financial debt, which was intended for financing both core and non-core business activities. While investments in core business activities were by far the most important drivers of the increasing financial debt of companies throughout the observed period, company's indebtedness was also strongly influenced by long term financial (portfolio) investments. However, the effects of the investments in real estate assets were much smaller, but not negligible.

Financial accelerator was crucial segment of the debt amplification and propagation mechanism, while expected discounted capital return was the main determinant of its power. Because the stock market was growing through the whole boom period and the real property market peaked just before the global crisis erupted, expected discounted capital returns were also increasing the power of financial accelerator in the whole boom period, without interruption.

Through the analysis I also found that companies' financial debt was increasing almost uniformly across the distribution of companies. A hypothetic individual company was quickly changing its relative position in the process of (company's) financial debt accumulation. In the observed period, I could thus identify relatively rapid transition of companies from one segment of indebtedness to another, whilst total indebtedness of all observed companies has been increasing uniformly.

The indebtedness process of individual companies proceeded in a random walk manner: every year the increase in debt didn't depend neither on the stock nor the increment of the debt in the previous year. Both, a lack of persistency and a high flexibility of dynamics of the (individual company) debt accumulation process document the high endogenous instability, even explosion proneness, of the process of debt accumulation.

Finally, companies with "unstable" ownership increased their financial debt more than companies with "stable" ownership, foreign owned companies and companies in state ownership. To accelerate ownership consolidation, while using higher potential leverage in the boom period, those companies invested in portfolio assets and core activities much more aggressively and broadly (across all sectors of the economy) than companies from other groups, which invested mainly in the core activities and in the sector they belong.

Overall, my findings indicate that, in the absence of the robust macroeconomic equilibrium, endogenously amplified and propagated external shocks could bring into the economy

distortions and misallocations of resources which could not be controlled (mitigated) by endogenous (systemic) self-regulation or at least not with tolerable macroeconomic costs. In an open economy such as Slovenia this is a key lesson of the centennial boom-bust episode.

4 COLLATERALIZATION AND CONTAGION AS CRISIS AMPLIFICATION MECHANISMS IN SLOVENIA[26]

4.1 INTRODUCTION

While in Europe the prevailing policy is austerity, other parts of the world are increasingly concerned about whether or not austerity will in fact become a major obstacle to global economic recovery. Particularly affected by poor post-crisis results and strict austerity measures are the so-called PIIGS countries.

In this part of dissertation I build on the study of Bole et al. (2012a) which shows that in Slovenia the "policy vacuum" in the boom-bust period (2005–2011) revealed not only the impotence of regulation and institutional setup to prevent disastrous effects of the external shocks, but also existence of the endogenous mechanism which even considerably amplified the effects of the external shocks on economic performance. It was the mechanism of the financial accelerator, which endogenously drove the amplification and propagation of the process of companies' debt accumulation, triggered by external shocks.

I examine the role of collateral as an amplification mechanism in times of balance sheet crisis in Slovenia. The importance of credit insurance thus increases in times of crisis, because commercial banks lose information capital on the functioning of companies. If in such circumstances, banks ration credits to companies and enforce either non-selective deleveraging or higher collateral for credits, their contribution to the reduction of the volume of credits could be significant.

I show that banks' deleveraging on the foreign wholesale markets and central bank's enforced banks capital adequacy increase in very short period drastically squeezed credit support to the Slovenian economy. This credit squeeze was implemented through the increased collateralization and rationing of credits. It jeopardized even the normal deleveraging of companies not to mention rolling over credits. I identify which segments of companies are the most endangered because of quickly increasing collateralization of credits. However, this is not the end of the story. By endangering companies with higher collateralization, these companies subsequently inflict other companies – their suppliers. I, therefore, also demonstrate the mechanism of illiquidity contagion.

I claim that a reduction in bank loans to companies stifled the fragile recovery in Slovenia in 2010. In addition, I affirm that external factors seriously deteriorate economic performances, but fatal contribution to disastrous performance of the Slovenian economy after crisis eruption was made by credit enforced credit squeeze and illiquidity contagion. However, accelerating credit collateralization and rationing haven't been the only change in banks' policy that considerably enhanced the crisis impact. By taking a passive role, banks have been further aggravating the crisis effects in Slovenia. They are focusing on transactional banking instead

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[26] This chapter of the dissertation has been presented as working paper on several conferences and is pending for publication as Bole, Prašnikar and Trobec (2012b).

of actively participating in the restructuring of companies and developing relationship banking.

The chapter proceeds as follows: the next section briefly describes the theoretical framework; the third section presents the results of the empirical analysis; and the last section captures our concluding remarks.

4.2   THE THEORETICAL ILLUSTRATION

In explaining the role of collateral in amplification mechanism of the crisis in Slovenia, I am relying on the balance sheet model of Miller and Stiglitz (2010)[27] where productive small businesses borrow from wealth-owners with deep pockets. Debts are secured by collateral but the collateral requirements generate significant externalities because they increase persistency of aggregate shocks. The reason for collateral constraint is repudiation risk: the idiosyncratic skill of small businesses entrepreneurs is non-contractible and cannot be taken over by the creditor in payment of debt. Non-contractibility imposes limits on borrowing and debt contracts secured by land used as collateral. This puts a strict upper limit on the amount of external finance that can be raised: so the rate of expansion of small businesses is determined not by their inherent earning power but by their ability to acquire collateral.

Suppose the stable equilibrium. If there is news of a potential technological improvement for small businesses, which promises higher productivity, and a greater share of resources for that sector, with corresponding favorable expectations, the asset price would jump on the news and investments in prospective new projects would start. However, since all businesses would be doing the same thing the price of land would increase, raising borrower net worth and allowing further acquisitions. The mechanism of the well-known financial accelerator therefore takes place.[28] Moreover, in the absence of fresh shocks, the system will gradually return to equilibrium along a stable path. But what if in the period t-1, at maximum asset prices and favorable expectations for the next period, the negative external shock struck the economy?

Miller and Stiglitz (2010) showed that small businesses would face a nasty shock, as asset prices fall and therefore so do corresponding items in their balance sheets because of mark-to-market valuation. By assumption, they had borrowed in previous period expecting a higher price, so they would be loaded-up with nominally increased debt while anticipated price increase didn't take place, so they are unable to service the debt. Besides, the price of land would also fall, so businesses would be short of collateral. Liquidation not acquisition will now be their mantra as they try to pay down their debt. The fire sales will add to the downward pressure on land prices as the financial accelerator actually goes into reverse. There will, effectively, be an increased demand for liquidity. The asset price correction may

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[27] Miller and Stiglitz (2010) based their model on Kiyotaki and Moore (1997). Similar models are developed by Krisnamurthi (2011) and Miller and Zhank (2011).

[28] Bernanke et al. (1999).

in actuality overshot. In fact, highly leveraged borrowers can very easily become insolvent. If for example their net worth was only 5% of assets held as collateral for loans, a correction of asset prices in excess of this would be enough to wipe out their net worth – even before fire-sales begin.

What parallels can be drawn between this model and Slovenia? The boom-bust period (2005–2011) in Slovenia coincided with the country entering the EU and ERMII mechanism, and later also the European monetary union. In the period of booming world economy it implemented nominal landing into ERMII and the euro area almost in a monetary policy vacuum, with falling nominal interest rate, falling sovereign risk premium and stable exchange rate. The stance of fiscal policy was formally neutral, it ran negligible deficits. Still, the fiscal policy was far too complacent for the economy not having control over the monetary policy. Although developed market economic institutions, including developed (cyclically not adjustable) system of (banking, capital market and market structure) regulation were implemented already by entering EU. They were neither willing nor able to prevent disastrous consequences of complacent fiscal policy and far too lax monetary policy. The fast and complete freeing of the (foreign) financial flows to accelerate the real landing process (implemented mainly through final phase of privatization and acquisition) was the cliché of the day.

It is the financial accelerator mechanism that endogenously drives the amplification and propagation of the process of a company's debt accumulation, triggered by described exogenously determined landing process. The financial accelerator was a crucial segment of the debt amplification and propagation mechanism, while expected discounted capital return was the main determinant of its power. Because the stock market was accelerating through the whole boom period and the real property market peaked just before the global crisis erupted, expected discounted capital returns were also increasing the power of the financial accelerator in the whole boom period, without interruption (Bole et al., 2012a).

This period was marked by free access of banks (and other economic units) to external resources. Banks actually had the same role as financial "deep pocket" investors have in the described Miller-Stiglitz model. Rocketing credit supply occurred due to abundant (external) loanable resources, the "policy vacuum" and absent regulators' activity after entering EU, when real economy and assets prices were booming. Competition of new banks entering the market to carve out high enough market share fueled further oversupply of cheap credit, and so did also the compensation schemes for top management, which pushed banks towards increased lending activities at dumping prices. Collateralization of credits was low, besides available collaterals were abundant because of fast increasing of asset prices. The usual collateral for fixed capital investments credits was real estate. When the global crisis emerged, the endogenous processes were interrupted by exogenous shocks. At this point banks were unable to get additional funds on the interbank market and therefore companies could not get additional credits from banks ("sudden stop" effect). As asset prices dropped, banks also increased collateral requirements. Due to the free fall of the stock market, real estate was

preferred collateral type. From here on, the story flows according to predictions of Miller and Stiglitz (2010). Only that regulator's requirements significantly amplified the process of credit collateralization and enforced deleveraging of companies. The initial economic recovery in the first half of 2010 was substantially curbed by sudden (six month period) and large increase in capital requirements the regulator (central bank) put on the commercial banks. Instead of taking an active role in the rehabilitation process of the companies with positive cash flow from current activities and using Chapter 11 procedures for insolvent companies, banks resorted to increasingly higher rationing of credits and accelerated deleveraging of companies to increase capital in required very short period.[29]

In what follows I firstly show the role of collateral in the prolonging of the crisis in Slovenian companies. Secondly I describe the mechanism of illiquidity contagion through which insufficient credit support spread also to other (solvent and liquid) companies.

4.3 AFTERSHOCK PERFORMANCE OF SLOVENIAN COMPANIES IN THE MANUFACTURING AND SERVICE INDUSTRIES

4.3.1 A CREDIT-BASED AMPLIFICATION MECHANISM – EVIDENCE FROM SLOVENIA

The crisis triggered real estate prices to drop by approximately 15% in Slovenia, which decreased the value of collateral used by companies and, therefore, stopped automatic credit renewal. Additionally, increased uncertainty about future development in the economic environment drastically cut the information capital of banks (their capability to estimate the future solvency of their client companies). To offset reductions in information capital, banks considerably increased the necessary collateral coverage of their client companies – banks completely switched their credit policies from a "mark-to-market" approach to a "mark-to-risk" approach. To offset reductions in information capital, banks not only began increasing the necessary collateral coverage, but also considerably enhanced credit rationing (of appropriately collateralized credit).

Such additional strengthening of the financial accelerator is illustrated in Figure 6 and Figure 7. In Figure 6, credit coverage and rationing are presented for the observed boom–bust period (2006–2011). The data set was extracted from 2011/2012 survey conducted on the largest Slovenian companies in the manufacturing and services industry (number of employees above 100). I collected data for 200 manufacturing companies and 141 services companies. The figures presented roughly correspond to similar figures on credit supply in Slovenia from other sources.[30]

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[29] According to ECFIN data, Slovenia is one of the European countries that decreased transmission of bank credits the most.

[30] Figures for 2010, for example, show approximately the same under-supply of credit as figures for credit rationing prepared by ECFIN and figures for collateral coverage available from the Bank of Slovenia. See, for example, BS (2011).

Figure 6: Collateral coverage and rationing
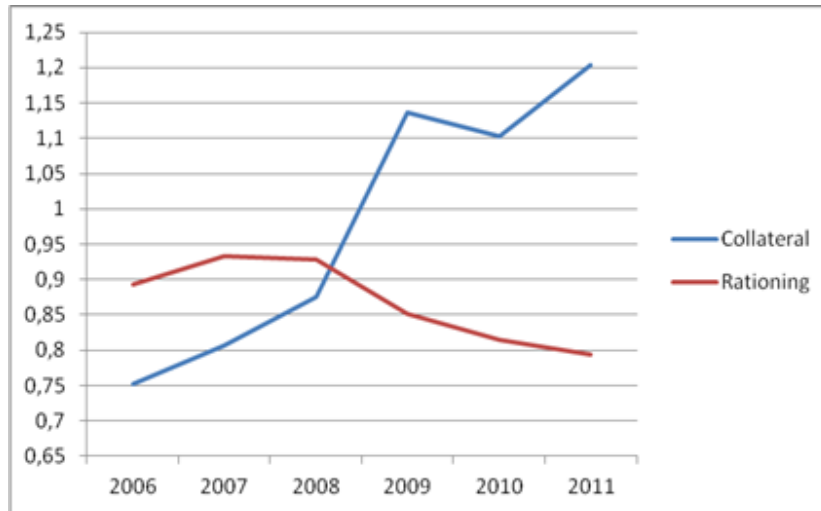
Note: Collateral coverage is defined as collateral per unit of credit; rationing is defined as a share of approved credit in total (appropriately collateralized but not saturated) credit volume demanded

Source: Survey of companies with over 100 employees; own calculations.

Figure 7: Distribution of collateral coverage
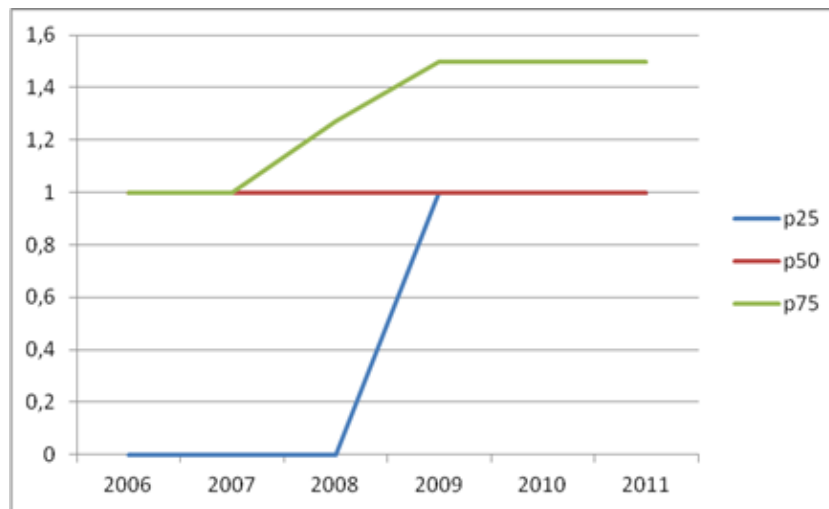
Note: Quartiles of companies for collateral coverage distribution

Source: Survey of companies with over 100 employees; AJPES; own calculations.

