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Proceedings
of 11th International Scientific Conference

KARVINÁ PH.D. CONFERENCE ON BUSINESS AND ECONOMICS

Organized by Department of Science and Research
Silesian University in Opava, School of Business Administration

The conference was financially supported by the Institutional Plan of the Silesian University in Opava, project ISIP/2018 named "Conference for Ph.D. Students and Young Researchers"

November 7 - 9, 2018

Karviná, Czech Republic

Silesian University in Opava

School of Business Administration in Karviná

ISBN 978-80-7510-322-2

Year of publishing: **2018**

Editor: Michal Tvrdoň

All papers passed a blind review process.

Suggested citation:

Author, A., 2018. "Title of the paper". In: Tvrdon, M. (ed.). Proceedings of 11th International Scientific Conference "Karviná Ph.D. Conference on Business and Economics". Karviná: Silesian University, pp. XXX-XXX. ISBN 978-80-7510-322-2.

Dears Participants of the Conference

The international scientific conference "Karviná Ph.D. Conference on Business and Economics" is the annual platform for international scientific discussion of Ph.D. students and young researchers on business and economics issues in its broadest sense.

The eleventh volume of this conference was held on November 7-9, 2018, Karviná, the Czech Republic. As in previous conferences, this year´s one is a platform for the worldwide dissemination and sharing of ideas for research in the field of Business Economics, Management, Marketing, Economics, Public Administration, Informatics, Information Management, Operational Research, Finance, Banking, Accounting and Taxes.

I would like to thank the organizing committee for their efforts in helping us compile this volume. I would also like to express my deeply appreciations and thanks to all participants for their high quality contributions. It was our pleasure to welcome at our conference a significant number of participants from abroad.

We are happy that we have been able to get such broad participation from different sectors of the scientists, practitioners, policy makers and private sector actors. Together we try to advance efforts and present new ideas related to different aspects of business and economics.

The proceedings contain only papers that have successfully passed a blind referee process and whose authors had agreed with publication in the proceedings. There have always been two referee reports on each paper. The referees selected are distinguished scholars from Czech as well as foreign universities.

I hope that next volume of our conference will be successful and enjoyable to all participants. We look forward to seeing all of you next year at the twelfth volume of "Karviná Ph.D. Conference on Business and Economics".

Associate professor Dr. Michal Tvrdon
Vice-Dean of Science and Research

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THE CONNECTIONS BETWEEN BRANDS AND DIFFERENT GENERATIONS

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Abstract
The environment of marketing communication is constantly evolving, over the last few decades it has changed enormously. Technology and the Internet are fundamentally changing the way the world is influenced and communicated. The brands and the communication are the link between the company and the customer because the company distinguishes by communication one brand from another. For decades, the brands have been crucial to building consumer relationships that ensure long-term business success. At a time of great consumer scepticism towards brands, along with a decline in the value of traditional media in branding, consumer branding issues are even more important for brand management. Brand identification for consumers refers to the individual sense of consistency with a particular brand. In spite of growing awareness, there is still much to be learned about the role of identifying consumers with the brand as well as its relationship to consumer behaviour. Therefore, the aim of the paper is to find out, how different generations of consumers apperceive their personal connections and identifications with the brands in the field of Czech market. The questionnaire as the primary research method was used and was distributed in September 2017. 840 respondents were involved to this research. The respondents were heavy social network users and were questioned about their connections between them and the brands.

Keywords
Brand, Brand Identification, Consumer, Generations, Marketing Communication.

JEL classification
M31

1 Introduction

Traditionally, age as a demographic factor comes to mind first as a ground for marketing decisions. Certainly, product and brand managers usually consider age as a way for segmenting the market, counting also other demographic factors such as occupation, gender, marital status and household size. This perspective is both inescapable and obvious. It is obvious because human morphology, tastes, attitudes, perceptions, and lifestyles change significantly over a lifetime, leading to substantial changes in buying behaviours. Marketing specialists may then note that specific behaviours match specific age groups, and use this match for segmentation, targeting, and positioning. (Chaney, Touzani and Slimane, 2017)

Age is also inescapable in marketing strategy, as it influences consumers' physical, psychological, sociological, and cultural features, thus making their relationships with products and brands wholly dependent on age. These considerations have led both professional and academic marketing specialists to consider age an expected segmentation criterion. Consequently, many companies focus on a single age group as their core target, while others, with more means or a more diverse strategy, will propose a specific marketing mix for each age group. (Chaney, Touzani and Slimane, 2017) One way of going beyond age-based segmentation, which is often criticized as one-dimensional, is to place it in a broader theoretical field: Generational Cohort (Theory Gözükara and Çolakoğlu, 2016).

Brand personality is major in forming the relationship between customers and company (Fennis and Pruyn, 2007; Anggraeni and Rachmanita, 2015). The various marketing communication strategies are used to build brand personality, which can also help the consumers to express self-concept and their symbolic benefits (Bouhlel et al., 2011; Anggraeni and Rachmanita, 2015).

Consumer personality and brand personality should be tighlty intertwinned as the latter will act as a means for the customers to express themselves via purchase and consumption (Orth, Limon and Rose, 2010; Anggraeni and Rachmanita, 2015).

The consumers from different generations are influenced by different historical events. That is why the perceptions in the field of identifications and connections with brands are also different. There are many foreign resources approving these differences, but this study investigates the customers from Czech market. The aim of the paper is to find out, how different generations of consumers apperceive their personal connections and identifications with the brands in the field of Czech market.

2 Literature review

According to the generational theory, cohorts develop similar beliefs and attitudes because of the life experiences they share (Meriac et al., 2010; Gözükara and Çolakoğlu, 2016). This theory considers that individuals who experience the same historical, social, cultural, political, and economic events during their coming-of-age years (17-23) share common core values and behaviours over the course of their lives (Mannheim, 1952). Individuals have to experience these major social changes when they are young to produce a shared generational consciousness or a collective memory (Schuman and Scott, 1989). Companies willing to take a generational approach to marketing strategy should identify distinctive generational cohorts and consider them as segments (Chaney, Touzani and Slimane, 2017). Generational cohort marketing has become a useful tool in segmenting markets since cohort members share similar values and generational cohorts have different experiences, which influence their values, preferences and shopping behaviour (Parment, 2013; Ordun, 2015).

There are defined many generations in the market. For this study the three generations were chosen – Baby Boomers, Generation X and Generation Y.

Generational marketing strategies are based on the concept of generations, each generation's major features, and the differences between them. Generational branding provides a concrete example of how such strategies may be implemented. Companies may then develop products that best suit a given generation. Buying decisions are often significantly conditioned by one's generation; peers often guide product and brand choice, directly or indirectly. (Chaney, Touzani and Slimane, 2017) Brand are acknowledged to provide emotional benefits to customers (Morgan-Thomas and Veloutsou, 2013). A brand is a tool to build a customer-company relationship. Brands are important tools leading customers to develop a favorable image of a company, which helps organizations to differentiate from their rivals (Kotler and Armstrong, 2004; Gözükara and Çolakoğlu, 2016).

Thanks to tremendous technological advances and consumer connectedness, it is easy for companies to adapt their offering to the unique expectations of younger consumers (Williams and Page, 2011; Chaney, Touzani and Slimane, 2017). Another branding strategy might be to develop transgenerational brands, devoid of generational markers (Wellner, 2003; Chaney, Touzani and Slimane, 2017). Here, companies would try to increase the transgenerational power of their brand by favoring positive word-of-mouth communication (Moore and Bowman, 2006; Chaney, Touzani and Slimane, 2017). The idea behind this perspective is to broaden the reach of the brand both horizontally – by involving several generations at the same time – and vertically – by allowing the brand to cross generations through time (Bourcier-Béquaert and Barnier, 2010; Chaney, Touzani and Slimane, 2017).

When a consumer loves a brand, the brand will shape a consumer's identity to be similar to what the brand is perceived as. Brand performance is closely linked to brand personality, a concept which allows a brand to form a relationship with the consumer (Hankinson, 2004; Anggraeni and Rachmanita, 2015). Brand personality is a result of human characteristics endowment to a brand (Aaker, 1997; Anggraeni and Rachmanita, 2015). The perception that a consumer has towards the

personality of the brand can be shaped through both direct and indirect experience dealing with the brand (Seimiene and Kamarauskaite, 2014; Anggraeni and Rachmanita, 2015). This perception can influence how consumers evaluate and consume the brand (Swaminathan, Page and Gurhan-Canli, 2007; Anggraeni and Rachmanita, 2015). Brand personalities can create memorable and favourable associations which lead to higher brand equity (Anggraeni and Rachmanita, 2015).

From that knowledge the following research question was defined: *How does the participation in some generation influence the perception about the connections with the brands?*

3 Materials and Methods

The study focuses on different generations placed in the Czech market and their feeling about the connections with the brands.