Figure 6 documents that collateral coverage accelerated its growth after 2006, and especially after the eruption of the crisis. In the period 2008-2011, average collateral coverage increased from 0.87 to 1.2. The credit squeeze was not implemented only through an increase in collateral coverage, but also through direct credit rationing, which increased in the same period 2008–2011 by almost 15%age points.[31] Considerable increases in collateral coverage and credit rationing resulted in a drastic drop in credit growth and, therefore, squeezed the

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[31] Share of non rationed credits fell from 0.94 to 0.79.

liquidity out of companies. This consequentially resulted in an additional drop in economic activity during the very time that the crisis erupted.[32]

Figure 7 illustrates the dynamics of changes in collateral coverage distribution in the 2006–2011 period. In the boom years, obviously, the distribution of collateral coverage was strongly asymmetric to the left. In 2007, for example, a significant part of companies had very low or even negligible collateral coverage, while median collateral coverage was already 1. It took only two years for the lower quartile of collateral coverage to increase from practically 0 to 1. Immediately after the crisis eruption, collateral coverage increased mainly for companies below median collateral coverage.

Figure 8 (below) documents how collateral increases and credit rationing amplified the credit cut and illiquidity drop caused by the crisis in 2009. In Figure 8, a linear curve is fitted to illustrate the dependence of cash flow in the current year on collateral in the previous year for the same company for 2008, 2009 and 2010 respectively.

The fitted linear dependence of cash flow on lagged collateral for 2008 and 2010 has a heuristically expected slope (sign). In the period when expectations lagged behind economy improvement, higher collateral enables better credit conditions and especially decreases potential credit rationing. Hence, higher (or at least unchanged) cash flow per unit of the balance sheet could be expected for companies using higher collateral to secure the credit. Such was the situation in 2008 before the crisis erupted, and in 2010 when recovery already started. But at the beginning of 2009 the credit and price (of collateral) bubble burst, so actual performance of the economy significantly lagged behind the expectations, that pushed cash flow down further in companies with higher collateral coverage (collateral per unit of credit).[33] This amplified the direct impact of the crisis. The adverse effect of the collateralization of credits during this time of shock is documented by the fitted curve for year 2009 in Figure 8. The slope is negative and considerably steeper than in 2008 and 2010. Figure 8 shows that the 2009 crisis impact on the cash flow of companies without collateralized debt was half of the crisis effect on the cash flow of companies with highly collateralized debt (with collateral coverage over 2).

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[32] The growth of credit to the business sector dropped from 29% in June 2008 to 18% in December 2008, 1% in December 2009, 0% in December 2010 and -3.5% in December 2011. See, for example, Bole (2009) and Bole, et al. (2012a).

[33] See, for example, Edison et al. (2000).

Figure 8: Cash flow and the size of collateral in the previous year
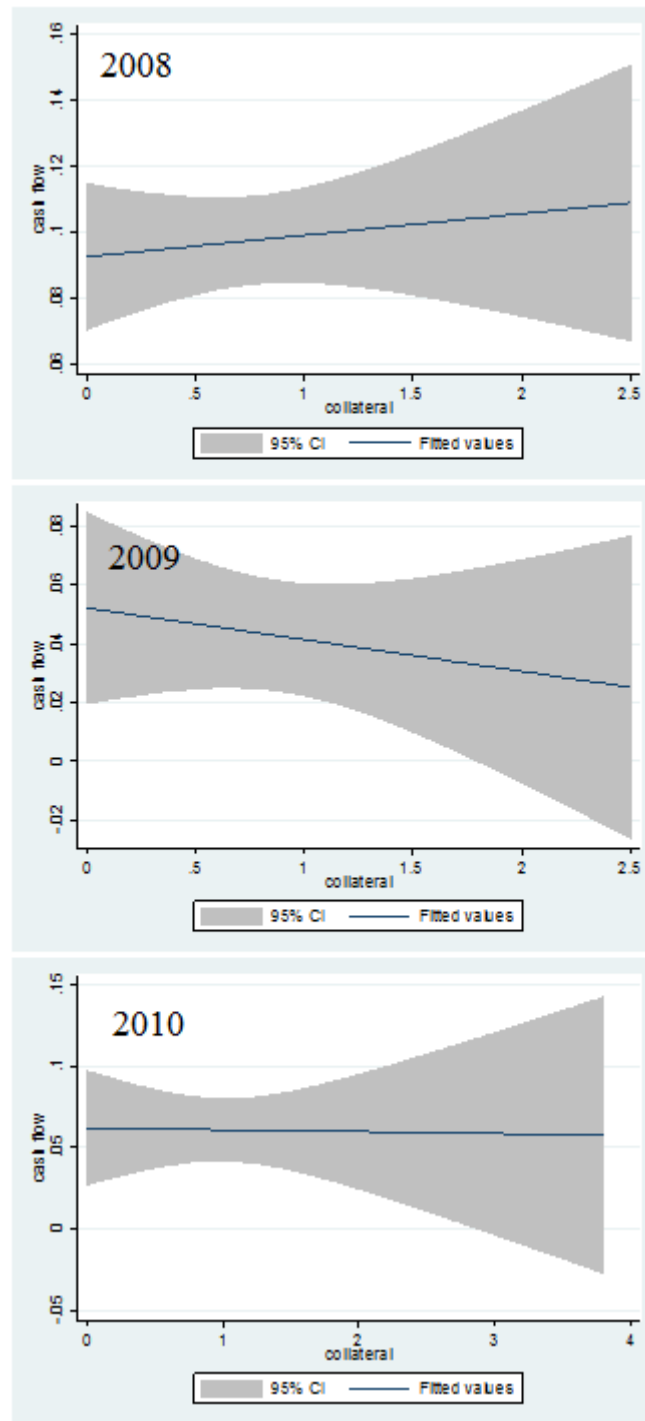
Note: Cash flow per unit of balance sheet sum; collateral per unit of credit; 95% confidence region is in grey color.

Source: Survey of companies with over 100 employees; own calculations.

4.3.2   RECOVERY ENDANGERED SEGMENT OF COMPANIES

To document also possible size and sectoral specific effects of the collateral amplification credit crunch mechanism, I will be using the AJPES database of all companies. I decided to separately analyze the manufacturing and service sectors. In the first there are all companies with economic activities in section C of NACE Rev. 2. The service sector consists of companies from the semi-tradable sector (companies that are oriented towards their domestic market, but also have some operations in foreign markets), as defined by sections G, H, I, L68, and N79[34], and companies from the non-tradable sector (companies operating mainly in their domestic market) as defined by section D, E, and J[35] of NACE Rev. 2.

In Figure 9 I show that by 2010, cash flow (from current business) of median companies has stabilized in the manufacturing sector, and cash flow performance in larger companies (with employment over 100) has already started to improve. Slow improvement in the cash flow of smaller companies followed with a one year lag. Figure 10 demonstrates that in the service sector, median companies have also succeeded in preventing further deterioration in cash flow by 2010. However, improvement in cash flow of larger service-oriented companies did not become visible before 2011, while smaller service companies still have not seen a pick up in cash flows. Although cash flow has now stabilized for median companies in all size segments of manufacturing and services companies, the "crisis" did cause a severe drop in the level of cash flow in 2009 which have remained mostly unchanged. In 2011, two years after the crisis erupted, cash flow of median companies in manufacturing and services sectors was still approximately only 60% of the size of cash flow prevailing before the crisis.

To detect segments of companies that could face potential solvency collapse in the continuation of the deleveraging process, on the Table 13 a trajectory of debt, cash flow and potential "fixed" collateral is presented for the period 2007-2011.[36] Figures are given for the entire economy, the manufacturing sector and service sectors for three quartiles of companies distribution: first-lower quartile (25%ile), median (50%ile), and third-upper quartile (25%ile).

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[34] Included are following activities: wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities, real estate activities, travel agency, tour operator reservation service, and related activities.
[35] Included are following services producing activities: electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities, and information and communication.
[36] "Fixed" collateral includes land, buildings, and machinery owned by companies.

Figure 9: Cash flow per unit of balance sheet sum by groups of companies in the manufacturing sector (median)
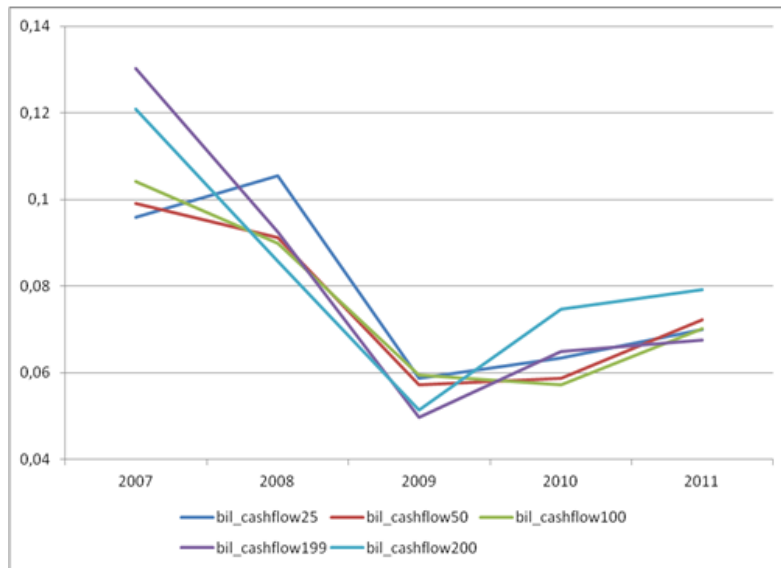
Note: Median values for manufacturing companies; cash flow per unit of balance sheet sum; indicated segments of companies are as follows: 25 – companies with less than 25 employees, 50 – companies with 25-50 employees, 100 – companies with 50-100 employees, 199 – companies with 100-200 employees and 200 – companies with more than 200 employees

Source: AJPES, 2012; own calculations.

Figure 10: Cash flow per unit of balance sheet sum by groups of companies in the service sector (median)
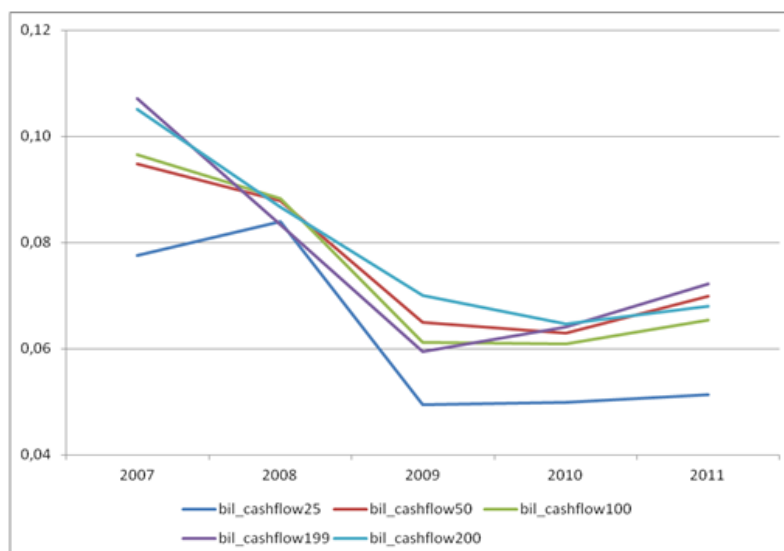
Note: Median values for companies in the service sector; cash flow per unit of balance sheet sum; indicated segments of companies are as follows: 25 – companies with less than 25 employees, 50 – companies with 25-50 employees, 100 – companies with 50-100 employees, 199 – companies with 100-200 employees and 200 – companies with more than 200 employees.

Source: AJPES, 2012; own calculations.

Table 13: Financial debt, cash flow and potential collateral

Whole economy

Financial debt

	2007	2008	2009	2010	2011
N	32172	31078	32232	33259	33374
p25	0.000	0.000	0.000	0.000	0.000
p50	0.108	0.140	0.155	0.154	0.150
p75	0.353	0.400	0.422	0.427	0.423

Cash flow

	2007	2008	2009	2010	2011
N	32172	31078	32232	33259	33374
p25	0.019	0.022	-0.015	-0.015	-0.007
p50	0.083	0.090	0.052	0.053	0.055
p75	0.178	0.181	0.129	0.129	0.133

Collateral

	2007	2008	2009	2010	2011
N	32172	31078	32232	33259	33374
p25	0.000	0.000	0.000	0.000	0.000
p50	0.000	0.000	0.000	0.000	0.000
p75	0.210	0.229	0.231	0.223	0.220

Manufacturing sector

Financial debt

	2007	2008	2009	2010	2011
N	4973	4857	4896	4920	4929
p25	0.000	0.014	0.022	0.022	0.021
p50	0.153	0.194	0.218	0.212	0.209
p75	0.357	0.408	0.433	0.441	0.431

Cash flow

	2007	2008	2009	2010	2011
N	4973	4857	4896	4920	4929
p25	0.037	0.040	-0.005	0.009	0.018
p50	0.099	0.102	0.057	0.064	0.071
p75	0.181	0.178	0.122	0.131	0.137

Collateral

	2007	2008	2009	2010	2011
N	4973	4857	4896	4920	4929
p25	0.000	0.000	0.000	0.000	0.000
p50	0.013	0.065	0.052	0.052	0.053
p75	0.279	0.300	0.313	0.311	0.325

Service sector

Financial debt

	2007	2008	2009	2010	2011
N	24825	20552	21401	22116	22213
p25	0.000	0.000	0.000	0.000	0.000
p50	0.098	0.133	0.146	0.144	0.141
p75	0.347	0.408	0.428	0.431	0.428

Cash flow

	2007	2008	2009	2010	2011
N	24825	20552	21401	22116	22213
p25	0.016	0.018	-0.015	-0.015	-0.010
p50	0.079	0.085	0.051	0.052	0.053
p75	0.177	0.180	0.130	0.128	0.131

Collateral

	2007	2008	2009	2010	2011
N	24825	20552	21401	22116	22213
p25	0.000	0.000	0.000	0.000	0.000
p50	0.000	0.000	0.000	0.000	0.000
p75	0.173	0.216	0.219	0.209	0.200

Note: In units of the balance sheet sum; "fixed" collateral (collateral assets do not include financial assets); quartiles of companies population are calculated for every variable (financial debt, cash flow and collateral) separately

Source: AJPES, 2012; own calculations.

As seen from Table 13, crucial characteristic of the post crisis period is uniform and strong drop in cash flow in 2009, its leveling off in 2010 and mild, in manufacturing companies concentrated, improvement in 2011. The drop in cash flow reached almost 40% of the pre-crisis level for the companies around the median and upper quartile. The crisis caused such a deterioration of cash flow that seriously endangered the solvency of companies in the first quartile of the whole economy and service sector. In both cases, cash flow dropped to negative values in 2009 and remained negative even three years after the crisis eruption. In the manufacturing sector, cash flow of the companies from the first quartile also dropped in negative values in 2009, but recovered to positive values already in 2010.

Fast growth of debt before the crisis leveled off in 2009, in all presented segments of companies. However, the level of debt in the post-crisis period in the manufacturing sector for the median companies has been much (50%) higher than in the service sector. At the same time, highly indebted companies (companies from the third quartile) have the same size of debt in the manufacturing and service sectors.

Available collateral of companies from the service sector is much lower (40%) than collateral of the companies from the manufacturing sector. That is the main factor behind obvious one year lag in cash flow improvement of the service-oriented companies (see Table 13, Figure *9* and Figure 10). However, almost half of companies from both segments had no "fixed" collateral in the studied boom-bust period 2006–2011. These companies are potentially the greatest hurdle for faster recovery of the Slovenian economy. Due to banks' practices of nearly complete collateralization of credit after the 2009 crisis, these companies could not get access to loans independent of the quality of their cash flow performance.

In Table 14 and Table 15, I illustrate that the improvement of the economic performance is completely blocked on a micro level because insufficient credit support of banks stifles the reproduction power of companies' ecosystems. The cash flow migration matrix of companies is documented for the period 2007–2010. It shows how the total population of companies in (current) year T is (cash flow) structured in the following year T+1. Three possible performance segments are observed in T+1 year: first, the segment of companies which are not active any more ("are bankrupt"), second, the segment of companies that have positive cash flow, and third, the segment of companies which have negative cash flow. Table 14 shows the possible outcomes (in year T+1) of companies with positive cash flow in the current (T) year according to their performance. In Table 15 companies with negative cash flow are shown using the same criteria. I classify companies with positive cash flow in year T which migrate to negative cash flow in year T+1 as "collapsing", and companies with negative cash flow in year T which improve their performance to positive cash flow in T+1 as "recovering".

Table 14: Following (T+1) year performance of companies with positive cash flow in current (T) year

T	Performance of company in T+1 year		
	Bankrupt	Cash flow becomes negative	Cash flow stays positive
2007	3.02%	10.58%	62.28%
2008	3.41%	16.82%	54.02%
2009	2.91%	12.12%	50.68%
2010	2.95%	11.88%	51.82%

Note: Performance in the following year (T+1); companies with positive cash flow in current year (T);%ages of total number of companies in current year ; "Bankrupt" are companies which have positive cash flow in current year (T) and are not active any more in the following year (T+1).

Source: AJPES, 2012; own calculations.

Table 15: Following (T+1) year performance of companies with negative cash flow in current (T) year

T	Performance of company in T+1 year		
	Bankrupt	Cash flow becomes positive	Cash flow stays negative
2007	2.33%	10.13%	11.66%
2008	2.85%	8.91%	13.99%
2009	3.83%	12.77%	17.69%
2010	3.80%	12.56%	17.00%

Note: Performance in following year (T+1); companies with negative cahs flow in current year(T); in%ages of total number of companies in current year ; "Bankrupt" are companies which have positive cash flow in current year (T) and are not active any more in the following year (T+1).

Source: AJPES, 2012; own calculations.

It is obvious from Table 14, that crisis drastically deteriorated performance migration of companies. In 2009, for example, almost one quarter of companies, which had had positive cash flow in 2008 (16.8% of all companies) run negative cash flow in 2009 and almost 5% became bankrupt.

Clearly, the first wave of performance migration deterioration hit the economy already in 2008. It is visible from the 2007 rows of Table 14 and Table 15 that already in 2008 percentage of recovering companies was smaller than percentge of collapsing one.

When comparing collapsing and recovering companies (figures in Table 14 vs. Table 15) I see that effects of collapsing companies are far stronger. An increase in the percentage of companies with positive cash flow in the first and a negative cashing flow in the following year can be observed. This increase was much larger than the decrease in the percentage of companies that switched from negative cash flow in current year to positive cash flow in the

following year (observing change from 2007 to 2008). In 2009, the increase in the percentage of collapsing companies was 6.2 percentage points (around 3000 companies), while decrease in the percentage of recovering companies fell only by 1.2 percentage points (around 480 companies).

While a percentage of recovering companies improved (normalized) in one year, a percentage of collapsing companies has been improving (decreasing) slowly. In 2011, still 11.9% of all companies (around 5700 companies) switched from positive (in 2010) to negative (in 2011) cash flow. By 2011, the difference between thev percentage of collapsing and recovering companies almost stabilized. A new equilibrium in the companies' eco systems is achieved. A permanent share of companies with negative cash flow and their bankruptcy rate are almost 50% higher then before the crisis. Insufficient bank crediting to companies obviously prevents the companies' eco systems to recover to its pre-crisis equilibrium.

After the crisis, the new equilibrium was established where over 17% of all companies had a negative cash flow. This segment represents the majority of the first quartile of companies from the manufacturing and service sectors. I therefore focus more in detail on the post-crisis performances of the worst quartile (according to the cash flow performance) of companies in the manufacturing and service sectors. These companies will be called recovery-endangered companies.

4.3.3   ENDANGERED COMPANIES STALLED IN RECOVERY

In Table 16 and Table 17, financial debt, cash flow, and collateral are presented for the worst 25% of companies in cash flow performance. Presented cash flow, financial debt, and collateral are median values for five size segments of companies (from the manufacturing sector and, separately, the service sector) chosen from the lowest quartile in cash flow performance; median values are calculated separately for every size segment of companies.[37]

Three types of potential collateral are studied. "Total" collateral, which includes land, buildings, machinery, and portfolios of bonds and equity shares; "fixed" collateral, which includes land, buildings, and machinery; and "real property" collateral, which includes only land and buildings of the company.

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[37] Segments of endangered companies are defined as follows: companies with less than 25 employees, companies with 25-50 employees, companies with 50-100 employees, companies with 100-200 employees, and companies with over 200 employees.

Table 16: Financial debt, cash flow and potential collateral for the worst 25% companies in services sector

Company size by number of employees	Year	Financial debt	Cash flow	Total collateral	Fixed collateral	Real property collateral
0-25	2007	0.154	0.014	0.000	0.000	0.000
	2008	0.230	0.012	0.000	0.000	0.000
	2009	0.206	-0.023	0.000	0.000	0.000
	2010	0.205	-0.025	0.000	0.000	0.000
	2011	0.198	-0.018	0.000	0.000	0.000
25-50	2007	0.279	0.038	0.148	0.133	0.101
	2008	0.369	0.039	0.195	0.179	0.138
	2009	0.356	0.017	0.185	0.157	0.120
	2010	0.350	0.023	0.204	0.194	0.167
	2011	0.290	0.025	0.196	0.184	0.157
50-100	2007	0.293	0.045	0.197	0.180	0.111
	2008	0.358	0.035	0.193	0.162	0.099
	2009	0.334	0.017	0.199	0.168	0.135
	2010	0.318	0.016	0.167	0.148	0.129
	2011	0.274	0.016	0.160	0.142	0.126
100-200	2007	0.298	0.050	0.227	0.201	0.151
	2008	0.328	0.028	0.137	0.109	0.091
	2009	0.318	0.011	0.214	0.184	0.157
	2010	0.328	0.022	0.142	0.097	0.072
	2011	0.257	0.022	0.173	0.150	0.123
over 200	2007	0.332	0.061	0.246	0.220	0.131
	2008	0.374	0.038	0.317	0.236	0.097
	2009	0.349	0.021	0.368	0.312	0.245
	2010	0.363	0.027	0.427	0.371	0.336
	2011	0.377	0.029	0.320	0.320	0.239

Note: Services sectors; variables are calculated per unit of balance sheet sum; companies from the first quartile of cash flow.

Source: AJPES, 2012; own calculations.

Figures for endangered companies from the service sector are given in Table 16. Small companies from the service sector are obviously in the most endangered position in terms of solvency. The smallest companies, with less than 25 employees, have on average negative cash flow in all three years after the crisis erupted. These companies also do not have any collateral to enable them further access to credit. At present bank credit policy standards, those companies are doomed. Even much faster growth of the economy (their receivables) would not push up their cash flow. Companies from this segment still employed around 18,000 people as of 2010.

The cash flow of endangered companies from the service sector with over 25 employees has already improved since the 2009 collapse. Cash flow in these segments of the service sectors was positive again already in 2010. Except for the segment of the largest companies (with over 200 employees), all other segments are far short of enough collateral to follow banks' post-crisis practices of increasing collateral requirements. Even the broadest definition of potential collateral does not cover the existing credit stock of these companies by more than 60%. If the present bank collateralization practice (further increases in necessary collateral

coverage and further reductions in credit given based on expected cash flow, i.e. further shrinkage of banks' information capital) would proceed, whole segment of endangered companies from the service sector (almost one quarter of companies from the service sector) would be stalled in inactivity or shrinking further even though they had, on average, positive cash flows in all three years after the crisis erupted.

Table 17: Financial debt, cash flow and potential collateral for the worst 25% companies in manufacturing sector

Company size by number of employees	Year	Financial debt	Cash flow	Total collateral	Fixed collateral	Real property collateral
0-25	2007	0.189	0.032	0.091	0.078	0.000
	2008	0.228	0.038	0.096	0.086	0.000
	2009	0.233	-0.009	0.090	0.080	0.000
	2010	0.245	0.005	0.083	0.067	0.000
	2011	0.253	0.014	0.091	0.075	0.000
25-50	2007	0.322	0.048	0.365	0.354	0.231
	2008	0.355	0.039	0.341	0.330	0.196
	2009	0.330	0.004	0.375	0.370	0.223
	2010	0.341	0.015	0.362	0.334	0.194
	2011	0.333	0.024	0.368	0.341	0.219
50-100	2007	0.309	0.046	0.389	0.352	0.204
	2008	0.361	0.029	0.339	0.339	0.191
	2009	0.316	-0.013	0.400	0.386	0.225
	2010	0.300	0.015	0.398	0.388	0.245
	2011	0.345	0.011	0.358	0.357	0.236
100-200	2007	0.292	0.077	0.388	0.371	0.216
	2008	0.360	0.038	0.432	0.399	0.255
	2009	0.346	0.008	0.414	0.401	0.252
	2010	0.389	0.011	0.380	0.360	0.256
	2011	0.362	0.019	0.398	0.375	0.260
over 200	2007	0.331	0.075	0.386	0.361	0.206
	2008	0.414	0.041	0.381	0.361	0.223
	2009	0.366	-0.003	0.415	0.388	0.230
	2010	0.376	0.032	0.369	0.333	0.207
	2011	0.371	0.035	0.380	0.345	0.221

Note: Manufacturing sector; variables are calculated per unit of balance sheet sum; companies from the first quartile of cash flow.

Source: AJPES, 2012; own calculations.

Figures for the endangered manufacturing companies (companies from the lowest quartile of the cash flow performance) for five size segments are given in Table 17. The cash flow performance of manufacturing companies is better than services companies. Besides, potential collateral is considerably higher for manufacturing companies, while indebtedness is almost the same except in the segment of the smallest companies. Similar conclusions can be made as in the service sector: the smallest companies (with less than 25 employees) are the weakest in solvency. Although cash flow of companies from this segment became positive already in 2010, the growth prospect of this segment of manufacturing companies is still very uncertain.

The stock of potential collateral in this segment is significantly smaller than the stock of credits, so their access to necessary loans would be jeopardized because of the bank enforced deleveraging of companies and, simultaneously, increasing trend in collateral coverage importance in bank credit approval policy.

Potential collateral of the larger (endangered) manufacturing companies (with more than 25 employees) is of the same order as the level of financial debt. Even fixed collateral is almost equal to the level of debt. If the situation in financial intermediation would not deteriorate further, access to credit for these companies would not be constrained by insufficient collateral. Nevertheless, the credit supply would not be abundant for these companies. If banks' practices (from 2011) of requiring over 120% collateral coverage[38] prevail, credit supplied to larger (endangered) manufacturing companies would also have to be partially rationed.

4.3.4   CONTAGION MECHANISM

After the eruption of the crisis, liquidity-squeezed companies started to increase the backlog of their payments to suppliers. Due to considerably lower levels of companies' cash flow in comparison to levels before the crisis and banks' credit supply restraints, the practice of forced credit could spread (through buyer-supplier relations) over the majority of companies. This could be an additional factor affecting the slow recovery of the Slovenian economy since illiquidity would also spread to companies with (directly or indirectly) growing demand.

A crucial question of the mechanism for illiquidity transmission is: which segments of companies are primary sources – originators - of forced credit? Since the crisis eruption, demand for services has not yet normalized, and strong external demand has been prevailing in the manufacturing sector for almost two years. It could be expected therefore, that companies from the service sector are using forced credit more frequently and are probably originators of forced credit, more than manufacturing companies. Smaller companies usually have less power in business relationships (the buyer power of their buyers is considerable). So for smaller companies, forced credit is probably the only possible weapon for alleviating or at least partly alleviating the effects of disorderly paying buyers. Especially since smaller (neither manufacturing nor service sector) companies do not have enough collateral to offset disorderly payments of buyers with banking credit. Smaller companies are, therefore, probably the most vulnerable to the spread of illiquidity. To illustrate possible illiquidity contagion effects, companies of different sizes and from segments with different demand (with different probability for contagion origination and different vulnerability to contagion) are compared.

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[38] See BS (2011).

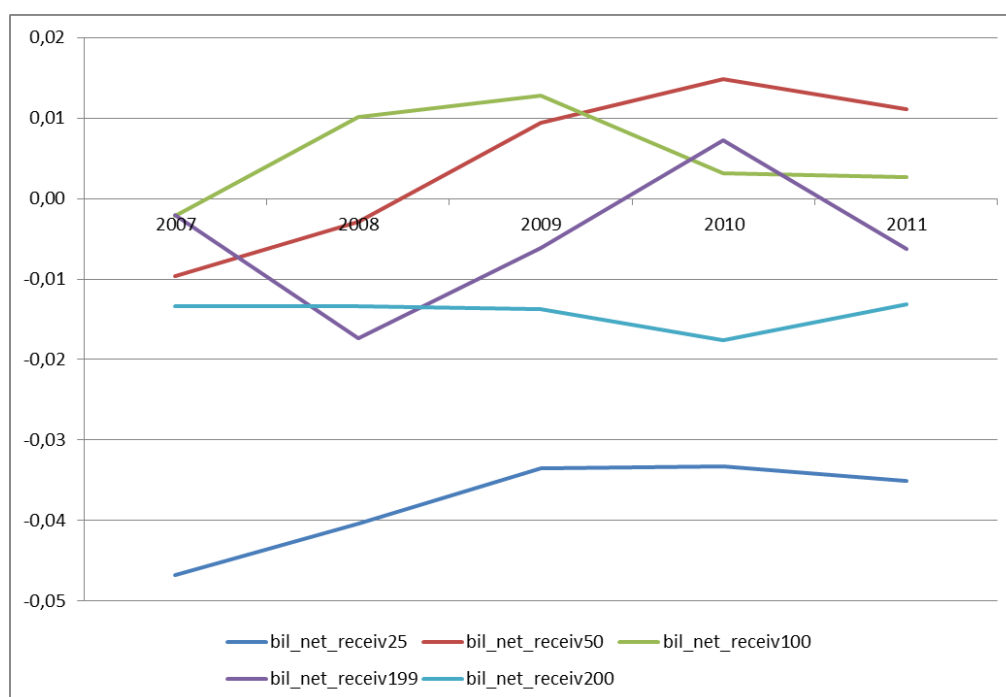*Figure 11: Net short term receivables for manufacturing companies*
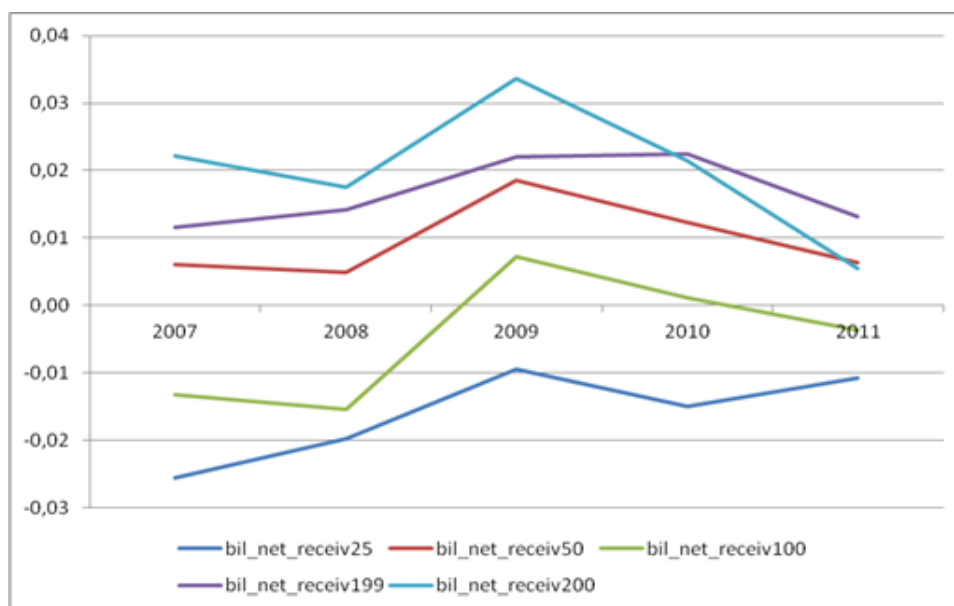
Note: Short term operating receivables less short term operating liabilities per unit of balance sheet sum; median of manufacturing companies; size segments of companies are as follows: 25 – companies with less than 25 employees, 50 – companies with 25–50 employees, 100 – companies with 50–100 employees, 199 – companies with 100–200 employees, 200 – companies with over 200 employees

Source: AJPES, 2012; own calculations.