For answering on research question of this paper the questionnaire as the primary research method was chosen. The survey was realized in 2017 and total of 840 respondents were participated. The respondents were in the age of 18 – 65 years old. There was no limitation regarding marital status, the level of incomes and education, gender, place of living and other demographic characteristics. The respondents were heavy social network users. For the purpose of the paper the primary data were obtained in Czech Republic through IPSOS research agency. This agency guarantees several mechanisms for controlling the quality of data and the panel is certified by SIMAR authority.

For gaining the answer on research question the data were processed by Chi-square test of the statistical methods in MS Excel.

The structure of respondents according to gender was 48 % of male and 52 % of female respondents. According to the age the respondents were determined to three generations. The structure (Fig. 1.) was 27 % of Baby Boomers (in 2017 in the age of 53-65), 33 % members of Generation X (in 2017 in the age of 38-52) and 40 % members of Generation Y (in 2017 in the age of 18-37).

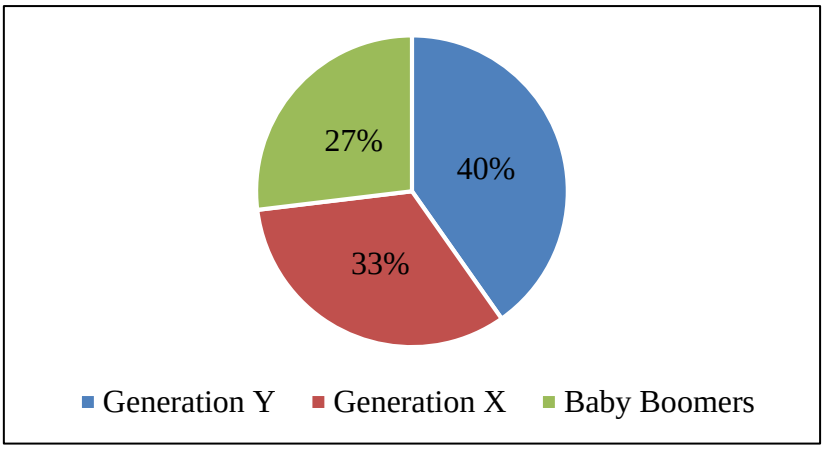


Fig. 1. The structure of respondents according to generations (Source: Authors' work in MS Excel)

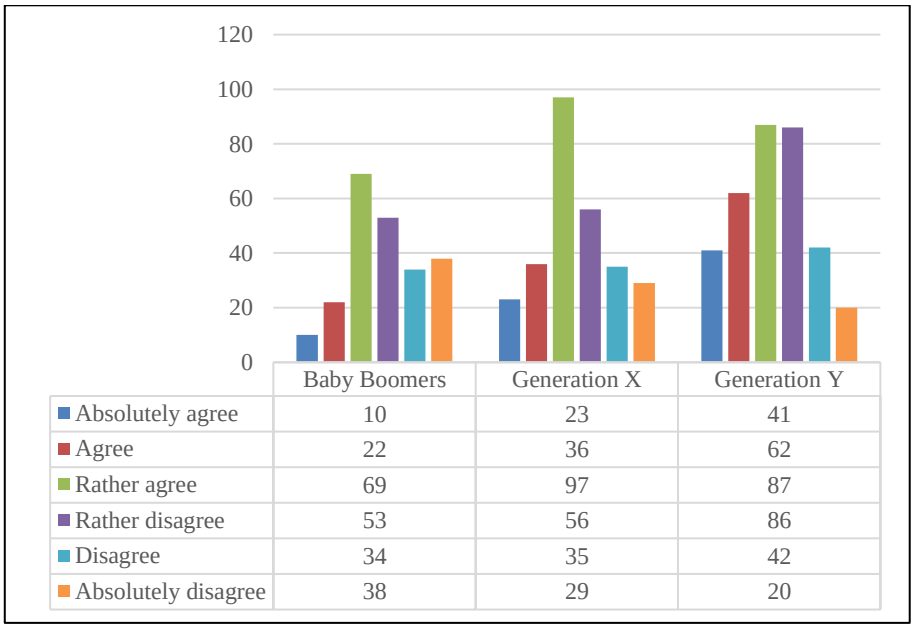
4 Results and discussion

As the available resources emphasize there are differences in behaviour, values, perceptions among the generations. Different generation tends to dissimilar opinions, trends, way of communication. The communication is crucial for the companies, because by communication one company is distinguished from another. Thanks to effective marketing communication the company builds its own brand. The generations are also different in the field of attitudes towards brands according to foreign resources. How is it in Czech Republic? Are there any differences in attitudes toward brand among different generations? From these questions one research question was designed "How does

the participation in some generation influence the perception about the connections with the brands"?

For achieving the aim of the study three statements were tested within the respondents, various generations. We wanted to find relations between participation in some generations and feeling connections with brands.

The first statement questioned special connection feeling. The respondents have had assigned the level of agreement with the statement: *I feel special connection with my favourite brands*. In this case the relation was found, because the number of significance was 3,7134E-10. From that point of view, we can announce that there is relation between participation in some generation and feeling the special connection with favourite brands. It means that we have to reject the null hypothesis and to accept alternative hypothesis: ***Participation in generation has significant influence on feeling the special connection with the favourite brands***.



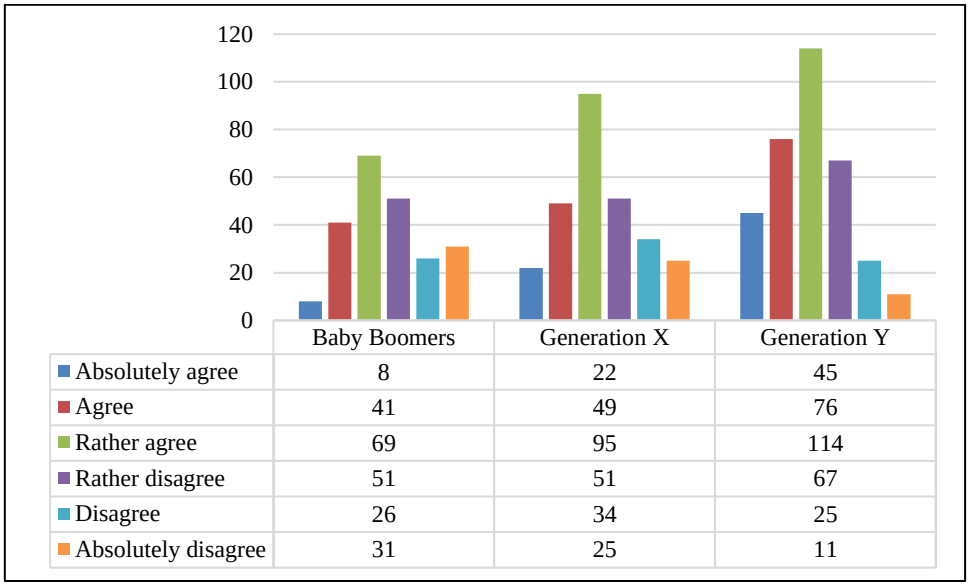
	Baby Boomers	Generation X	Generation Y
Absolutely agree	10	23	41
Agree	22	36	62
Rather agree	69	97	87
Rather disagree	53	56	86
Disagree	34	35	42
Absolutely disagree	38	29	20

Fig. 2. Statement: I feel special connection with my favourite brands (Source: Author' work in MS Excel)

As we can see (from Fig. 2.) just 14 % of respondents from Baby Boomers generation chose their agreement with that statement in level absolutely agree and agree. 21 % of respondents from generation X agreed with this statement and almost 31 % of Millennials (generation Y) agreed with the statement that they feel a special connection with their favourite brands.

After that the respondents were questioned about their agreement with the statement: *I consider my favourite brands as a part of me*. From Fig. 3. we can see that the relation between this statement and participation in concrete generation was found. The number of significance in this case was 8,44157E-11. According to these findings we can declare that respondents from Baby Boomers generation and Generation Y have different relationships with the brands. From that findings we can declare that it is necessary to reject the null hypothesis and we have to accept the alternative one. It means that we accept alternative hypothesis: ***Participation in generation has significant influence on feeling the brand as part of myself***.

Also in this case the respondents from the generation Y answered in positive way with this statement. As result we can announce that the younger people lean to the brand more than the older ones. In Czech Republic is trend that the consumers from generation Y like their brands and identify with them more than the consumers from other generations (generation X and Baby Boomers).