In Figure 11 and Figure 12, the dynamics of possible illiquidity transmission is illustrated by net short-term receivables (short-term operating receivables less short-term operating liabilities) for manufacturing and services companies of five different sizes. Net short-term receivables are given for median companies of corresponding segments of company. Values are calculated per unit of the balance sheet sum.

Illiquidity transmission for manufacturing companies is illustrated in Figure 11. Obviously, the largest companies (with over 100 employees) have systematically larger short-term operating receivables than liabilities. In 2011 operating receivables of these companies were around 1% (of the balance sheet sum) larger than operating liabilities. As expected, forced credit is the most common weapon of the smallest companies; they use it far more frequently. In net terms their operating liabilities were around 2% (of the balance sheet sum) larger than operating receivables. When the crisis erupted, net operating receivables in all size segments of manufacturing companies increased by at least 0.5% of the balance sheet sum, afterwards net operating short term receivables started to decline. In 2011, except for the two segments of the smallest companies, net operating receivables were already equal or lower than before the crisis (in 2007 and 2008).

Figure 12: Net short term receivables for services companies

Note: Short term operating receivables less short term operating liabilities per unit of balance sheet sum; median of companies in the service sector; segments of companies: 25 – companies with less than 25 employees, 50 – companies with 25–50 employees, 100 – companies with 50–100 employees, 199 – companies with 100–200 employees, 200 – companies with over 200 employees.

Source: AJPES, 2012; own calculations.

In Figure 12 the effects of spreading illiquidity in the segments of services companies are illustrated. Noticeably, net receivables of services companies are much lower in comparison to those of manufacturing companies. After the crisis erupted, net short term receivables considerably increased in all size segments of service companies, except the biggest one (with over 200 employed). The increase in net receivables reached at least 1% of the balance sheet sum. In 2011, net short term receivables are still higher than in years before the crisis (e.g. 2007), but only the smallest and the largest companies had larger short-term operating liabilities than receivables. The difference was 3.5% and 1.3% of the balance sheet sum. Heuristically speaking, both figures show that the smallest companies are exposed the most to illiquidity transmission. After the crisis started, the spread of illiquidity visibly increased even for the median companies. To reveal the mechanism of liquidity transmission inside both, the manufacturing and service sectors' segments of companies, a simple model of liquidity contagion is estimated on the segments of endangered companies, for which effects of possible contagion (additional increase in illiquidity) would be the most detrimental.

For determining contagion effects even more precise I replaced net short-term receivables with net working capital (calculated as receivables plus inventories minus payables) as it also incorporates the effects of needed (or released) cash flow for increased (or decreased) inventories and it pertains to companies' operating activities. Undoubtedly, contagion is

smaller when the difference between short-term operating receivables plus inventories and liabilities is smaller, but in absolute not nominal terms. Therefore, a dependent variable in the model is defined as an increment in absolute value of net working capital. Independent variables are increments in financial debt and in cash flow. All variables are measured per unit of the balance sheet sum. Because of possible endogenity of explanatory variables, the model is estimated by instruments using the GMM method. Instruments are current and lagged fixed collateral as well as current and lagged number of employees. To embrace the possible contagion effects of the mentioned increase in importance of the credit collateralization for banks' credit policies (that is, effects of decreased information capital), endangered companies (the worst 25% companies) from manufacturing and service sectors are divided into two groups. The first group consists of companies with positive cash flow and the second group of companies with negative cash flow.

Table 18: Model of contagion mechanism

Endangered companies from services sectors with positive cash flow			
	Coefficient	t-statistics	p-value
Dbil_fdebt	-0.588	-3.81	0.00
Bil_cash_flow	0.023	0.02	0.16
Constant	0.006	0.21	0.19
N	4761		
Hansen's J	4.330		0.228 (p-value)
Endangered companies from services sectors with negative cash flow			
	Coefficient	t-statistics	p-value
Dbil_fdebt	-0.484	-2.32	0.020
Bil_cash_flow	-0.058	-1.95	0.051
Constant	0.048	4.01	0.000
N	5514		
Hansen's J	0.349		0.951 (p-value)
Endangered companies from manufacturing with positive cash flow			
	Coefficient	t-statistics	p-value
Dbil_fdebt	-0.403	-2.72	0.006
Bil_cash_flow	0.391	0.48	0.630
Constant	-0.009	-0.29	0.770
N	1316		
Hansen's J	4.950		0.176 (p-value)
Endangered companies from manufacturing with negative cash flow			
	Coefficient	t-statistics	p-value
Dbil_fdebt	-1.501	-1.24	0.216
Bil_cash_flow	-0.472	-1.84	0.066
Constant	0.040	0.85	0.393
N	1031		
Hansen's J	2.817		0.421 (p-value)

Note: Dependent variable (increment in contagion) is defined as an increment of absolute value of the net working capital; independent variables are: dbil fdebt increment in credits, bil_cash_flow cash flow from current business; variables are calculated per unit of balance sheet sum; model is estimated by instruments (GMM method) for year 2010; instruments are: current and lagged values of fixed collateral and employment.

Source: AJPES, 2012; own calculations.

Estimated models are presented in Table *18*. In the previous section I already mentioned that for companies with positive (but low) cash flow from operating activities to stay afloat, it is crucial that deleveraging, especially in times of depressed prices of assets is slow. Oppositely, forced repayment of credit would push them into insolvency.

Both versions of the model (for manufacturing and services) estimated for the endangered companies with positive cash flow confirm such a suggestion. Both models significantly contribute to curbing illiquidity transmission, while corresponding effects of cash flow is insignificant (negligible). Besides, the corresponding effect on contagion is almost 50% larger for manufacturing companies. This fact confirms the previous conclusion that deleveraging in the service sector must be slowed.

The message from the contagion model estimated for endangered companies with negative cash flow from operating activities is just the opposite. Both versions (for manufacturing and services) of the model estimated for companies with negative cash flow (from operating activities), confirm that to prevent illiquidity from spreading among such companies, the change in current cash flow performance is crucial. Only larger credit support would not stop increases in contagion. In both corresponding models, the cash flow variable is significant (with appropriate negative sign), while the credit variable is only significant for manufacturing sector.

4.4   CONCLUSIONS AND DISCUSSION

The fourth chapter discusses the role of collateral and contagion as amplification mechanism in the time of the balance sheet crisis in Slovenia. It sheds a light on the fact that considerable increases in bank required collateral coverage and credit rationing resulted in a drastic drop in credit growth. That fact stopped a fragile recovery, which began in the first quartile of 2010. Banks' policies pushed companies into difficult situation especially smaller ones, which generally have less available real assets serving as collateral for their credits. Especially threatened are those service sector companies with fewer than 25 employees.

The tightening of lending conditions and banks' tendency for rapid deleveraging of indebted companies does not only affect indebted companies themselves, but also companies that are associated with them (their suppliers and their buyers). If for example, banks insist on deleveraging or demand higher credit collaterals for companies in troubles, they infect the whole ecosystem of companies in the same network. By bankrupting companies, banks are not only loosing the indebted company as their business partner, but also other members of the ecosystem. As ecosystem members are also their clients, banks are also bearing the indirect consequences of their own actions. Either they do not carry out business activities with banks anymore or, in the case of indebtedness, they are unable to repay their debts to banks. Seemingly, this has an effect on the liquidity of the overall economy.

Two conclusions follow. First, instead of taking an active role in companies' rehabilitation process, especially in those with positive cash flow from core operating activities and using

Chapter 11 procedures in insolvent companies, commercial banks in Slovenia completely switched their credit policies, not only from a "mark-to-market" to a "mark-to-risk" valuation of their claims, but also from relationship based to transactional based approach for their clients. That is in large supported by the actions of the regulator (the Bank of Slovenia), which considerably sharpened banking regulation during the crisis, especially insisting on a significant increase in capital adequacy in very short periods, while in times before the crisis it was almost impotent. By the end of 2011, credit growth to companies was already in negative figures and accelerating falling. Negative growth of credits pushed the economy into recession for the second time in three years. Secondly, sharp austerity measures taken by the Slovenian government which are directed towards cutting of the public sector wages (predominantly in university education) and social transfers (and decreasing taxes on profits), will further deteriorate domestic demand and will have through the working of the financial accelerator an additional contribution to the recession. Because of such additional waning of domestic demand, the already fragile services sector, whose development was praised in the previous term, will be under even greater pressure.

The Slovenian situation has a certain political dimension. After its independence, with a small intermezzo in between, the center-left alternative was in power for over ten years. It has achieved a solid growth (average real growth rate per year over the period of 1993 to 2004 was 3.84%[39]). Most of the time it managed to maintain macroeconomic balance. But due to a significant share of state ownership in the economy and the country's transitional nature, so called "crony capitalism" features occurred. The center-right alternative came to power in 2004. Its governance was built on the neo-liberal ideas. Reducing the tax burden of the highest income class of the population has been one of its priorities, whilst drastic deterioration of the structural budget deficit was one of the most visible results of its operations. Besides, tax reform was launched in the time of an already booming economy. The economy therefore ballooned even more as labor costs and inflation jumped. It is ironical that during a center-right government a bulk of management buyouts were realized, which couldn't have been implemented because of tighter financial conditions under the previous center-left government. In the 2008 elections the center-left alternative won again but its term ended prematurely in 2011. The government wanted to preserve the welfare state also in a post-crisis period. It also prepared the emergency legislation that would establish long-term conditions for achieving macro-economic balance and sustainable economic growth, including necessary pension reform. The opposition skillfully exploited conflicts within the center-left coalition and prevented adoption of necessary laws by constantly triggering referendums. Although none of the center-right parties won the early 2011 elections, they managed to somehow form a coalition. Following the shared values in Europe, the program of austerity measures made up their platform. The idea is that by reducing government expenditures the budget deficit would reach 3% already in 2012. This policy will continue in 2013. The same government (consisting of the same parties) which in boom years ballooned structural fiscal deficit by tax-cutting reform and launched the law on public wages which

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[39] Statistical yearbook RS, 2004.

caused enormous increase in public wages (almost 20% in a year and half) is now, as a savior, launching savage cuts in wages and social transfers. Obviously, they are only removing the damage they had previously caused. But such a "revolution" in the policy maker's doctrine does not pertain only to politicians but also to academics. The program of substantial decrease in public spending, including the salaries of the public sector, which was launched in this year is supported and partially prepared by the economists, who were, in the boom years main authors behind tax cutting reform (with had disastrous impact on the structural fiscal stance), and which in that time maintained that growth dynamics in wages of public sector, lower than those requested by trade unions, would endanger economic growth.

What about the banks? The banking sector and banking regulators have had a significant contribution to disastrous performance of the Slovenian economy after 2009. When referencing banks (in Slovenian succession after 1999 and especially in the booming euro-landing period) limited purpose banking and with it also relationship-based banking had disappeared. When crisis erupted, the Slovenian "Jimmy Stewart" was also already dead.[40] It is, therefore, not surprising that the CEO of the largest bank in Slovenia stated that his bank has no qualified people who could be used in companies' rehabilitation processes.[41] Such a statement was made four years after the eruption of the crisis. At this time it would be only necessary to take a good look at what the bank, and quite successfully, had done fifteen years ago. I cannot end without also mentioning the regulator of the banking system, the Bank of Slovenia and its contribution to the economy's post crisis performance. Perhaps it is best summed up with statement from the deputy governor (chief of supervision) that said that banks are not here to "treat heavily diseased liver patients with alcohol."[42] But if I refresh our memory, the banking regulator in late 2007 tolerated the growth of credits to non-financial corporations by almost 40% within which the booming construction sector actually reached 60% per year. Banks financed such a credit stampedo with a 50% increase of foreign debt in the same year (2007).[43] Both statements illustrate what could be expected from institutions, which greatly contributed to the present diseased situation of the Slovenian economy.

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[40] See, Kotlikoff (2010).
[41] See, Marn (2012)
[42] See Pureber (2012).
[43] See Bank of Slovenia »Monthly Bulletin« ,and »Financial Stability Review«, 2010.

CONCLUDING REMARKS

A large number of economic issues arise when looking at the Slovenian economy in recent years, especially in the period between 2006 and 2011 on which the dissertation focuses. In the pre-crisis era, Slovenia was marked by an overheated economy where companies were rapidly expanding their operations nationally (investing in new activities and business) and internationally (expanding existing and investing in new businesses abroad). Amongst others, there were non-avoidable topics of greener operations, corporate environmentalism, new niche markets with "green" services and products. With a surfeit of available financing options, many companies found themselves investing (and therefore indebting themselves) in unknown areas (in many cases investments in creating higher environmental leverage) with actual returns exceeding the expected returns. Such an overheated economy entered the crisis unprepared. With the onset of the crisis and its disastrous effects on the Slovenian economy, the question of what went wrong arises. In trying to answer this question and explain the situation in the Slovenian economy pre- and post-crisis, I present the following conclusions from my dissertation.

First, I show the conclusions on the corporate environmentalism situation in Slovenia and the proposed integral typology relate to the level of environmental awareness and commitment. With the approach to corporate environmentalism, the analysis presents the existing literature, while the dimensions, typical company clusters and dynamics of corporate environmentalism are expanded. The proposed clusters of companies are profiled based on variables such as selected business indicators, possession of the ISO 14000 certificate etc. Two main conclusions flow from the empirical research. First, the proposed integral approach to corporate environmentalism is suitable for a small open transitional economy where the model identifies distinct company clusters. Second, based on my empirical work "radical innovators" among Slovenian companies do not exist, and less than one-third of companies are committed to environmentally friendly processes and products.

Interestingly, the size of the "greenwashers" segment is far from negligible in spite of the rising threat of a consumer backlash (Crane, 2000). »Greenwashers« should and could be pushed to live up to their promises as they are performing worst in the areas of waste, emissions and transport management, where the public and regulators could have a significant influence on them.

The results of the study show that the average Slovenian manufacturing company is paying more attention to internal issues than to the systemic integration of environmental concerns across the value chain. A position widely held by companies in transition countries is that environmental concerns are mostly the government's domain. As confirmed by my results, corporate environmentalism has to function in compliance with the legal and regulatory environment of a given state.

I was able to confirm hypothesis (H1) that companies which are part of an international supply chain are more deeply engaged in environment-friendly activities and have a more

prominent external ecological focus. The environmental awareness of internationally integrated companies is stronger, as is also demonstrated by the confirmed hypothesis H3 (Companies with an environmental certification are more environmentally aware) as these companies are forced (by their more environmentally aware supply chain stakeholders) to have environmental certification. This finding could serve as a recommendation for Slovenian companies because it reveals the importance of companies' commitment to corporate environmentalism as well as peer pressure within an international supply chain for doing business abroad. As mentioned in Chapter 2, Damijan et al. (2007) show that more productive Slovenian companies are also more internationalized which is also in line with my findings as a sound environmental strategy is a pre-condition for a company's inclusion in an international supply chain.

The large empty space of corporate environmentalism at the highest level (no "radical innovators") could stimulate both companies and economic policymakers to consider environmental innovation as a potential source of growth and competitive advantage, which is an important consideration in times of economic crisis.

Although corporate environmentalism could play an important role in the recovery process of the Slovenian economy and it played an important role before the crisis influencing companies' investment decisions and operations, the debt accumulation process has been even more influential and devastating for the Slovenian economy. As mentioned in Chapter 3, my findings reveal the existence of an endogenous mechanism which has considerably amplified the effects of external shocks on economic performance. The endogenously-driven mechanism of a financial accelerator amplified the process of companies' debt accumulation, which is specified and empirically tested.

For the purpose of studying the financial accelerator mechanism, the theoretical model of Bernanke et al. (1999) is expanded to enable the tracking of the financing specificities of three types of investment projects (investments in core activities, investments in long-term financial assets, and portfolio real estate investments), which are crucial for the Slovenian boom-bust period. The model also controls for ownership and industry types.

The results show that the sample companies doubled their financial debt in the boom (2005–2008) period, which was intended for financing both core and non-core business activities. Companies' indebtedness was strongly influenced by long-term investments in financial assets although the main driver of the increasing financial debt was investments in core business activities. Investments in portfolio real estate were much smaller, but did not have a negligible effect. The debt amplification and propagation mechanism was substantially defined by the financial accelerator with the expected discounted capital return being the determinant of its power. The whole boom period was marked by the growth of the stock and real estate market (which peaked just before the global crisis emerged), consequently allowing the expected discounted capital returns to increase the power of the financial accelerator in the whole boom period, without interruption.

The empirical results also show the "random walk" manner of the indebtedness process of individual companies, which means that the year-to-year increase did not depend on the stock or the increment of the debt in the previous year. Companies were quickly changing their indebtedness position and transitioned from one segment of indebtedness to another relatively quickly. In spite of that, the total indebtedness of all observed companies has been increasing uniformly. This high flexibility of the dynamics of individual companies' debt accumulation processes demonstrates the high endogenous instability of the debt accumulation process.

Controlling for the ownership structure of companies reveals that financial debt has increased the most in the group of companies with "unstable" ownership. These are the companies that were consolidating their ownership structure and thus using higher potential leverage in the boom period. To finance their higher financial leverage, these companies also invested much more aggressively and broadly in financial assets, portfolio real estates and core activities than other groups of companies which also devoted a larger share of their financing to core activities.

The dynamics of the debt accumulation process reveal the great vulnerability of Slovenian companies and their inability of endogenous self-regulation in the absence of a robust macroeconomic equilibrium. Therefore, the role of regulators and policymakers is crucial as is shown in the last part of the dissertation where the role of collateral and contagion as an amplification mechanism at a time of a balance sheet crisis in Slovenia is analyzed. The fragile recovery which began in the first quartile of 2010 has come to a halt due to increases in bank-required collateral coverage and credit rationing which had resulted in a credit crunch.

Especially smaller companies have been pushed into a difficult situation as banks have tightened up their policies since they have less available potential collateral for their credits. Service sector companies with fewer than 25 employees have been hit the most. Banks have not only tightened the lending conditions but also forced indebted companies into rapid deleveraging, which has also affected those companies' business partners. Such bank behavior has infected the whole ecosystem of companies in the same network as those in trouble. Through such a practice, banks have consequently lost or forced into bankruptcy other connected companies and lost additional business and, at the same time, influenced the liquidity of the ecosystem of companies and the overall economy.

Commercial banks in Slovenia have changed their credit policies (instead of taking an active role in companies' rehabilitation process) to the "mark-to-risk" valuation of their claims and to a transaction-based approach to their clients. This is in line with the sharper actions of the regulator (the Bank of Slovenia) which was very benign before the crisis but has insisted on a significant increase in capital adequacy in a very short period. A result has been the negative growth of credits (further accelerating at the end of 2011) which has pushed the economy back into recession. The previously mentioned fragile service sector will be under even greater pressure as the tough austerity measures coupled with lower taxes will erode domestic demand. The disastrous performance of the Slovenian economy after 2009 was largely

induced by the banking sector and banking regulators. When referencing banks limited purpose, banking and with it also relationship-based banking have disappeared.

To conclude, I cannot overlook the role of the banking regulator and its actions in the pre- and post-crisis eras. It is the banking regulator that tolerated the almost 40% annual growth of credits to non-financial corporations in late 2007, with commercial banks increasing their foreign debt at the same time by 50% to finance such growth. And now the same regulator is applying the brakes after the onset of the crisis in fragile times of recovery, instead of stimulating active participation in companies' rehabilitation processes.

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APPENDIXES

Appendix 1: An overview of attitudinal item structure with relevant Cronbach alpha coefficients

Topic	Dimension	Item	Alpha-value
Primary motives for corporate environmentalism	Market opportunities	Our efforts towards environment protection will influence the future legislation in our industry.	0.869
		Our customers believe the destruction of environment to be the key problem of today's world.	
		Our customers demand more and more environment-friendly products and services.	
		Our customers expect us to be environment-friendly.	
		Due to achieved environment-related product improvements I managed to significantly lower our costs.	
		With regular investment in development of »cleaner« products and processes I could become the industry leader.	
		By making our products more environment-friendly I can increase our market share.	
		By reducing negative environmental impact of our activities I improve the quality of our products and processes.	
	Legislation	Our environmental strategy is to a large extent influenced by the government policy of regulation.	0.747
		Environmental legislation importantly influences our future growth.	
		A more restrictive environmental legislation is the main driver of our environmental efforts.	
		Our industry is influenced by a very strict environmental legislation.	
	Management vision	Our top management is completely dedicated to environment protection.	0.893
		Company activities aimed at environment protection have a full top management support.	
		Environmental strategy in our company is fully shaped by our top management.	
Environmental orientation	Environmental focus	Environmental issues are the primary guideline for decision-making processes in our main business functions.	0.915
		Environment protection is actively promoted as the basic internal goal of all our departments.	
		We make sure our employees in all our key business areas are aware of environmental issues.	
		Environment protection is the key value of our company.	
		Ecology is the key element pertaining to the positive public image of our company.	
		Our responsibility towards the owners is more important than our responsibility towards the environment.	
		We feel a high degree of responsibility towards environment protection.	
		We would like the public to perceive us a company that acts in an environment-responsible way.	
	General environmental protection strategy	Environmental issues are included in our process of strategic planning.	0.897
		Our quality is also assessed by the influence of our products and processes on the environment.	
		Wherever possible, our environmental goals match our strategic goals.	
		We are developing new products and processes that	

Level of strategic integration		minimize our negative environmental impact.	
		Environment protection is the key element of our strategy.	
Level of strategic integration	Environmental strategy in production and marketing	Wherever possible I use sources of renewable energy.	0.896
		Reduction of environmental pollution is the primary goal of our production processes.	
		We advertise environmental benefits of our products and services.	
		Our marketing strategy is driven by environmental issues.	
		Our product and market decisions are always made in view of environmental concerns.	
		In our marketing activities I always tend to emphasize our care for environment protection.	
		In our company the packaging is adjusted in such a way as to minimize the negative environmental impact.	
	Environmental strategy in HRM	We encourage our employees to separately collect waste within the company.	0.779
		Our employees are regularly educated about ways and means to protect the environment.	
		In order to increase environmental awareness of our employees I deploy our internal company newsletter.	
		We encourage our employees to use environment-friendly means of transportation to work.	
		We always reward the employees whose ideas contribute to environment protection.	

Topic	Dimension	Item	Alpha-value
Scope & degree of implementation	Customer-related activities	Customers are actively searching for ecological products and ecological suppliers.	0.838
		In order to protect the environment, customers are ready to change their habits.	
		Our customers are prepared to pay a higher price for environment-friendly products.	
		Our sector (department, service …) is actively promoting environment-friendly activities of our company when addressing our customers.	
		We are actively aiming to educate our customers about the importance of environment protection.	
		Following the suggestions/demand by customers I already developed environment-friendly products.	
	Ecological activities in transport	Energy consumption in transport.	0.864
		Transport emissions.	
	Production process enhancement	Consumption of energy in the production process.	0.765
		Consumption of materials in the production process.	
	Waste and emission management	Emissions of greenhouse gas in the production process.	0.722
		Hazardous waste, created in the production process.	
		Waste recycling.	
		Water pollution.	
	Eco-friendly product and process development	We have an efficient internal information system to disseminate information on business process improvements in the area of environment protection among different departments within our company.	0.904
		One of the core tasks of R&D is implementation of energy-saving processes.	
		Our company is actively developing products with the smallest possible negative environment impact during their lifecycles and beyond.	
		When developing new products I carefully study possibilities to use environment-friendly materials.	
		When developing new products, I take into account all their possible negative environmental impacts in all their lifecycle phases and beyond them.	
		With regard to our environment-protective technology I qualify as industry followers.	
		We are implementing ecological technological solutions, which are something new in our industry and provide us with competitive advantage.	
		We actively encourage innovation which leads to reduced energy and materials consumption and consequently to reduced environment pollution.	
Level of systemic integration	Activities in the supply chain	In order to adjust the supply chain to environmental concerns I closely cooperate with our suppliers.	0.769
		Our suppliers are regularly evaluated from the viewpoint of their ecological activities.	
		When evaluating our suppliers from the viewpoint of their ecological activities I use specific environmental standards.	
		We actively increase the share of renewable energy sources (e.g. biomass, solar energy, wind energy, etc.).	
		Whenever possible I only buy environment-friendly materials.	
		Within purchasing I managed to increase the share of recycled materials to a very high level.	
		Our transport and logistics are more environment-friendly	

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		than demanded by the current legislation.	
		A number of ecological solutions were developed and implemented due to an initiative or a demand of our suppliers.	
	Ecological focus outside the company	Suppliers' consumption of energy.	0.848
		Suppliers' emissions.	
		End-of-life product recycling.	
		Customers' energy consumption.	
		Customers' emissions due to our products.	
		Customers' hazardous waste due to our products.	
Barriers to environmental strategy deployment	Costs/owners	Implementation of environment-friendly solutions is not attractive from the investment point of view (size of investment, payback time).	0.743
		Our owners' interest for environmental issues is limited.	
		Environment-friendly solutions are too expensive, investment would not repay.	
	Problems with customers/suppliers	We are facing many problems when trying to include our suppliers in our environment-friendly activities.	0.742
		We are facing many problems when trying to include our customers in our environment-friendly activities.	
	Limited technology supply	The market supply of renewable energy sources is very limited.	0.702
		The market supply of ecologically clean technologies is very limited.	

DALJŠI POVZETEK DISERTACIJE V SLOVENSKEM JEZIKU

Opis znanstvenega področja in cilji doktorske disertacije

Večdimenzionalnost problema podnebnih sprememb, ki ga je ustvaril človek, je razvidna na več ravneh, na katerih tudi potekata razprava in ukrepanje: na ravni osrednje paradigme v ekonomskih in poslovnih vedah; v procesu mednarodnega usklajevanja okolju prijaznih dejavnosti; pri izvajanju ukrepov za bolj učinkovito rabo energetskih virov in proti povečanim emisijam toplogrednih plinov na državni ravni; na ravni podjetij v strateških razpravah in končno, na ravni posameznega delavca oziroma potrošnika. Tako štiri interesne skupine vključujejo menedžerje, lastnike, vlade in delavce oziroma potrošnike. V svoji disertaciji obravnavam različne ravni zainteresiranih javnosti, kjer se pojavijo številna vprašanja: V kolikšni meri se podjetja ravnajo resnično odgovorno do okolja? V kolikšni meri so njihova prizadevanja le deklarativna, v nasprotju z intenzivnimi ali inovativnimi? Kje in v kakšnem obsegu postanejo okoljske rešitve vključene v strategijo in se izvajajo v vsakodnevnih operacijah? Kakšne so glavne ovire za njihovo integracijo in izvajanje, kot jih dojemajo menedžerji podjetij?

V iskanju odgovora na ta vprašanja najprej razvijem tipologijo, ki povzema ne le motivacijo in zamisel, ampak tudi način in hitrost izvajanja korporativnega okoljevarstva. Širok spekter opredeljenih dimenzij korporativnega okoljevarstva podjetij pomaga pri identificiranju petih osnovnih skupin podjetij, ki jih predlagam.

Korporativno okoljevarstvo je večinoma odvisno in determinirano z investicijsko politiko podjetij, saj ta zaznamuje njihovo poslovanje v prihodnosti. Zato je disertacija osredotočena tudi na dejavnike, ki vplivajo na investicijske odločitve podjetij. Te odločitve so bile posebej izrazite pred izbruhom sedanje svetovne gospodarske in finančne krize ter po njem. Poleg tega je kriza pokazala, kako ranljive so bilance podjetij, kar je povzročilo velik premik v naložbenih dejavnostih in strateškem vedenju na splošno. Ranljivost bilanc podjetij zaradi visoke stopnje zadolženosti ne povzroča samo problemov pri financiranju naložb, ampak bo ovirala tudi potrebno povečanje financiranja redne proizvodnje med pospešeno rastjo (Bole, 2009). V času izbruha krize pa se pojavlja še posebno vprašanje, kako zavarovanje posojil podjetij in njihov odnos glede zadolževanja endogeno krepita krizo. To je lahko vzrok, da slovensko gospodarstvo še bolj trpi zaradi krize ter hkrati upočasnjuje proces okrevanja. Zato bosta zadolženost podjetij in organiziranost institucionalnega okolja (predvsem bančnih regulatorjev) igrala pomembno vlogo v procesu okrevanja, hkrati pa neizogibno vplivala na prihodnje vedenje podjetij do okoljskih vprašanj.