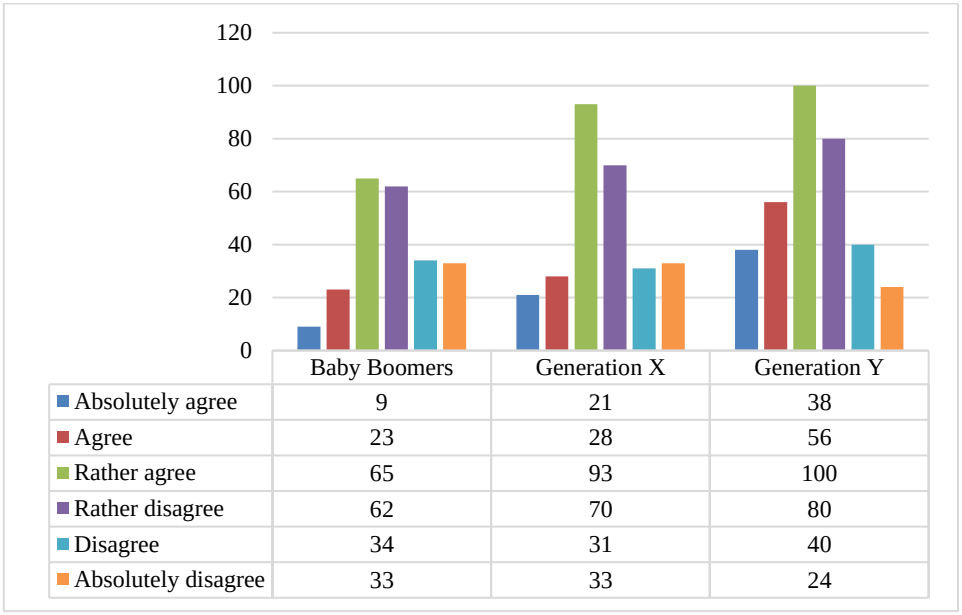


	Baby Boomers	Generation X	Generation Y
Absolutely agree	8	22	45
Agree	41	49	76
Rather agree	69	95	114
Rather disagree	51	51	67
Disagree	26	34	25
Absolutely disagree	31	25	11

Fig. 3. Statement: I consider my favourite brands as a part of me (Source: Author' work in MS Excel)

As the last was tested the statement: *I often feel personal connection between me and brands*. Also in this case the relation between agreement with this statement and participation in some generation was found. The number of significance was 2,27365E-07. It means that also in the case related to this statement we have to reject the null hypothesis and accept the alternative one. Accepted alternative hypothesis is: ***Participation in generation has significant influence on intensity of feeling personal connection with the brands.***

From Fig. 4. is apparent that members of generation Y tend to the brands more than other generations. Younger consumers (in the age 18-37 in 2017) feel stronger connections between brands and themselves than older consumers. The difference between generation Y and Baby Boomers are extensive.



	Baby Boomers	Generation X	Generation Y
Absolutely agree	9	21	38
Agree	23	28	56
Rather agree	65	93	100
Rather disagree	62	70	80
Disagree	34	31	40
Absolutely disagree	33	33	24

Fig. 4. Statement: I often feel personal connection between me and brands (Source: Author' work in MS Excel)

5 Conclusion

There are many generations in the market. Each of them deserves attention of academic researchers, from the generation Z to generation Builders, because they make the lucrative segments for practitioners.

Different generations have different attitudes to many fields. That is why it is important to investigate them. According to the findings the managers can adjust their communication to the selected segments. Generational marketing has its own grounding in the research. Because the members of the same generation experienced the same historical events and also grew up in the same conditions in macro-economic level. It is obvious that for these reasons the members of the same generation will have the equal or similar attitudes, opinions, behaviour and will distinguish from the other generations.

Not just the members of different generations are distinguishing from the others. Also the members of the same generation, but from distinct part of world, differentiate. Thus, it is necessary to investigate the members of the individual generations in many countries, because it is not possible to take the announcements of different generations from other country and used them in another.

This study focused on the consumers placed on the Czech market. The generation Y, X and Baby Boomers were investigated. For finding out, if there is any relation among participations in some generation and feeling the connections with the brands, three statements were tested. In all cases the relation was found. We can assert that different generations have different approaches.

From the survey is obvious that there is a big difference between generation Y and Baby Boomers. The differences between generation X and generation Y is not that notable. The younger generation (as generation Y) identifies with the brand easier than older generation (as Baby Boomers). In Czech market the Baby Boomers are not used to choose among various brands, which are currently on the market. On the other hand, the generation Y during its coming-of-age years had or has many options in the field of brand of various products. Thus, the competition on the side of seller is huge, but the survey showed that the members of generation Y tend to the connections with their favourite brands, from the personal to special connection. This implies that if the company's communication is well set up according to the preferences of generation Y, this company builds the strong brand among the members of generation Y. Afterwards they appropriate that and stay with this brand even if there are sometimes little shortcomings from the side of that brand. The generation Y is nowadays very lucrative segment because of its desire to shop, that is why it is important to pay more attention connected to this generation.

6 Acknowledgement

This research was financially supported by the Student grant competition project SGS/7/2017: "Acceptance of technology from the perspective of marketing tools."

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FINANCIAL MODELING OF THE MEAN-REVERTING PROCESS IN THE CASE OF AGRICULTURAL COMMODITIES

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Abstract
This paper deals with the financial application of mean reverting volatility trajectory driven by stochastic process. The Ornstein–Uhlenbeck model is used for volatility tracking of selected agricultural commodities. The parameters of the model were estimated using the Maximum likelihood function. The main aim of the paper is to determine the influence of unexpected external shocks for instance announcement for investors on the mean reverting process. Two simulation process for corn and wheat commodity futures are run. The results show the statistically confident influence of external shocks. The wheat commodity is most influenced by shocks introduced by strong evidence of "mean reversion" constant with rapid movements to the mean.

Keywords
Futures Corn and Wheat price, stochastic volatility, mean reverting process, OU – process, financial modelling.

JEL classification
Q14, B23, C01

1 Introduction

The study of price movements of financial assets or commodities is the main objective of many economist or financial practitioners. The aim to investigate price volatility is also the main core of many agricultural investors and hedgers. The agricultural commodities play an important role in the international commodity markets, especially the main worldwide commodity exchanges. The importance of price volatility analysis paper of Bouchet-Hourdon (2011) stressed out. According to that research, there is a significant change of trend in the commodity markets after years 2006 – 2009.

The motivation to investigate the price process of the selected agricultural commodities – corn and wheat are on the field of a new approach of financial price modelling, commodity derivatives hedging or replicating the investments positions. As well the price investigation is the core aim of agricultural producers, that can benefit from risk management or decision making. The selected commodities are from the family of basic food commodities, which are trading mostly in the commodity exchanges. One of the important purpose, why to focusing on these commodities, is that corn and wheat are useful for human nutrition. The analysis of price process influences both agricultural producers and processors.

The character of financial data with high-frequency has changed. Since Black and Scholes assumption of constant volatility (Black, Scholes, 1973) many empirical studies approved the existence of non-constant volatility. Generally, the stochastic volatility is driven by Brownian motion, the basic Wiener process. Thus the new approach to modelling volatility with mean reversion is occurring. The Ornstein-Uhlenbeck model (1930) has been introduced for detecting the reversion behaviour of the asset price. The mean reverting process is popular because this process can ensure the equilibrium of supply and demand for commodities (Doob, 1942). Author Siegel (2007) uses another meaning for "mean reverting" describing within the financial time series. The returns can be very stable in the long run but unstable in the short run.

The aim of this paper is to determine the external shocks by parametrization of mean reverting process, especially the Ornstein-Uhlebeck process. Also, the realized volatility of agricultural commodities is displayed.

The remainder of the paper as follows. The first section is an introduction with basic notes on the topic. The second's section is a literature review. Next, there is the section data and methodology with methods that are used. Finally, the sections results and conclusion follow.

2 Literature review

Authors Gibson and Schwartz (1990) deal with the mean-reverting process on the example of commodity convenience yield. Author Önalan (2009) model the OU mean-reverting process in the case of General Motor stocks. He shows the price process from the view of volume trading. Wets and Rios (2012) introduced the new methodology for the copper price. They created the new multi-dimensional non-linear system for a numerical solution in the case of the OU process.

Authors Bartoszek et al. (2017) deal with the concept of application the Ornstein-Uhlenbeck process in the field of biology. They applied the model to detect the relationship between species. Isah et al. (2015) use the impact of macroeconomic price shocks on the macroeconomic variables in Nigeria. They use GARCH and VaR models to investigate the influence of these factors.

The approach of financial modeling of mean reverting process with the modified Ornstein-Uhlenbeck process was used by authors Barndorff-Nielsen et al. (2001). The OU process was used also by authors Ricciardi and Sacerdote (1979). They modeled the neuronal activity by this type stochastic process. Perelló et al. (2008) used the dynamics for the description of the stochastic log-volatility within pricing of European call options and the feature of randomness. Authors Aalen and Gjessing (2004) study the OU process from a natural context following the equilibrium stand in the long run. They find some connections with financial modeling of interest rates.

Overall there is much application of price modeling in the commodity markets such as by authors Nowman and Wang (2010) or Taylor (2008).

3 Data and Methodology

Since the character of data is time series the problem of seasonality is occurring. The first variable represents the Futures Corn price. The second variable is the Futures Wheat price. Both variables are in US Dollar units. The dataset was obtained from the CME Stock exchange group. The period of observation consists of the years 2010 – 2013 with daily frequency. The estimation is obtained by MATLAB implementation code.

The Augmented Dickey-Fuller test for testing the hypothesis about the existence of unit root is used (Dickey, 1979). We approve the null hypothesis about non-stationarity in the data set with 5 % of significance. Therefore, the logarithmic returns are considered:

$$r = \ln(X_{t-1}/X_t)\,, \tag{1}$$

Where Xt is the price of and r is first order differentiated data. The logarithmic returns influence the price process with high values of kurtosis and negative skewness. We consider the leptokurtic distribution of transformed time series.

The Ornstein-Uhlenbeck process is modelled as:

$$dS_t = \lambda(\mu - S_t)dt + \sigma dW_t\,, \tag{2}$$

where W_t is a Brownian motion, λ investigates the speed of mean reversion, μ represents the long-run mean, in the other words tendency to revert to mean and σ is the stochastic volatility (Doob, 1942). Finally the parameter S_t is a commodity price at time t. The formula must satisfy these conditions: $\lambda > 0$ and $\sigma > 0$.

The Ornstein-Uhlenbeck process is continuous computed. From that reason it is needed to transform by closed – form solution on:

$$S_t = S_{t-1}\,\lambda(\mu - S_{t-1})\Delta t + \sigma dW_t \qquad (3)$$

Where W_t is a Brownian motion, λ is the mean reversion parameter of speed, S_t represents the commodity price at time t, μ is the long-run mean parameter and σ is the stochastic volatility parameter.

The Maximum Likelihood method is used for parameter estimation. The purpose is to maximize the likelihood function as:

$$L\,(\theta/t) = \prod_{i=1}^{n} p(t_i, \emptyset), \qquad (4)$$

where $\emptyset$ is the identifiable parameter, L represents the likelihood parameter and t is time (Mullowney, Iyengar, 2006).

4 Results

The parameters of OU process were obtained by maximization of Likelihood function. There are 3 values of parameters by each commodity. The results are presented below (Table 1 and 2).

Table 1. Estimation of WHEAT

Parameters	λ	μ	σ
	0.6289	0.8450	0.059

Significance on the 5% level, MATLAB estimation

Fig. 1. Wheat price (Source: Own computation, Microsoft Excel)

We can see from Table 1 that there is a strong evidence of mean reversion in the case of wheat price. The value of "mean-reversion" coefficient represented by value of 0.8450 introduces the high degree of tendency to the mean within a price process in the selected period. It is obvious also from the Chart 1. The price trajectory shows the effect of price shocks, which has tendency to very rapid reversion to the mean value. The speed of mean reversion is also significant with value of 0.6289. The volatility is on the value of 0.059.

Table 2. Estimation of CORN

Parameters	λ	μ	σ
Value	0.5420	0.6112	0.089

Significance on the 5% level, MATLAB estimation

In the case of Corn price the value of coefficient "long-run to the mean" is 0.6112, see Table 2. The tendency to revert to the mean is significantly high. The value of the coefficient "speed of the mean reversion" is on the value of 0.5420. There is also the strong reaction on the shocks modeled by OU process. The volatility of the price process is 0.089. We can see in the Chart 2 that the tendency to price movements to the mean is significantly strong. It displays the price dynamics of corn price within period 2010 – 2013 with evidence of stochastic mean reverting process. The chart 3 displays the level of volatility by both commodities. We can say that during the period was extreme value of volatility by corn commodity with shock, which is not incorporated in the estimation of parameters. The volatility for both commodities is approximately on the same value.

:

Fig. 2. Corn price (Source: Own compilation, Microsoft Excel)

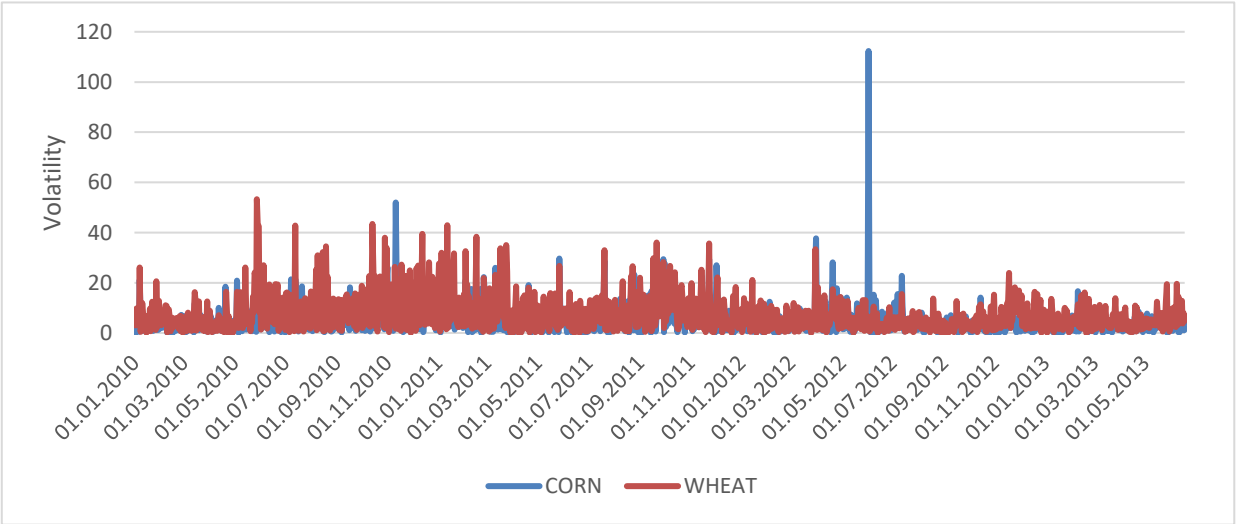

Fig. 3. Price volatility Source: Own computation, Microsoft Excel)

5 Conclusion

The financial processes of commodities corn and wheat are investigated with respect to mean-reverting price trajectory. The price behavior of each commodity follows a non-stationary path. The logarithmic transform was run. The Ornstein-Uhlenbeck process was run to estimate the parameters of price processes both for corn and wheat commodities. The results indicate that there is a strong influence of "mean-reversion" parameter by wheat commodity. It is influenced by the high degree of external shock, which are mean reverted. The value of the parameter for the speed of mean reversion process is also significant. The wheat commodity price has a tendency to rapid movements to the mean. In other words, external shocks are reflected more rapidly. The results are consistent with findings of Perelló (2008) with toward on reverting to mean value.

The corn price represents the variable with less speed to the mean of price process. The incorporation of external shocks is significantly slower. The volatility of both commodities is significantly at the same level. The corn price is more volatility than the wheat price. This paper can summarize that the main tradeable agricultural commodities follow the mean reverting process. The research can be extended by determination of exact factors, which influence the price process. Other interest of research can be in the field of stochastic volatility, especially the use of the model of volatility, e. g. GARCH etc. We can incorporate the findings to further research in the field of risk management analysis, for instance for the calculation of Value at Risk.

6 Acknowledgement

This research was financially supported by the Internal Grant Agency of Faculty of Economics, Czech University of Life Sciences Prague (Grant NO 20171031).

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THE NEXUS BETWEEN RENEWABLE ENERGY AND SUSTAINABLE DEVELOPMENT: A PANEL DATA ANALYSIS FOR SELECTED EU COUNTRIES

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Abstract
Provision of efficiency in energy use has a reputation that cannot be ignored in terms of sustainable development. When the depletion of natural energy resources is assessed on the axis of sustainable development, it requires both efficient use of existing natural resources and tending to renewable energy sources. Due to the high cost of renewable energy investments, it can be said that the relevant investments throughout Europe are not at the desired level. When one looks at the sustainability of growth, one of the most important variables in the forefront is the carbon emission levels in the countries concerned. In 2014, greenhouse gas emissions in the EU-28 were down by 22.9 % compared with 1990 levels, representing an absolute reduction of 1 136 million tonnes of CO_2-equivalents, putting the EU on track to surpass its 2020 target, which is to reduce GHG emissions by 20 % by 2020 and by 40 % by 2030 compared with 1990. The literature on energy economics includes a number of studies highlighting the linkages between the use of renewable energy sources and sustainable development. In this study, the relationship between greenhouse gas emissions consumption of renewable electricity energy and growth performance will be addressed in terms of sustainability in selected EU countries (Czech Republic, Slovakia, Slovenia, Poland, Hungary, Malta, Cyprus, Latvia, Lithuania and Estonia). In this framework, a panel data analysis help will be tried to reveal related relationships.

Keywords
CO_2, Sustainable Development, Renewable Energy, EU, Green Gas Emission.

JEL classification
Q43, O11, O13

1 Introduction

The changes in the world and the increase in the competition in the recent years are driving the countries to different quests in realizing the economic development moves. On the other hand, while the countries achieve the necessary economic development pattern, the other aim is sustainable development. Global warming, pollution and other environmental factors, as well as the so-called traditional sources of both the reduction in the amount of energy resources and sustainable development is controversial whether or not controversies constitute the main area of interest of recent studies. In this context, it is necessary to give priority to renewable energy resources in the development axis of countries.

Renewable energy resources need priority because: 1) the overwhelming scientific evidence that anthropological emissions of greenhouse gases from carbon combustion threaten catastrophic results from rapid climate change; 2) the severe health and environmental consequences from fossil fuel combustion being experienced in every major developing country city; and 3) the high cost, environmental damages and security threats of nuclear power. The aim of this paper is to examine the causal relationship among growth and renewable energy consumption.