Ob zgoraj omenjenih dejstvih in v teh neugodnih okoliščinah v disertaciji (1) identificiram učinke notranjih in zunanjih dejavnikov, ki vplivajo na obseg sredstev, v katera podjetja vlagajo, ter neposredno in posredno tudi na varovanje okolja, (2) razvijem in vpeljem celostno tipologijo korporativnega okoljevarstva, (3) prikažem učinke sprememb v zadolženosti podjetij v povezavi z lastniško strukturo in njen vpliv na naložbene dejavnosti, (4) opredelim dejavnike krepitve krize v Sloveniji, ki so povzročili katastrofalne posledice za gospodarstvo.

Predmet raziskave

V prvem delu disertacije se osredotočam na integralno tipologijo korporativnega okoljevarstva. V nalogi analiziram, razvijem in izvedem tipologijo, temelječo na vrsti prepoznanih dimenzij korporativnega okoljevarstva, ki so značilne za različne skupine podjetij glede na njihovo okoljsko vedenje in ki vplivajo na gospodarsko uspešnost teh podjetij. Sledita opredelitev iniciativ podjetij in ciljev za okolju prijazne dejavnosti ter razprava o tem, katera podjetja bolj verjetno opravljajo te dejavnosti.

V drugem delu disertacije se osredotočam na strukturne spremembe bilanc stanja slovenskih proizvodnih podjetij v času pred izbruhom gospodarske krize in po njem. To je močno povezano s korporativnim okoljevarstvom, saj naložbene dejavnosti podjetij ključno vplivajo na srednje in dolgoročno poslovanje podjetij ter s tem hkrati tudi na usmerjenost k okoljsko vzdržnemu poslovanju. Tako je ključni element pri naložbenih strategijah podjetij vir financiranja naložb, ki pa je v veliki meri tudi dolžniški kapital. Podjetja so od leta 2005 do 2009 (Bole idr., 2010) povečala svoj finančni dolg. Bistveni del tega povečanja odpade na povečanje financiranja pomožnih dejavnosti. V času trenutne gospodarske krize so slovenska podjetja prizadeta zaradi dveh stvari, in sicer zaradi padca povpraševanja in visoke stopnje finančne zadolženosti. Osredotočam se na to, kako te spremembe vplivajo na možnosti naložb (tudi na naložbe, ki vplivajo na trenutno in prihodnje korporativno okoljevarstvo), ki so potrebne za redno proizvodnjo med pospešeno rastjo. Hkrati pa kot smiselno nadgradnjo tega proučim tudi učinek zavarovanj posojil in okužbe z nelikvidnostjo kot mehanizma krepitve krize, ki ključno vplivata na gospodarsko okolje, kjer ta podjetja poslujejo, s čimer tudi končam nalogo in celovito obravnavam poslovanje podjetij z vidika korporativnega okoljevarstva hkrati z razmerami v poslovnem okolju pred izbruhom krize in po njem tako na mikro kot makro ravni.

Raziskovalna vprašanja

Raziskovalna vprašanja, zastavljena v treh člankih, ki sestavljajo disertacijo, sledijo opisanim znanstvenim področjem. Hipoteze, ki jih testiram v disertaciji, izhajajo iz teh vprašanj in so na tej osnovi tudi oblikovane.

Razlike v dejavnostih ter strategijah podjetij in osredotočanje na okolje predstavljajo dobre temelje za njihovo razvrščanje na osnovi stopnje okoljske ozaveščenosti. Nobena od pregledanih tipologij korporativnega okoljevarstva ni popolna, ker v nobeni od njih kompleksna večdimenzionalnost korporativnega okoljevarstva ni obravnavana v celoti. Ker pa tipologije niso združljive, predlagam sintezo glavnih idej obstoječih tipologij in oblikujem integralno tipologijo.

Hipoteze, ki jih testiram v tem delu naloge, tj. razvijanje, izvajanje in opisovanje integralne tipologije za korporativno okoljevarstvo, so:

H1: Podjetja, ki so del mednarodne dobavne verige, so bolj globoko vključena v okolju prijazne dejavnosti in imajo vidnejšo zunanjo ekološko usmerjenost

H2: Za večja podjetja je značilna večja okoljska dejavnost/ozaveščenost.

H3: Podjetja z okoljskim certifikatom so bolj ekološko ozaveščena.

H4: Podjetja z večjo donosnostjo lastniškega kapitala so bolj ekološko ozaveščena.

Hipoteze o delu disertacije, ki proučuje vplive sprememb zadolženosti podjetij (in v zadnjem delu disertacije gradi na zavarovanih posojil in okužbi z nelikvidnostjo kot mehanizmoma krepitve krize), ki jih testiram, pa so:

H5: Podjetja povečujejo finančne dolgove, da bi vlagala v tri vrste projektov: za razširitev svoje osnovne (produktivne) poslovne dejavnosti, za povečanje portfeljskih naložb v nepremičnine in za povečanje svojih dolgoročnih finančnih naložb.

H6: Podjetja v različnih panogah si izposojajo v skladu s specifičnimi pričakovanimi diskontiranimi donosi kapitala; takšne politike zadolževanja vodijo v dodatne posebnosti panog.

H7: Skupine podjetij z bolj stabilno lastniško strukturo, podjetja s tujimi lastniki in podjetja v državni lasti povečujejo finančni dolg v manjšem obsegu kot skupine podjetij z bolj nestabilno lastniško strukturo.

H8: Pred pojavom gospodarske krize so finančne naložbe prevladovale nad portfeljskimi naložbami v nepremičnine pri ustvarjanju dolgoročnih finančnih dolgov podjetij.

H9: Zadolženost podjetij v različnih skupinah podjetij glede na povečevanje dolga se enakomerno povečuje.

H10: Sestava skupin podjetij glede na povečevanje dolga se bistveno spreminja v kratkih časovnih obdobjih.

H11: V cvetočih gospodarskih pogojih najemanje posojil s strani podjetij sledi načinu "naključnega prehajanja" − prirastek dolga podjetja ni odvisen od predhodno nakopičenega dolga. Torej ni endogenega samopopravljanja, negativnih povratnih informacij, učinka velikega dolga podjetij v nadaljnjem procesu akumulacije dolga.

H12: Po izbruhu krize višje stopnje finančnih dolgov naredijo podjetja veliko bolj ranljiva pri financiranju osnovnih in stranskih dejavnosti.

Možen prispevek k znanosti

Trenutna gospodarska kriza se kaže kot priložnost za dokončno premostitev vrzeli med zakonskimi zahtevami standardov, ki si jih je postavila industrija sama, sistemov upravljanja okolja ter zamisli o samozadostni proizvodnji. Vse ukrepe podjetij (tako obvezne kot samoiniciativne), katerih posledica so bodisi nevtralni ali pozitivni vplivi na okolje, je treba

obravnavati kot ukrepe, ki gradijo okoljski vzvod za oblikovanje konkurenčne prednosti podjetij. V svoji disertaciji raziščem, kako različni finančni položaji podjetij in odnos podjetij do okoljskih vprašanj vplivajo na njihovo delovanje in v zvezi s tem razvijem celovito tipologijo korporativnega okoljevarstva. Znanstveni prispevek je v razvoju tipologije korporativnega okoljevarstva ter hkrati demonstracija podjetjem, kako se lahko izboljšajo na tem področju.

Disertacija v drugem in tretjem delu prispeva k znanosti še iz dveh vidikov, empiričnega, ki je podlaga za priporočila ekonomski politiki in regulatorjem bančnega trga, ter metodološkega. Metodološki prispevek je predvsem v delu disertacije, ki proučuje proces akumulacije dolga. Izboljšam in nadalje razvijem model splošnega dinamičnega ravnovesja Bernanke idr. (1999), ki pojasnjuje vlogo trenj na kreditnih trgih v cikličnih nihanjih. Tako predlagam nov način analize, kako odločitve o naložbah podjetij (z odločitvami mislim na izbiro med bodisi finančnimi, nepremičninskimi ali naložbami v osnovno dejavnost) vplivajo na kopičenje njihovih dolgov. Zadnji del disertacije prispeva dokaze o tem, kako zavarovanja posojil in okužba z nelikvidnostjo delujeta kot mehanizma krepitve krize, in daje pomembne vpoglede institucijam (zlasti bančnim regulatorjem) za boljše obvladovanje kreditnega krča in izvajanje politik za pospešitev procesa okrevanja.

Opis znanstvene metode

Metodologija, ki jo uporabljam v prvem delu disertacije, kjer se osredotočam na integralni pristop h korporativnemu okoljevarstvu, temelji na eksplorativni faktorski analizi, s katero definiram več merskih lestvic, ki kažejo ustrezno variabilnost. Te merske lestvice so nato klasificirane v skladu s prej identificiranimi petimi glavnimi dimenzijami korporativnega okoljevarstva: primarni motivi za korporativno okoljevarstvo, okoljska usmerjenost, stopnja strateške integracije, obseg in stopnja izvajanja, stopnja sistemske integracije in ovire v uporabi okoljske strategije. Ker se pokaže več dejavnikov, ki so linearne kombinacije originalnih postavk v okviru vsake od petih identificiranih tem, sem pri vsaki preverjal veljavnost lestvice z izračunom koeficientov Cronbach alfa.

V drugi fazi definiranja skupin podjetij, ki temelji na predlagani tipologiji za korporativno okoljevarstvo, uporabim identificirane merske lestvice, da razvrstim industrijska podjetja v skupine. Prvotno razvrščanje je hierarhično z uporabo Wardove metode s kvadratnimi evklidskimi razdaljami. Pri naslednjem koraku pa uporabim postopek k-means, da izboljšam rezultate hierarhičnega postopka. Te nato lahko povežem z osnovnimi skupinami podjetij, predvidenimi v hipotezi.

V tretji fazi prvega dela disertacije, kjer določim odnos med okoljsko uspešnostjo podjetij in velikostjo podjetij, njihovim finančnim položajem in odločenostjo podjetja, da izpolni okoljske standarde, ki jih predstavljajo različni okoljski certifikati, predvidim vrstni red distribucije identificiranih skupin podjetij in uporabljam binarno logistično regresijo. Pri ocenjevanju parametrov logistične regresije zaradi precej majhnega vzorca uporabim metodo zankanja, da dobim zanesljivejše ocene za parametre in njihove standardne napake.

V drugem in tretjem delu disertacije, kjer raziščem zadolženost podjetij in temu posledične naložbene omejitve, ter delu disertacije, ki proučuje zavarovanje posojil in okuženost z nelikvidnostjo kot mehanizma krepitve krize, uporabim naslednje metode. Najprej na izbranih spremenljivkah iz podatkov bilance stanja in izkaza poslovnega izida uporabim preprosto metodo navadnih najmanjših kvadratov in regresijski model s fiksnimi učinki. Končno verzijo zaradi možnih problemov z endogenostjo ocenjujem s panelno regresijo z uporabo instrumentalnih spremenljivk (IV). Instrumenti so oblikovani iz razpoložljivih razlagalnih spremenljivk. Postopek oblikovanja instrumentov je naslednji. Najprej oblikujem panelne podatke po sektorjih. Podatki za vsako razlagalno spremenljivko so nato združeni v trimestnih sektorjih klasifikacije NACE2, posebej za vsako skupino glede na lastništvo in leto. Za te sektorje NACE2 sem izračunal instrumentalne spremenljivke. S hevrističnega vidika je za vsako razlagalno spremenljivko, vsako skupino glede na lastništvo, vsak sektor in leto uporabljena povprečna vrednost po drugih skupinah glede na lastništvo (razen skupina, za katero velja povprečna vrednost) kot vrednost ustreznega instrumenta za panel po sektorjih. Te sektorske instrumente potem prenesem na podjetja glede na skupino in sektor podjetja. Za isto specifikacijo modela in instrumentov so nato ocenjeni instrumentalni dvostopenjski najmanjši kvadrat (2SLS), naključni učinki instrumentalnega generaliziranega dvostopenjskega najmanjšega kvadrata (G2SLS) in fiksni učinki instrumentalnega G2SLS. Vse ocene sem naredil z razlikami. Za IV pri 2SLS, G2SLS in za IV regresijskega modela s fiksnimi učinki so opravljeni testi kakovosti instrumenta (LM-test Andersonove kanonične korelacije za premajhno identifikacijo omejitev in Sargan-Hansenov test za prekomerno identifikacijo omejitev).

Prav tako v tem delu raziskave gradim na uporabi modela Bernanke idr. (1999), ki so razvili dinamični model splošnega ravnovesja. Ta pojasnjuje vlogo trenj na kreditnih trgih v cikličnih nihanjih. V nadaljevanju je prikazana prilagoditev modela, ki sem jo uporabil.

V parcialnem ravnotežju modela preverjanja optimalnega razmerja med podjetnikom in posojilodajalcem[44] finančni akcelerator endogeno širi (stopnjuje) učinke zunanjih šokov na pričakovan kapitalski donos na način

$$Q_t K_{t+1}^j = \Psi(s_t)N_{t+1}^j \qquad \Psi(1)=1 \qquad \Psi'(.) \ge 0 \tag{1}$$

kjer j označuje posamičnega podjetnika, Q_t je cena, K_{jt+1} obseg investiranega kapitala, N_{jt+1} je podjetnikovo neto premoženje, investirano v projekt in ψ naraščajoča funkcija pričakovanega diskontiranega donosa kapitala. Če je R^k_{t+1} povprečen (bruto) kapitalski donos in R_{t+1} netvegana mera (oportunitetni strošek za banke − posojilodajalce), potem je pričakovan diskontirani donos na kapital opredeljen s

$$s_t = E\left(\frac{R_{t+1}^k}{R_{t+1}}\right) \tag{2}$$

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[44] Glej Bernanke, Gertler in Gilchrist (1999).

Če vzamem, da je investicijski projekt financiran z zadolževanjem in z neto premoženjem (predhodno ustvarjenim), potem funkcijo ponudbe za zunanje financiranje naložb lahko zapišem (z normaliziranjem na zadolževanje) kot

$$B_{t+1}^{j} = Q_t K_{t+1}^{j} \left(1 - \frac{1}{\Psi(s_{0t})}\right)$$ (3)

Diskontirani donos kapitala določenega podjetja ne more odstopati od povprečnega diskontiranega donosa kapitala celotnega gospodarstva, razen v primeru idiosinkratične motnje v podjetju. Relativna gospodarska dejavnost (in s tem donosnost na kapital) bi se namreč lahko bistveno razlikovala med panogami, če bi se učinki posameznih makroekonomskih politik med njimi razlikovali.[45] V ustrezno spremenjenem prvotnem modelu zaradi idiosinkratičnih motenj podjetje spremeni svoj diskontirani donos kapitala glede na diskontirani donos kapitala v panogi, ki ji podjetje pripada. V modelu (3) je to označeno s s_0. Ker je funkcija diskontirane donosnosti (za dano leto) ψ enaka in se spreminja le pričakovana diskontirana donosnost kapitala med panogami, model (3) dejansko vsebuje take panožno značilne učinke naložb na zadolževanje podjetja (v določenem letu) v diskretnih multiplikativnih učinkih panoge. Linearizirano (razširjeno okoli povprečne vrednosti za celotno gospodarstvo) razmerje (3) lahko zapišem, kot sledi:

$$B_{t+1}^{j} = \left(Q_t K_{t+1}^{j} - \overline{Q_t K_{t+1}}\right)\left(1 - \frac{1}{\overline{\Psi}}\right) + \frac{1}{\overline{\Psi}^2}\left(\frac{1}{\overline{\Psi}} - \frac{1}{\Psi(s_{0t})}\right)\overline{Q_t K_{t+1}} + \overline{Q_t K_{t+1}}\left(1 - \frac{1}{\overline{\Psi}}\right)$$ (4)

s_{0t} označuje pričakovane diskontirane donose na kapital v panogi, ki ji pripada določeno podjetje j. Prvi izraz v enačbi (4) predstavlja učinek naložb določenega podjetja (ki se obnaša optimalno) na njegovo zadolževanje, drugi izraz razkriva dodatne učinke posameznih panog (panožne dummy spremenljivke), tretji pa prikaže kalibracijski učinek celotnega gospodarstva (konstanta v ustreznem regresijskem modelu).