Energy represents a vital factor for achieving sustainable economic growth, but the contemporary economic welfare is endangered by circumstances such as increased energy demand driven by the increase of world population which has entailed the quick consumption of traditional energy resources such as oil, coal, and natural gas, besides energy price rises, and discharging of harmful gases to the atmosphere.

The Renewable Energy Directive establishes an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual

national targets. All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020. On 30 November 2016, the Commission published a proposal for a revised Renewable Energy Directive to make the EU a global leader in renewable energy and ensure that the target of at least 27% renewables in the final energy consumption in the EU by 2030 is met.

2 Conceptual Framework for Sustainable Development

A review of the multidisciplinary literature on sustainable development reveals a lack of a comprehensive theoretical framework for understanding sustainable development and its complexities (Jabareen, 2004). The review shows that the definitions of sustainable development are vague (Gow, 1992; Mozaffar, 2001); that there is a lack of operative definitions (Villanueva, 1997: 154); that there is disagreement over what should be sustained (Redclift, 1993; Sachs, 1999: 25; Satterthwaite, 1996: 32); that the concept is unclear in terms of emotional commitment (Solow, 1992). Yet, there is no general agreement on how the concept should be translated into practice (Berke and Conroy, 2000). Andrews (1997) further observes that ''sustainable development is primarily symbolic rhetoric, with competing interests each redefining it to suit their own political agendas, rather than serving as an influential basis for policy development''. Beatley and Manning (1998) argue that there is a general sense that sustainability is a good thing, but that it still requires definition and elaboration.

When we look at the studies in the literature we can see for dimension about sustainable development.

First group of studies belongs to various bodies of knowledge across social sciences such as sociology, economy, politics, geography, architecture and urban studies, government and public policy. In addition, the review includes philosophy and ethics, environmental studies, ecology, and transportation. In brief, this study reviews all fields that concern and study sustainable development. Therefore, the study reviews journals and books in fields that cover sustainable development. Most of the reviewed books and articles were published in English mainly after 1987 the year of the Brundtland Report, Our Common Future (WCED, 1987).

Second group studies first aim is to note patterns within the results of the first step. This step looks for similarities or patterns within the sample and codes the results according to categories of meaning. Third group studies creating independent concepts, where each concept has distinctive meanings and represents close ideas. It is important to mention that the mechanism of concept-making is an iterative process and repetitive. When the concept is identified inductively, the researcher then moves into a verification mode, trying to confirm or qualify the finding. This then sets off a new inductive cycle. And the last group studies conceptualizing a theoretical framework of sustainable development and describing the relationship among the derived concepts.

3 General Economic Performance of Selected EU Countries (2008-2017)

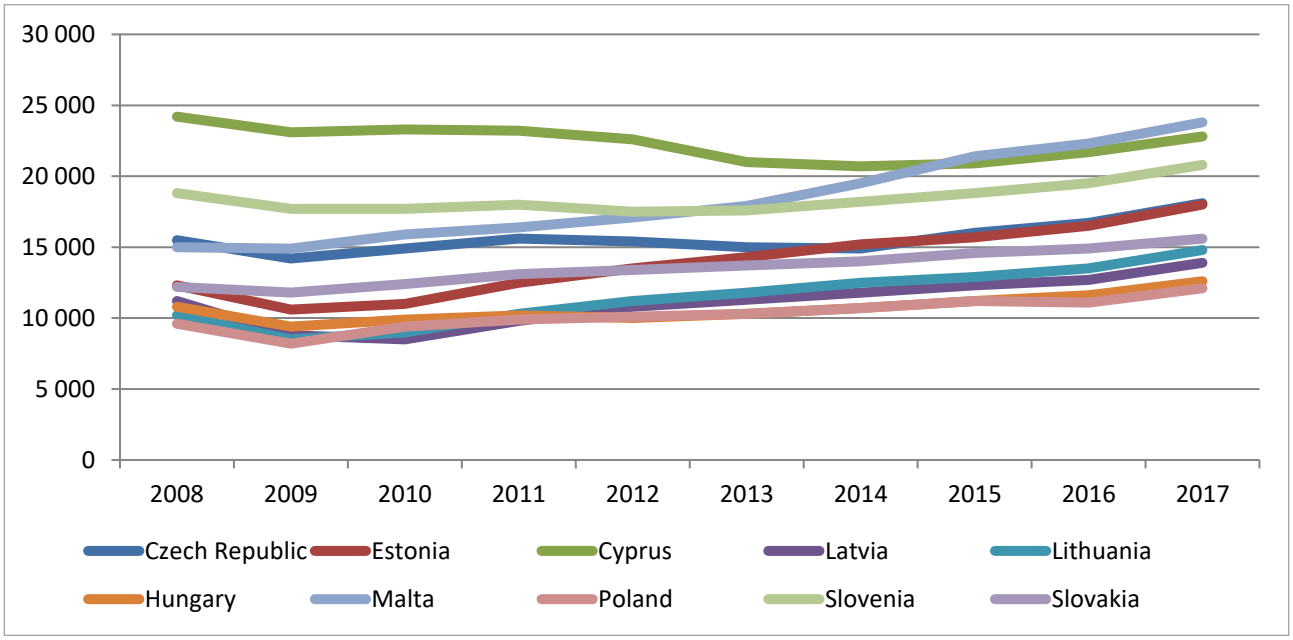

Fig. 1. GDP Per Capita In Selected Ten EU Countries (Source: https://ec.europa.eu/eurostat/data/database**)**

4 Nexus Between Renewable Energy and Sustainable Development

Renewable resources hold great promise for meeting the energy and development needs of all countries throughout the world, but particularly for developing countries where in many areas commitment has not been made to fossil fuel dominance and where rural areas may be served more economically than with traditional resources like kerosene and diesel fuel (Ottinger, 2005: 3).

There are many barriers to wider spread use of renewable energy resources; while they can be overcome and have been in many countries, doing so will require a large, concerted, prioritized effort. The main constraints to the more widespread use of renewable resources are (Ottinger, 2005: 9-10):

- Lack of information by the public, and even many government, commercial and industrial energy officials, about the availability, costs and benefits of renewable energy technologies;

- Lack of knowledge by project initiators and managers of the social and energy related needs of rural communities, how to adapt projects to meet these needs, and involvement of the communities in the design of projects. Failure of public involvement may be the most significant barrier. If projects fail to meet the local needs for which they are intended, such failures can impede renewable energy applications for decades. Rural community residents can ill afford unsuccessful experiments;

- Failure to get the prices right, particularly distorting the energy market when heavily subsidized traditional energy is compared to renewable energy options and the failure to value all resources on a life-cycle cost basis taking into account externality costs to society.

- Preference for known fossil resources over newer renewable resources by government, commercial and industrial officials responsible for making energy decisions and by banking and other financing officials;

- Discrimination against intermittent energy sources such as solar and wind power by pool power dispatchers, utilities and government procurement agencies, even though these resources often are available at peak times of power needs. Dispatchers often require commitments of availability with penalties for failure to comply that are unreasonable for intermittent resources. Utilities place unreasonable interconnection requirements such as excessive standby rates, cost recovery through fixed unavoidable charges which lengthen the payback period to intermittent r source providers, and exit fees charged the intermittent generator to compensate for stranded costs that are over-stated or even fictitious. Government agencies also often require excessively burdensome approval requirements for interconnection of intermittent resources. Dispatchers, utilities and government procurement regulators all usually fail to credit intermittent resources with the benefits they provide such as elimination of pollution emissions, prevention of power surges, fuel diversity and absence of fuel costs.

- Huge well-financed sales forces for traditional energy sources and frequently a financial stake by energy decision makers in these sources;

- Paucity of sales forces for renewable energy resources and lack of financial and political clout to promote them effectively;

- Lack of personnel trained in the installation, operation and maintenance of renewable energy equipment;

- Lack of knowledge and personnel trained in financing mechanisms available to support renewable energy projects;

- Import duties on renewable equipment and other barriers to foreign investment generally and as related to renewable energy resources; and

- The small amount of R&D effort and funding being devoted to improving renewable technologies.

5 Literature

Fang (2011) evaluates the role of both, the amount and share of renewable energy consumption in economic welfare for China from 1978 to 2008, using a production function and a multivariate ordinary least squares (OLS) approach. Apergis and Payne (2010) analyzed causality relationship between renewable energy consumption and economic growth in 13 countries in Europe and Asia for the period 1992-2007 and concluded that there was a two-way causality in both short and long-term. Shafiei et al. (2013) analyzed effects of renewable and non-renewable energy consumption on economic activities in comparison and concluded that both energy sources had an actuator role for economic growth in OECD countries. For a panel of twenty OECD countries, Ohler and Fetters (2014) implement an error correction model to analyze the causal relationship between economic growth and renewable electricity generation disaggregated by renewable energy sources (biomass, geothermal, hydro, solar, waste, and wind) considering data from 1990 to 2008. Inglesi-Lotz (2016) investigates the impact of renewable energy consumption on economic welfare for 34 OECD countries from 1990 to 2010, using a multivariate framework based on the production function.

6 Methodology

6.1 Data and Model

In this study, the relationship between per capita income (GDP), renewable energy use and greenhouse gas emissions is investigated. In the EU's 5th enlargement phase, a panel data set for EU economies was created. The definitions for the variables used in the analyzes are presented in Table 1.The data consist of a panel of ten EU countries which participate in to EU in 2004 with the fifth expanding process of EU (Czech Republic, Slovakia, Slovenia, Poland, Hungary, Malta, Cyprus, Latvia, Lithuania and Estonia), covering the period 2005 to 2016; the annual data from 2005 to 2016 are obtained from the World Bank's World Development Indicators and Eurostat database.

Symbol of Variable	Definition
REN	Share of Renewable Energy in Gross Final Energy Consumption
GDP	GDP per capita growth (annual %)
GGE	Greenhouse gas emissions - tonnes per capita

Thus, the following model may be employed to explore the causal relationships between variables:

$$GDP = \beta_0 + \beta_1 REN + \beta_2 GGE$$

7 Analysis Results

To test the stability of the generated series Levin, Lin & Chu unit root test was used. After than to determine the variables if they act together in long term Co-integration test was used which developed by Johansen. And lastly to determine the causal relationships between variables Granger causality test was used.
Among the variables in order to establish a causal relationship, whether or not the variables carry a consistency in themselves. It is important for the significance of the evaluations.

7.1 Unit Root Test

All variables are stationary at level.

Table 1. Panel Unit Root Test

Variables	Statistic	Prob*
GDP	-2,62	0,0044
REN	-2,45	0,0072
GGE	-2,7	0,0035

*Levin, Lin & Chu , * indicates the significance level % 5

7.2 Panel Cointegration Test

Results of cointegration analysis given in Table 2. Panel PP and Group PP prob values show that there is acointegration between GDP, REN and GGE in long term.

Table 2. Cointegration Results

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	1.218549	0.1115	0.955040	0.1698
Panel rho-Statistic	0.651601	0.7427	0.860803	0.8053
Panel PP-Statistic	-1.704599	0.0441*	-1.021266	0.1536
Panel ADF-Statistic	-1.539280	0.0619	-1.032582	0.1509

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.311419	0.9896
Group PP-Statistic	-2.126260	0.0167*
Group ADF-Statistic	-1.254682	0.1048

*indicates the significance level % 5.

7.3 Panel Causality Test

Causality tests results given in Table 3.

Table 3. Panel Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
REN does not Granger Cause GDP	100	0.11949	0.8875
GDP does not Granger Cause REN		2.06746	0.1322
GGE does not Granger Cause GDP	100	0.66618	0.5161
GDP does not Granger Cause GGE		4.46187	0.0141
GGE does not Granger Cause REN	100	1.16190	0.3173
REN does not Granger Cause GGE		1.18325	0.3108

Granger Causality tests show that there is a causality relationship between GDP and GGE. So we can say that the increase in GDP cause an increase in GGE. So the importance of renewable energies can evaluate healthy.

7.4 Fixed Effects Model

Hausmann test applied for which model is appropriate for the analysis. After the results of Hausmann test fixed model is appropriate. The analyses results are given in the Table 5.

Table 4. Fixed Effects Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5282.405	3609.400	1.463513	0.1462
REN	1107.377	86.29353	12.83267	0.0000
GGE	381.6785	291.1294	1.311027	0.1926
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.826595	Mean dependent var		25287.48
Adjusted R-squared	0.808933	S.D. dependent var		5364.438
S.E. of regression	2344.861	Akaike info criterion		18.45248
Sum squared resid	5.94E+08	Schwarz criterion		18.73123
Log likelihood	-1095.149	Hannan-Quinn criter.		18.56568
F-statistic	46.80163	Durbin-Watson stat		0.771682
Prob(F-statistic)	0.000000			

8 Conclusion

Renewable energy resources and their utilization are intimately related to sustainable development. For societies to attain or try to attain sustainable development, much effort should be devoted to discovering sustainable energy resources in terms of renewables. In addition, environmental concerns should be addressed. The following concluding remarks can be drawn from this study:

• There are a number of environmental problems that we face today. These problems span a continuously growing range of pollutants, hazards and ecosystem degradation over ever wider areas. The most significant ones are acid precipitation, stratospheric ozone depletion, and global climate change.

• Potentially the most important environmental problem relating to energy utilization is the greenhouse effect. Increasing atmospheric concentrations of greenhouse gases are increasing the manner in which these gases trap heat radiated from the Earth's surface, thereby raising the surface temperature of the Earth and as a consequence risen sea levels.

• Recently, a variety of potential solutions to the current environmental problems associated with the harmful pollutant emissions has evolved. However, renewable energy appears to be one of the most important solutions.

• Renewable energy technologies, in general, are sometimes seen as direct substitutes for existing technologies so that their benefits and costs are conceived in terms of assessment methods developed for the existing technologies. For example, solar and other renewable energy technologies can provide small incremental capacity additions to the existing energy systems with short lead times. Such power generation units usually provide more flexibility in incremental supply than large, long lead-time units such as nuclear power stations.

• Development of advanced renewable energy technologies that serve as cost-effective and environmentally responsible alternatives to conventional energy generation. Technical and market potential exists to significantly increase the current contribution of renewable energy sources to country's energy demands by the year 2000, resulting in employment and economic benefits many times the R&D investment. Many government energy institutions and agencies recognize this opportunity and support their renewable energy industry's efforts to exploit near-term commercial potential.

• In order to attain the energy, economic and environmental benefits that renewable energy sources offer, an integrated set of activities such as R&D, technology assessment, standards development and technology transfer should be conducted as required.

• Sustainable development demands a sustainable supply of energy resources that, in the long term, is readily and sustainably available at reasonable cost and can be utilized for all required tasks without causing negative societal impacts. Supplies of such energy resources as fossil fuels (coal, oil, and natural gas) and uranium are generally acknowledged to be finite; other energy sources such as sunlight, wind and falling water are generally considered renewable and therefore sustainable over the relatively long term.
• The exploitation of renewable energy resources and technologies is a key component of sustainable development due to the facts: (i) much less environmental impact, (ii) more flexibility, (iii) being undepleted, and (iv) decentralization possibility.
• Increasing world population requires the definition and successful implementation of sustainable development.

Biomass affords sustainable growth through decreasing financial and ecological expenditures concerning transport and contributes to national energy security by diminishing the reliance on fossil fuels. In addition, biomass lessens landfills by converting the waste that is detrimental to the environment into somewhat valuable, while the rural development is spurred by agriculture and forestry wastes.

Finally, consistent with EU Directive 2009/28/EC, we acknowledge that EU-28 states did not achieve yet the targets set for the share of renewable energy in gross final energy consumption and for the share of renewable energy in transport fuel consumption. As policy implications, the cooperation mechanisms among EU-28 states, in form of statistical transfers, joint projects, or joint support schemes, should be intensified. In fact, appropriate connections among countries will mitigate the risk of electricity failures, therewith reducing the demand for setting other power plants and enhancing the management of fluctuating solar or wind renewable energies.

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

THE RELATIONSHIP BETWEEN BUSINESS ENVIRONMENT AND PERFORMANCE OF THE CZECH ECONOMY

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Abstract
The aim of the article is to find out the relationship between the gross domestic product representing the Czech economy and the micro-environment, which is characterized by indicators of liquidity, profitability, activity and indebtedness for the period 2006-2016. In order to meet the objective of the article, variables such as gross domestic product, instantaneous, ready and current liquidity, return on equity and equity, return on inventories, receivables and payables, the ratio of foreign capital to equity, long-term and short-term bank loans. All data was drawn from the Czech Statistical Office and the AMADEUS database. For the purpose of this article, a total of 7,087 medium-sized companies were generated from the AMADEUS database. The correlation analysis and the Granger causality test were used to determine the relationship between the Czech economy and the micro-environment. The results of the correlation analysis showed a very weak correlation between gross domestic product and prompt liquidity, current liquidity, total capital and long-term bank loans. The Granger causality test demonstrated the effect of the existence of a two-way relationship between gross domestic product and long-term bank loans. At the same time, the effect of the unilateral relationship between the gross domestic product and the time of receivables turnover, the turnaround time, and the liquidity indicator were demonstrated.

Keywords
Activity indicators, gross domestic product, indebtedness indicators, liquidity indicators, microenvironment, profitability indicators.

JEL classification
E60, G10

1 Introduction

Among the most important factors that influence the motivation to start business and the course of the business itself is the economic, political and social climate. In summary, these aspects are referred to as the business environment. All macroeconomic and microeconomic environments affect all businesses. The business environment is given in particular by the legislative and economic aspects of each country, which affects entrepreneurs, but this principle also works in reverse – entrepreneurs determine the character of the business environment.