Za obogatitev informacij v preprostem modelu financiranja naložb (4) (ali (3)) je smiselno izrecno razlikovati učinke zadolževanja zaradi treh različnih vrst naložb: naložbe v osnovna sredstva, naložbe v nepremičnine in finančne naložbe (vključno s prevzemi).[46] Dejavniki, ki vplivajo na diskontirane donose teh naložb, se praviloma precej razlikujejo. V Sloveniji, po izbruhu krize na primer, se učinki šokov v diskontiranih donosih na kapital teh treh vrst niso

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[45] V Sloveniji so se v obdobju 2004−2008, ko se je gospodarstvo pospešeno pregrelo, posamezne panoge spoprijemale s precej drugačnim okoljem. Zaradi gradnje državnega cestnega programa in poceni stanovanjskih posojil so naložbe v stavbe in ceste cvetele in tako pognale gradbeni sektor v nebo; narasli so tudi tuji trgi, zato sta se pospešeno povečala izvoz in proizvodni sektor, vendar precej manj kot gradbeni; pospešeno so se povečale tudi naložbe v opremo, vendar z zamikom, kar je bila predvsem posledica močnega izvoznega povpraševanja, domače storitve "za gospodinjstva" (trgovina na drobno, turizem) so se pospešeno, vendar s še večjim zamikom povečale, ker so bile v glavnem povzročene s pospešeno potrošnjo gospodinjstev.

[46] Ko omenjam dolgoročne finančne naložbe slovenskih podjetij, je treba omeniti, da so v opazovanem obdobju podjetja pospešila neposredne tuje naložbe v tujini, zlasti v države nekdanje Jugoslavije in nekdanje Sovjetske zveze (Damijan idr., 2007). Vendar pa, kot že rečeno, pomemben del finančnih naložb v slovenskih podjetijih sodi med odkupe s finančnim vzvodom.

razlikovali samo po velikosti, temveč tudi v njihovem predznaku. Če bi torej imeli le agregirane naložbe v modelu, bi s tem bistveno oslabili njegovo analitično moč.

Za razčlenitev investicijskih učinkov v modelu (3) (ali (4)) je treba razširiti teorijo v ozadju modela financiranja naložb (1).

Vzemimo, da ima na začetku obdobja $t+1$ podjetnik neto premoženje N^j_{t+1}. Predpostavim lahko, da namerava razporediti neto premoženje med tri različne projekte ${}_1N^j_{t+1}$, ${}_2N^j_{t+}$, ${}_3N^j_{t+1}$, kjer je

$${}_1N^j_{t+1} + {}_2N^j_{t+1} + {}_3N^j_{t+1} \leq N^j_{t+1}$$

Prvi projekt je naložba v osnovna sredstva, drugi je nepremičninska naložba in zadnji projekt je finančna naložba. Za vsak projekt si tudi izposodi finančna sredstva od banke v skladu z optimalnim načrtom financiranja, kot je določeno v modelu (1), pri čemer pa upošteva, da se diskontirani donosi na kapital (ustreznih projektov) razlikujejo.

$$_1s_t = E\left(\frac{{}_1R^k_{t+1}}{R_{t+1}}\right) \qquad _2s_t = E\left(\frac{{}_2R^k_{t+1}}{R_{t+1}}\right) \qquad _3s_t = E\left(\frac{{}_3R^k_{t+1}}{R_{t+1}}\right) \tag{5}$$

Če je $\Gamma(\omega)$ pričakovan bruto delež dobička, ki gre k posojilodajalcu, potem je pričakovan dobiček podjetnika iz vseh treh projektov enak:

$(1- \Gamma(\omega_1) E({}_1R^k_{t+1})/R_{t+1}\ {}_1Q_t\ {}_1K_{t+1} + (1- \Gamma(\omega_2) E({}_2R^k_{t+1}) /R_{t+1}\ {}_2Q_t\ {}_2K_{t+1} + (1- \Gamma(\omega_3) E({}_3R^k_{t+1}) /R_{t+1}\ {}_3Q_t\ {}_3K_{t+1}$

kjer se $\Gamma(\omega_i)$, $E({}_iR^k_{t+1})$, ${}_iQ_t$, ${}_iK_{t+1}$ nanašajo na projekt i, kjer je $i = 1,2,3$! Optimalne vrednosti za mejne vrednosti ω_1, ω_2, ω_3 so odvisne od različnih vrednosti diskontiranih donosov kapitala, in sicer

$s_i = E({}_iR^k_{t+1}) /R_{t+1}$ za investicijske projekte $i=1,2,3$

Mejne vrednosti se določijo s funkcijo diskontiranih donosov kapitala: $s_i = \rho(\omega_i)$ za $i=1,2,3$[47]

Racionalen podjetnik (podjetje) j bi strukturiral projekte (prerazporedil neto premoženje) tako, da bi bil skupen dobiček zanj največji glede na velikost skupnega (investiranega) neto premoženja N^j_{t+1}, ki je na voljo na začetku tekočega obdobja in glede na pričakovane donose kapitala v analiziranih segmentih potencialnih investicijskih projektov. Zato bi našel optimalno strukturo razporejenega neto premoženja ${}_1N^j_{t+1}$, ${}_2N^j_{t+1}$, ${}_3N^j_{t+1}$ z rešitvijo naslednjega problema optimizacije:

$$\max \left(\left(1- \Gamma(\omega_1)s_1\psi(s_1){}_1N^j_{t+1}\right) + \left(1- \Gamma(\omega_2)s_2\psi(s_2){}_2N^j_{t+1}\right) + \left(1- \Gamma(\omega_3)s_3\psi(s_3){}_3N^j_{t+1}\right)\right) \tag{6}$$

za dane omejitve

$s_i = \rho(\omega_i)$ za $i=1,2,3$ \qquad ${}_1N^j_{t+1} + {}_2N^j_{t+1} + {}_3N^j_{t+1} \leq N^j_{t+1}$ \qquad ${}_1N^j_{t+1} \geq 0$, ${}_2N^j_{t+1} \geq 0$, ${}_3N^j_{t+1} \geq 0$

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[47] Glej Bernanke idr. (1999).

Ker je vsota razporejenega neto premoženja, dodeljenega za projekte, omejena, in so posamezne postavke pozitivne, je problem treba rešiti z uporabo Kuhn Tuckerjevih pogojev. Vendar je struktura ciljne funkcije preprosta, rešitev pa enostavna. Racionalen podjetnik bo vložil neto premoženje v projekt(e), v katerem diskontirani donosi kapitala s_i prinašajo najvišjo vrednost $(1 - \Gamma(\omega_i)s_i\psi(s_i)$. Če imata dva projekta enako vrednost diskontiranega donosa na kapital s_i, lahko podjetje vlaga v oba projekta (deleži niso pomembni) ali pa v vse tri, če so vrednosti diskontiranih donosov na kapital vseh treh projektov enaki (deleži med projekti spet niso pomembni).[48]

Končna različica funkcije ponudbe za zunanje financiranje naložb za j podjetje, ki spada v panogo z diskontiranim donosom na kapital, s_{0t}, bi bila:

$$B_{t+1}^j = \sum_i {}_iQ_{t\,i}K_{t+1}^j\left(1 - \frac{1}{\Psi\left({}_is_{0t}\right)}\right) \tag{7}$$

Njena linearizirana različica je, kot sledi:

$$B_{t+1}^j = \sum_i \left({}_iQ_{t\,i}K_{t+1}^j - \overline{{}_iQ_{t\,i}K_{t+1}}\right)\left(1 - \frac{1}{\overline{\Psi\left({}_is_t\right)}}\right) + \sum_i \left(\frac{1}{\overline{\Psi\left({}_is_t\right)}} - \frac{1}{\Psi\left({}_is_{0t}\right)}\right)\frac{\overline{{}_iQ_{t\,i}K_{t+1}}}{\overline{\Psi}^2\left({}_is_t\right)} + \sum_i \overline{{}_iQ_{t\,i}K_{t+1}}\left(1 - \frac{1}{\overline{\Psi\left({}_is_t\right)}}\right) \tag{8}$$

Enačba (7) kaže, kako različni pričakovani diskontirani donosi na kapital vplivajo na prioriteto različnih vrst naložb in obseg zadolževanja podjetja. Očitno je, da je zadolževanje podjetja odvisno od naložb v osnovna sredstva, naložb v nepremičnine in finančnih naložb, z multiplikativnimi panožno specifičnimi učinki. V linearizirani različici modela je zadolževanje podjetja odvisno od (pojasnjevalne spremenljivke v prvi vsoti) naložb v osnovna sredstva, naložb v nepremičnine in finančnih naložb (vse spremenljivke so v obliki odmika od povprečja gospodarstva). Poleg tega je zadolževanje podjetja odvisno od (pojasnjevalne spremenljivke v drugi vsoti) panožno značilnih diskontiranih donosov na kapital, ki ustrezajo aditivnim učinkom panoge (slamnate spremenljivke). Končno pa je zadolževanje podjetja odvisno tudi od povprečnih učinkov naložb v gospodarstvu (pojasnjevalne spremenljivke v tretji vsoti, agregirane kot konstanta v regresijskem modelu). Za vsako podjetje in obdobje so vsote pojasnjevalnih spremenljivk v (6) sestavljene le iz tistih elementov (vrst naložb) i, za katere velja

$\Gamma(\omega_i)s_i\psi(s_i) = \max_\alpha (1 - \Gamma(\omega_\alpha)s_\alpha\psi(s_\alpha)$ v ustreznem obdobju.

Gornji model je uporabljen v analizi omenjenih treh vrst naložb za podjetja z različno lastniško strukturo v vseh proučevanih panogah.

Ugotovitve in zaključki

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[48] Enostavna razširitev modela (6) kaže, da so možni tudi investicijski projekti z različnimi diskontiranimi donosi na kapital. Smiselno je namreč domnevati (še posebej v majhnem gospodarstvu, ki se vključuje v svetovno gospodarstvo), da so v obdobju t podjetju j na voljo projekti, ki so omejene velikosti. V takem položaju je treba (6) dodati tri dodatne neenakosti ($_iN_{t+1}^j$ $i=1,2,3$), čemur sledi rezultat v nadaljevanju.

V prvem delu disertacije sem s predstavljenim pristopom k analizi korporativnega okoljevarstva obogatil obstoječo literaturo o dimenzijah korporativnega okoljevarstva, tipičnih skupin podjetij in dinamike korporativnega okoljevarstva. Razvoj, testiranje in uporaba izčrpne raziskave tak pristop klasificirajo kot izviren in odpirajo široko paleto možnosti za njegovo replikacijo. Prav tako je to možno tudi s predlagano tipologijo podjetij, katerih profili so sestavljeni na podlagi globalno relevantnih spremenljivk, kot so izbrani poslovni indikatorji, posedovanje certifikata ISO 14000 itd.

Na podlagi empirične raziskave sta možna dva zaključka. Prvič, predlagani celostni pristop h korporativnemu okoljevarstvu deluje v okviru manjših odprtih tranzicijskih gospodarstev, kjer model prepoznava različne skupnosti podjetij in tako poudarja potrebo po tem, da h korporativnemu okoljevarstvu pristopamo kot h kompleksnemu, multidimenzionalnemu fenomenu. Drugič, med slovenskimi podjetji ni nobenih radikalnih inovatorjev in manj kot tretjina podjetij aktivno razmišlja in deluje v skladu z okolju prijaznimi postopki in izdelki.

Oba zaključka bi morala biti pomembna vzpodbuda za tiste, ki določajo pravila na področju okoljevarstva, industrijske politike in politike tujih investicij, in tudi za tiste, ki na ravni podjetja sprejemajo odločitve, ko prepoznajo nove vire konkurenčne prednosti:

Rezultati kažejo na to, da povprečno slovensko industrijsko podjetje na lestvici prioritet manj pozornosti posveča sistemski integraciji okoljskih prizadevanj – največja prioriteta gre notranjim zadevam. Nadalje večina podjetij okoljske zakonodaje ne ocenjuje kot najbolj pomembnega motiva delovanja, zdi se, da ni nobene pomembne razlike med prepoznanimi skupnostmi podjetij ("kršitelji" so le za kanček bolj pozitivno ocenjeni kot preostale tri skupine podjetij). To je v skladu s prevladujočim stališčem v tranzicijskih državah, kjer so okoljska prizadevanja predvsem domena vlade in posledično korporativno okoljevarstvo deluje v skladu s pravnim in regulatornim okvirom dane države. Medtem ko v Sloveniji obstaja relevantna okoljska zakonodaja, viri in mehanizmi za njeno učinkovito uveljavljanje manjkajo.

Uspelo mi je potrditi mojo delovno hipotezo (H1): podjetja, ki so del mednarodne dobaviteljske verige, so globoko integrirana v okolju prijazne dejavnosti in so bolj zunanje ekološko osredotočena. Okoljevarstvena orientacija teh podjetij, vidna v njihovi okoljevarstveni osredotočenosti in splošni okoljevarstveni strategiji, je močnejša. Enako velja za njihovo raven strateške integracije. Ta ugotovitev bi morala služiti kot pomembna informacija tako slovenski kot tudi tuji industrijski politiki, saj prikaže pomembnost izpostavljenosti podjetij na mednarodnih tržiščih, skupaj s pritiski s strani enakih podjetij znotraj mednarodne dobaviteljske verige, za dinamiko korporativnega okoljevarstva.