The business environment is a very comprehensive concept that can be explained in several possible ways. Guinn, Kratochvíl and Hashesh (2009) define the business environment as a set of impacts on entrepreneurs, businesses and business itself. Business development is directly influenced by the quality of the business environment, which is made up of a wide range of business conditions in the field of legislation, institutional infrastructure and market operations. The creation of the business environment is mainly driven by government bodies managed by relevant ministries, state-run or state-supported institutions, courts and public authorities. Another definition says that the business environment is a sum of factors, such as economic, political, legal, technological, social and cultural factors. These factors have a significant impact on the quality of business environment conditions, in which business entities develop their activities and significantly influence their competitiveness, performance, growth potential and determine the attractiveness of the country for foreign investors (Kalinská, 2010).

At the turn of the 19th century, the development of the business environment and its problems are increasingly becoming the subject of scientific research. A successful business sector in each country is an important prerequisite for economic growth. In terms of the economy, the business environment

shapes both macroeconomic characteristics and the financial sector situation that determines enterprise access to capital. The business sector is very closely related to a financial analysis that examines the financial health of an enterprise and is an integral part of the systematic financial management of the business. Financial analysis is, in other words, the feedback of all assets – it reveals where the business has been in the various areas of financial management, what financial goals have been achieved and, on the contrary, which objectives are the weakness of the business. Financial analysis methods are used to identify most business risks.

Financial analysis is an important part of the municipal financial management complex as it provides feedback between the anticipated effect of decision-making decisions and reality. It is closely linked to financial accounting, which provides data and information for financial decision making through the main financial statements: balance sheet, profit and loss account, and cash flow statement. These statements are compiled on the basis of financial accounting as a process that collects, records, classifies and documents the municipal management data. The sources for financial analysis are also sources of in-house accounting, economic statistics, money and capital markets.

According to Odehnal and Michálek (2011), the microeconomic environment of the business environment is represented by the presence of specific factors, whose existence directly affects the behavior of economic subjects, and thus differentiates on the basis of the attractiveness of the environment, for example for potential investors. The presence of factors characterizing such a defined business environment thus acts as one of the possible causes influencing the economic maturity of the regions.

The aim of the article is to find out the relationship between the gross domestic product representing the Czech economy and the micro-environment, which is characterized by indicators of liquidity, profitability, activity and indebtedness for the period 2006-2016. To achieve the objective of the article, variables such as gross domestic product, instantaneous, ready and current liquidity, return on equity and equity, good stock turnover, receivables and payables, the ratio of foreign capital to equity, long-term and short-term bank loans were used.

The article structure is as follows. The first chapter of the article will include an overview of literature focusing on the relationship between the Czech Republic's business environment represented by Gross Domestic Product and indicators of profitability, liquidity, assets and indebtedness, and Gross Domestic Product in terms of the business environment of small and medium-sized firms. The second part of the thesis will focus on the chosen methodology and the data used, the individual methods that will be needed to fulfill the stated goal will be described. The following section of the article will contain the results and discussion over them. In the last part of the article, all results will be summarized.

2 Literature review

According to Petříček (2006), the business environment shapes both the macroeconomic characteristics and the situation in the financial sector regulated by the monetary policy, which determines to a large extent the access of companies to capital. In order to improve not only the business environment on the territory of the municipalities, various financial instruments of public finances are used. The economic performance of the business sector will also depend on the extent to which there is a good business environment – in other words, the state has a good environment if it appropriately supports entrepreneurship, if it has the right legislation, and at the same time effective law enforcement and flexible state and public administration.

Bélas et al. (2015) point out that the financial crisis and the gradual recovery of economies in the European Economic Area cause a deterioration in the business environment. The basic prerequisite for the successful management and development of all enterprises is a favorable business environment in which the state supports and protects competition, creates clear and stable rules and effectively ensures compliance with all market participants while minimizing administrative barriers to entrepreneurs. Positive perceptions of the company's business situation could mean a greater interest

in starting a business, which may further lead to higher GDP and higher employment rates. In general, countries with better business conditions also have a higher standard of living.

Financial security for economic entities is part of the state's financial security, as the company generates added value, which is a gross domestic product at the state level. Delas, Nosova and Yafinov (2015) state that businesses are among the main taxpayers that influence government revenue and local budgets. Matviychuk (2009) defines the company's financial security as an identified system of real and potential external and internal threats that may affect the financial interests of the company.

The theoretical background between financial development and economic growth can only be observed at the beginning of the last century (Hermes, 1994; Khan and Sendhaji, 2003). With regard to the theoretical background, views on the importance of the financial sector and economic growth in 2008 were divided into two main categories, when (i) the first came from the Schumpeter study (1911), the oldest economist who emphasized the importance of finance in the process of economic development, financial services in promoting economic growth, and (ii) the second category, which is derived from the Robinson Study (1952), which considered finance to be an unimportant factor in the growth process.

The relationship between financial development and economic growth was one of the most discussed topics. The most frequent questions in this area were whether the financial sector influences and contributes to the process of economic development. There are many empirical studies exploring the experiences of developed countries and their economies. According to Levine (1997), financial systems facilitate trading, securing and pooling risks, tracking managers and developing corporate control, facilitating the exchange of goods and services, and so on.

With regard to empirical literature in this area, there are countless empirical studies dealing with this issue. These include the Al-Tamini et al. (2002) which examines the causal relationship between the indicators of financial development and economic growth by analyzing time series for selected Arab countries. The results showed a strong long-term link between financial development and real GDP growth in 2004. However, the Granger causality test and the impulse response function indicate that this link is weak in the short run. Moreover, there is no evidence that financial developments have affected economic growth and vice versa.

Based on existing empirical literature on causation between financial development and economic growth, the bivariate model can be written as follows (Calderón, Liu, 2003):

$$Economic\ Growth = f\ (Financial\ Development) \tag{1}$$

This issue was also dealt with by authors such as Achy (2005); Boulila and Trabelsi (2004); Craene et al. (2004).

3 Metohodology and data

To achieve the goal of the article, all data was drawn from the Czech Statistical Office and the AMADEUS database. The data set includes a time series ranging from 2006 to 2016, when all data are surveyed on an annual basis. For the purpose of this article, a total of 7,087 medium-sized companies were generated from the AMADEUS database. The AMADEUS database provides data from each company's annual reports. According to this database, a medium-sized enterprise can be understood as an enterprise with operating revenues of more than EUR 1 million, total assets greater than EUR 2 million and more than 15 employees.

In order to determine the relationship between the gross domestic product representing the Czech economy and the micro-environment, which is characterized by the indicators of liquidity, profitability, activity and indebtedness, the variables listed in Table 1 below will be used.

Table 1. Overview of used variables

Marking a variable	Variable name	Calculation
Liquidity indicators		
L1	cash ratio	$\frac{cash}{current\ liabilities}$
L2	quick ratio	$\frac{current\ assets - inventory}{current\ liabilities}$
L3	current ratio	$\frac{current\ assets}{current\ liabilities}$
Ukazatele rentability		
ROA	return on total capital (return on assets)	$\frac{profit\ before\ tax\ (EBIT)}{total\ assets} * 100$
ROE	return on equity	$\frac{profit\ after\ tax\ (EAT)}{equity} * 100$
Indicators of activity		
NDI	number of days inventory	$\frac{inventory}{sales/365}$
NDR	number of days receivables	$\frac{receivables}{sales/365}$
NDL	number od days liabilities	$\frac{liabilities}{sales/365}$
Debt indicators		
DER	the ratio of debt to equity (debt to equity)	$\frac{debt}{equity}$
LTL	long-term loans	$\frac{long - term\ loans}{total\ assets}$
STL	short-term loans	$\frac{short - term\ loans}{total\ assets}$

Source: own processing.

Liquidity indicators such as current liquidity, prompt and immediate, point to how quickly an enterprise is able to repay its short-term liabilities. According to Shim and Siegel (2000), the liquidity of the company's ability to liquidate a short-term debt that is payable within one year. Maintaining sufficient liquidity is the goal or even the prerequisite for any company without which it would not be possible to achieve business continuity. Maness and Zietlow (2005), a low level of liquidity can lead to increased financial costs and consequent inability to pay their liabilities. Matarazz (2003) also states that high liquidity is as undesirable as low liquidity, which means poor financial management of the company.

Profitability indicators provide information on the effectiveness of the business and evaluate the profitability of the business. The higher the values, the better for the business. Based on profitability indicators, it is also possible to find out whether it is more efficient to use own funds or foreign capital and, last but not least, also points to weaknesses in the management. Profitability can be defined as

the ultimate measure of the economic success the firm has achieved in relation to the invested capital in the enterprise. Profitability assessment is usually done through ROA and ROE, which is the ultimate indicator of economic success (Pimentel, Braga, Casa Nova, 2005).

Activity pointers provide information on how companies effectively manage their assets, assets, receivables, inventories etc. Turnover and turnarounds are tracked, with the turnover being the highest, and the turnaround in days should be as low as possible values.

The credit load of businesses evaluates debt ratios that indicate the relationship between the foreign and the company's own resources. The credit burden on businesses is somewhat desirable, but the company may not be burdened with high financial costs. Higher levels of indebtedness are possible, but only on the basis of higher returns.