Rezultati posredno kažejo tudi na to, da bi razumne okoljevarstvene strategije lahko bile vir primerjalne prednosti. Kot je prikazano v delu Damijan idr. (2007), so bolj produktivna slovenska podjetja tudi bolj internacionalizirana, medtem ko glede na mojo raziskavo modra okoljevarstvena strategija služi kot predpogoj za vključenost podjetja v mednarodno dobaviteljsko verigo. To bi tako tiste, ki sodelujejo pri ustvarjanju gospodarske politike, kot

tudi tiste, ki sprejemajo odločitve na ravni podjetij, moralo vzpodbuditi, da okoljevarstveno inovacijo vidijo kot potencialni vir rasti. Med številnimi napakami in ovirami korporativnega okoljevarstva so se kratkovidni ukrepi, ki zmanjšujejo pomembnost korporativnega okoljevarstva samo na problem znotraj podjetja, izkazali za še posebej opazne. To nakazuje na potrebo po tem, da menedžerji in ustvarjalci politik zavzamejo bolj celovit in sistematičen pristop h korporativnemu okoljevarstvu (in razmišljajo o vrednostnih verigah in sistemih, ne pa posameznih podjetjih) ter da se k okoljevarstvenim tehnologijam pristopi ne samo kot k vitalnemu viru, temveč tudi kot k tržni priložnosti. V obeh primerih je široko in intenzivno sodelovanje nujen predpogoj za napredek in radikalne inovacije.

Kljub vedno večji grožnji potrošniškega odpora (Crane, 2000) se nezanemarljivo število podjetij še naprej odloča za taktiko navideznega okoljevarstva. Pristop se še posebej zdi pomemben v (vendar ne omejen na) tekstilni, modni in obutveni proizvodni industriji. Glede na to da je bilo za podjetja, ki so samo navidezno okolju prijazna, ugotovljeno, da so se glede odpadkov, emisij in transporta najbolj vidno slabo odrezala, bi javnost in regulatorji morali bolj kritično pristopiti k tem področjem delovanja in samo navidezno okolju prijazne vzpodbuditi (če ne prisiliti), da izpolnjujejo svoje okoljevarstvene obljube.

Glavna omejitev raziskave je uporaba celostnega pristopa v korporativnem okoljevarstvu v okviru manjših, odprtih tranzicijskih gospodarstev. Zato je popolnoma razumljivo, da se pojavljajo vprašanja glede njene veljavnosti in posplošenosti. Raziskovalni izziv v prihodnje zato ostaja v implementaciji in ovrednotenju tega pristopa v: (1) gospodarstvih podobne velikosti in razvojne ravni, (2) večjih gospodarstvih in (3) bolj razvitih kot tudi manj razvitih gospodarstvih, da bi bila splošna veljavnost tega pristopa podprta.

V drugem delu disertacije proučujem učinke zadolževanja podjetij in s tem delovanje finančnega akceleratorja. "Politični vakuum" v obdobju vzpona in padca (2005−2010) v Sloveniji je razkril ne samo nezmožnost zakonov in institucijske naravnanosti, da bi preprečili pogubne učinke zunanjih pretresov, temveč tudi obstoj endogenega mehanizma, ki je občutno povečal učinke zunanjih pretresov na delovanje gospodarstva. Mehanizem finančnega akceleratorja je endogeno povzročal poslabšanje procesa kopičenja dolgov podjetja, ki so ga sprožili zunanji pretresi. Ta mehanizem je v disertaciji specificiran in empirično preverjen.

Teoretični model Bernanke idr. (1999) je za študijo mehanizma finančnega akceleratorja obogaten, da z njim lahko sledim finančnim specifičnostim različnih vrst investicijskih projektov in skupin podjetij, ki so ključnega pomena za študijo slovenskega obdobja vzpona in padca. Znotraj investicijskih projektov modificiran model jasno razlikuje med investicijami v osrednje dejavnosti ter (portfeljskimi) investicijami v dolgoročne finančne naložbe in naložbene nepremičnine. Skupine podjetij, prepoznane s tem modelom, so razvrščene glede na njihove tehnološke, lastniške in organizacijske značilnosti.

Empirični testi, izvedeni na vseh podjetjih z več kot 100 zaposlenimi v proizvodnem sektorju v Sloveniji med letoma 2006 in 2009, kažejo na to, da so med močnim vzponom (2005−2008) podjetja znatno povečala (podvojila) svoj finančni dolg, kar je bilo namenjeno financiranju

tako osrednje kot tudi stranskih dejavnosti. Medtem ko so bile naložbe v osrednje dejavnosti zdaleč najbolj pomembni akterji v povečanju finančnega dolga podjetij skozi celotno opazovano obdobje, so na zadolženost podjetij močno vplivale tudi investicije v dolgoročne finančne naložbe. Vpliv investicij v naložbene nepremičnine je torej bil veliko manjši, vendar nezanemarljiv.

Finančni akcelerator je bil ključni segment mehanizma kopičenja dolgov, medtem ko je bil pričakovani diskontirani donos na kapital njegov poglaviti vir moči. Ker je delniški trg rastel skozi celotno obdobje vzpona in je nepremičninski trg dosegel vrhunec, ravno preden je izbruhnila globalna kriza, so tudi pričakovani diskontirani donosi na kapital povečali moč finančnega akceleratorja v celotnem obdobju vzpona, brez prekinitev.

Skozi analizo sem ugotovil, da se je finančni dolg podjetij povečeval skoraj enakomerno v celotni distribuciji vzorca podjetij. Posamično hipotetično podjetje je hitro spreminjalo svoj relativni položaj v procesu (njegovega) kopičenja finančnih dolgov. V opazovanem obdobju sem torej lahko prikazal relativno hiter prehod podjetij iz enega segmenta zadolženosti v drugega, medtem ko se je celotna zadolženost vseh opazovanih podjetij enakomerno povečevala. Proces zadolženosti posameznih podjetij je neenakomerno napredoval. Vsako leto se je izkazalo, da povečanje dolga ni bilo odvisno niti od stanja niti od povečanja dolga v letu poprej. Tako pomanjkanje vztrajnosti kot tudi visoka fleksibilnost dinamike procesa kopičenja dolgov (posameznega podjetja) dokumentirata visoko endogeno nestabilnost, celo nagnjenost k eksploziji procesa kopičenja dolgov.

Podjetja z "nestabilnim" lastništvom so svoj finančni dolg bolj povečala kot podjetja s "stabilnim" lastništvom, podjetja v tuji in podjetja v državni lasti. Da bi pospešila lastniško konsolidacijo, so ta podjetja dosti bolj agresivno in širše (v vseh sektorjih gospodarstva) vlagala v portfeljske naložbe in osrednje dejavnosti kot podjetja iz drugih skupin, ki so večinoma vlagala v osrednje dejavnosti v lastnem sektorju.

V celoti ugotovitve kažejo na to, da v odsotnosti robustnega makroekonomskega ravnovesja endogeno ojačani in razširjeni zunanji pretresi lahko v gospodarstvo prinesejo nepravilnosti in nepravilno razporeditev virov, česar se ne da nadzorovati (ublažiti) z endogeno (sistemsko) samoregulacijo ali vsaj ne z znosnimi makroekonomskimi stroški. V odprtem gospodarstvu, kot je slovensko, je to ključna lekcija stoletnega obdobja vzponov in padcev.

Zadnji del disertacije obravnava vlogo kolateralov in okužbe z nelikvidnostjo kot ojačevalnih mehanizmov v času krize bilanc v Sloveniji. Prikaže dejstvo, da so znatna povečanja v pokrivanju posojil s kolaterali in omejevanju posojil povzročila drastičen upad v rasti posojil. To dejstvo je ustavilo krhko okrevanje, ki se je začelo v prvem četrtletju leta 2010. Politike bank so podjetja potisnila v težek položaj, še posebej manjša, ki imajo ponavadi manj realnega premoženja, ki služi kot kolateral njihovih posojil. Posebej ogrožena so podjetja iz storitvenega sektorja z manj kot 25 zaposlenimi.

Vedno strožji posojilni pogoji in tendenca bank k hitremu razdolževanju zadolženih podjetij ne vpliva le na zadolžena podjetja, temveč tudi na podjetja, ki so povezana z njimi (njihovi dobavitelji). Če banke na primer vztrajajo na razdolževanju ali zahtevajo višje kreditne kolaterale za podjetja v težavah, s tem vplivajo na celoten ekosistem podjetij v istem omrežju. Z bankrotiranjem podjetij banke ne izgubljajo samo zadolžena podjetja kot svoje poslovne partnerje, temveč tudi druga podjetja v ekosistemu. Ker so podjetja v ekosistemu tudi stranke bank, te posredno nosijo posledice lastnih dejanj. Ali podjetja ne izvajajo več svojih poslovnih dejavnosti v sodelovanju z bankami ali pa so, v primeru zadolženosti, nezmožna odplačati svoje dolgove bankam. Omenjeno pa ima vpliv na likvidnost celotnega gospodarstva.

Sledita dva zaključka. Prvič, namesto da bi banke zavzele aktivno vlogo v rehabilitacijskem procesu podjetij, še posebej tistih s pozitivnimi prilivi iz trenutnih dejavnosti, in uporabile postopke iz t. i. "Chapter 11" pri insolventnih podjetjih, so komercialne banke v Sloveniji popolnoma zamenjale svoje kreditne politike ne samo iz "vrednotenja po tržni vrednosti" na "vrednotenje glede na tveganje posojila", temveč tudi iz relacijskega na transakcijsko naravnan pristop do svojih strank. To je v veliki meri podprto s strani regulatorja (Banke Slovenije), ki je znatno poostril bančna pravila med krizo, predvsem pa vztrajal na občutnem povečanju kapitalske ustreznosti bank v zelo kratkih obdobjih, medtem ko je bil pred krizo skoraj neodziven. Do konca leta 2011 je bila rast posojil podjetjem že v negativnih številkah in je pospešeno padala. Negativna kreditna rast je gospodarstvo že drugič v treh letih potisnila v recesijo. Strogi varčevalni ukrepi, ki jih je sprejela slovenska vlada, usmerjeni v nižanje plač javnega sektorja (večinoma v visokem šolstvu) in socialnih transferjev (in nižanje davkov na dobičke), bodo še nadalje poslabšali domače povpraševanje in dodatno prispevali k recesiji. Zaradi dodatnega upada domačega povpraševanja bo že tako ranljiv storitveni sektor, katerega razvoj je bil tako izpostavljen v prejšnjem mandatu, še pod večjim pritiskom.

Slovenski položaj ima določene politične dimenzije. Po razglasitvi neodvisnosti, s krajšim vmesnim premorom, je bila sredinska levica na oblasti več kot deset let. Slovenija je dosegla solidno rast (povprečna stopnja realne letne rasti v obdobju med letoma 1993 in 2004 je bila 3,84%[49]). Večino časa ji je uspelo obdržati makroekonomsko ravnovesje. Vendar so se zaradi znatnega deleža državnega lastništva v gospodarstvu in zaradi tranzicijske narave države pojavile tako imenovane značilnosti "pajdaškega kapitalizma". Sredinska desnica je prišla na oblast leta 2004. Njeno vladanje je bilo osnovano na neoliberalističnih idejah. Zmanjšanje davčnega bremena v razredu z največjim dohodkom je bila ena izmed njenih prioritet, medtem ko je bilo poslabšanje strukturnega deficita ena najbolj opaznih posledic njenega delovanja. Poleg tega je bila v času cvetočega gospodarstva uvedena davčna reforma. Gospodarstvo je imelo zato še večjo rast, saj so se stroški delovne sile znižali in inflacija poskočila. Ironično je, da je bilo med vladanjem sredinske desnice izpeljano veliko menedžerskih odkupov, katerih v času prejšnje vlade, sredinske levice, ni bilo mogoče izpeljati zaradi strožjih finančnih pogojev. Na volitvah leta 2008 je sredinska levica spet zmagala, vendar se je njen mandat predčasno končal leta 2011. Vlada je hotela blaginjo

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[49] Statistical yearbook RS, 2004.

ohraniti tudi v obdobju po krizi. Pripravila je tudi zasilno zakonodajo, ki bi vzpostavila dolgoročne pogoje za dosego makroekonomskega ravnovesja in trajnostne gospodarske rasti, vključno s potrebno pokojninsko reformo. Opozicija je spretno izkoristila konflikte znotraj levosredinsko koalicije in preprečila sprejetje potrebnih zakonov s sprožanjem referendumov. Čeprav nobena desnosredinsko stranka ni zmagala na predčasnih volitvah leta 2011, jim je nekako uspelo sestaviti koalicijo. Po zgledu skupnih vrednot v Evropi je program strogih varčevalnih ukrepov postal njihov politični program. Ideja za tem programom je, da bi z zmanjšanjem proračunskih izdatkov proračunski primanjkljaj dosegel 3 % že v letu 2012. Ta politika se bo nadaljevala v letu 2013.

Ista vlada (sestavljena iz istih strank), ki je v letih blagostanja povečala strukturni primanjkljaj z davčno reformo in uvedla zakon o plačnem sistemu v javnem sektorju, kar je povzročilo znaten dvig plač v javnem sektorju (skoraj 20 % v letu in pol), zdaj kot rešitelj uvaja še bolj znatno zniževanje plač in socialnih transferjev. Očitno samo zmanjšuje škodo, ki jo je povzročila poprej. Toda taka "revolucija" v politični doktrini ne zadeva samo politike, temveč tudi akademike. Program znatnega zmanjšanja javnih izdatkov, vključno s plačami v javnem sektorju, ki je bil letos sprejet, so podprli in delno pripravili ekonomisti, ki so bili v letih razcveta glavni avtorji pri davčni reformi (ki je imela poguben vpliv na strukturni primanjkljaj) in ki so v tistem času povzročili, da je bila rast plač v javnem sektorju višja celo od zahtevane rasti s strani sindikatov, bo ogrozil gospodarsko rast.

Kaj pa banke? Bančni sektor, vključno z Banko Slovenije, je dosti pripomogel h katastrofalnemu delovanju slovenskega gospodarstva po letu 2009. Pri sklicevanju na banke (v nasledstvenem obdobju po letu 1999 in posebej v cvetočem obdobju prevzema evra) je bančništvo z omejenim namenom in z njim tudi relacijsko bančništvo izginilo. Ko je izbruhnila kriza, je slovenski "Jimmy Stewart" že umrl[50]. Zato ni presenetljivo, da je direktor največje banke v Sloveniji izjavil, da njegova banka nima nobenih kvalificiranih ljudi, ki bi lahko sodelovali v procesu rehabilitacije podjetij[51]. To je izjavil štiri leta po izbruhu krize. Takrat bi bilo treba samo dobro pogledati, kaj je banka zelo uspešno delala petnajst let prej. Preden zaključim, je treba omeniti še regulatorja bančnega sistema, Banko Slovenije, in njen prispevek k delovanju gospodarstva v obdobju po krizi. Verjetno to najbolje povzame izjava viceguvernerke, da ni namen bank "dajati alkohola tistim, ki jim razpadajo jetra"[52]. Vendar je, če osvežim spomin, bančni regulator proti koncu leta 2007 dopustil rast posojil nefinančnim korporacijam za skoraj 40 %, pri čemer je cvetoči gradbeni sektor dosegel celo 60 % letno. V istem letu (2007) so banke ta kreditni stampedo financirale s 50% povečanjem tujih virov[53]. Obe izjavi kažeta, kaj se lahko pričakuje od institucij, ki sta veliko prispevali k trenutnemu slabemu položaju, v katerem se je znašlo slovensko gospodarstvo.

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[50] Glej Kotlikoff (2010).
[51] Glej Marn (2012).
[52] Glej Pureber (2012).
[53] Glej Bank of Slovenia »Monthly Bulletin« and »Financial Stability Review«, 2010.