Gross domestic product showing the performance of the Czech economy in the monitored period reached an alternate trend. Figure 1 graphically shows the evolution of gross domestic product between 2006 and 2016.

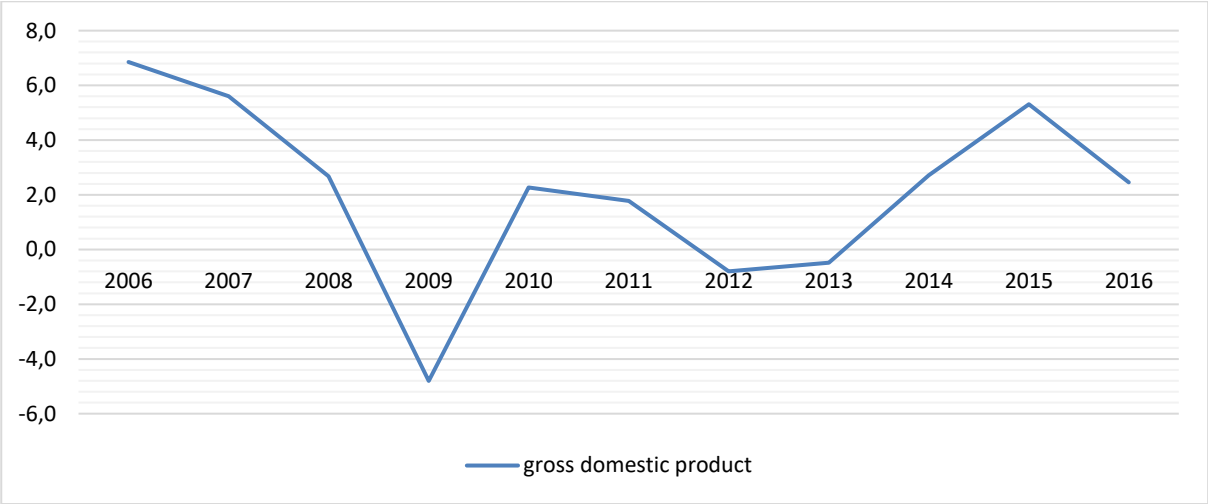

Fig. 1. Development of Gross Domestic Product for 2006-2016 (Source: Web Portal Czech Statistical Office: Main Macroeconomic Indicators [online] [seen 20 September 2018]. Available from: < https://www.czso.cz/csu/czso/hmu_cr>.)

From the graph in Figure 1, it is evident that in 2006 the growth rate of gross domestic product was at record level. The Czech economy at that time increased its economic performance by 6.1% as well as in 2005. The dynamics achieved became one of the fastest growing countries in Europe. Only the Baltic countries and Slovakia grew faster. For the domestic economy, the importance of trade flows from the high share of export and import value to GDP.

The development of the Czech economy continued in positive trends over the period 2006-2008 despite a slight decline in GDP, reflecting the stabilized economic environment. However, the results of the fourth quarter of 2008 were already showing an upcoming economic recession. In 2009, after a ten-year period of continuous growth, gross domestic product fell by 4.1% year-on-year, which was also the deepest decline in the history of the Czech economy. The development of the Czech economy did not differ significantly from the overall economic situation in Europe. This is particularly true of the year-on-year decline in gross domestic product, which was also 4.1% in euro area countries.

The relationship between the business environment, which is defined by the indicators of liquidity, profitability, activity and indebtedness and the performance of the Czech economy, which is presented by gross domestic product, will be used for correlation analysis. Pearson's correlation coefficient r, which measures the linear dependence of two random variables on a two-dimensional normal distribution, can be used to measure dependence and can be expressed using the following equation (Hendl, 2009):

$$r = \frac{\sum(x_i - \bar{x})\,(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2\ \sum(y_i - \bar{y})^2}} \tag{2}$$

where the sum of the squares in the denominator is n-1 times the sample scatter. Therefore, it is more likely to encounter a simpler correlation coefficient in the following form:

$$r = \frac{s_{xy}}{s_x s_y} \tag{3}$$

where sx is the standard deviation of the variable X, the standard deviation of the variable Y and the so-called covariance of the variables X and Y, which is calculated as follows:

$$s_{xy} = \frac{1}{n-1}\sum(x_i - \bar{x})\,(y_i - \bar{y}) \tag{4}$$

In this case, the Y variable represents the Czech economy represented by the Gross Domestic Product, and the X variables are indicators of the microeconomic environment, such as indicators of liquidity, profitability, activity and indebtedness.

Correct interpretation of the correlation coefficient assumes that both variables are random variables and have a common two-dimensional normal distribution. Then the zero correlation coefficient means that the quantities are independent. The closer the relationship between the two variables is, the more the absolute value of the correlation coefficient approaches one. The negative values of the correlation coefficient express indirect correlation (with the increase of the values of one variable the values of the second variable are reduced), the positive values indicate the correlation direct (the values of one variable also increase the values of the second variable). If the value r approaches zero, it means that there is no linear correlation between the variables.

Correlation is a measure of context, so the correlation force can also be described verbally. According to Evans (1996), an interpretation for the absolute value of the correlation coefficient can be used to determine the correlation force between the variables as follows:

- 0,00 – 0,19 „very weak correlation “,
- 0,20 – 0,39 „weak correlation “,
- 0,40 – 0,59 „middle correlation “,
- 0,60 – 0,79 „strong correlation “,
- 0,80 – 1,00 „very strong correlation “.

Using correlation analysis, we can see if there is a link between the variables (positive, negative, neutral), and how strong the relationship is between dependencies.

In order to determine whether there are short-term relationships between two time series, the Granger causality test is used in econometrics. The Granger test (2003) works with stationary rows and delays that are used in cointegration analysis. The goal of Granger's causality is to reject the zero hypothesis that there is no causal relationship between the variables studied. Granger causality can be determined by the following equations:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{\sigma} \beta_{1i}\, \Delta Y_{t-i} + \sum_{i=1}^{\gamma} \beta_{2i} \Delta X_{t-1} + \varepsilon_{1t} \quad (5)$$

$$\Delta X_t = \varphi_0 + \sum_{i=1}^{\gamma} \varphi_{1i}\, \Delta X_{t-i} + \sum_{i=1}^{\gamma} \varphi_{2i} \Delta Y_{t-1} + \varepsilon_{2t} \quad (6)$$

where Y_t and X_t represent in our case the Czech economy and microeconomic variables, ε_t error or residual component, β_0 and φ_0 constants of causal equations, β_{1i}, $\beta_{2i,}$ φ_{1i} and φ_{2i} intersections with X and Y axes.

4 Results and discussions

The following section presents the results of the correlation analysis and Granger causality test, including their subsequent comments. In order to determine the relationship between the gross domestic product representing the Czech economy and the micro-environment, which is characterized by indicators of liquidity, profitability, activity and indebtedness for the period 2006-2016, a correlation analysis was first used, the results of which are presented in Table 2 below.

Table 2. Correlation between gross domestic product and selected microeconomic indicators

	Indicators liquidity			Profitability indicators		Indicators activities			Indicators indebtedness		
	L1	**L2**	**L3**	**ROA**	**ROE**	**NDI**	**NDR**	**NDL**	**DER**	**LTL**	**STL**
GDP	-0.0002	0.0099	0.0127	0.0298	0.0045	-0.0035	0.0012	0.0031	-0.0031	0.0451	-0.0045
Prob.	0.9538	0.0087	0.0007	0.0000	0.2360	0.3497	0.7483	0.4100	0.4133	0.0000	0.2303

Source: own processing.

Table 2 shows that there is a very weak correlation linking to a negative correlation between gross domestic product and instant liquidity (L1), but this link is not at 1%, 5% or 10%, which means that this relationship can not be considered statistically significant. There are also no statistically significant relationships between Gross Domestic Product and Return on Equity (ROE), number of days inventory (NDI), number of days receivables (NDR), number od days liabilities (NDL), the ratio of debt to equity (DER) and short-term bank loans (STL).

Within the liquidity indicators, the table shows that there is a very weak correlation between gross domestic product and prompt liquidity (L2). This resulting relationship was confirmed at a significance level of 1%. This means that L2 growth will trigger GDP growth and vice versa. Positive very weak correlation dependence on 1% of statistical significance was also demonstrated between GDP and current liquidity (L3), total equity (ROA) and long-term bank loans (LTL).

By means of correlation analysis, there was a link between variables such as gross domestic product and indicators of liquidity, profitability, activity and indebtedness, and how strong the correlation dependency between the variables examined is. Using the Granger causality test, we can determine the direction in which the variables analyzed are mutually affected, as shown in Table 3.

Table 3: The results of Granger causality in micro-environment conditions of the Czech Republic

Variables	F-Statistic	Probability
LTL → HDP HDP → LTL	16.6119 46.3668	5.E-05 1.E-11
HDP → NDR	3.50080	0.0613
HDP → NDL	4.12499	0.0423
HDP → L1	2.81370	0.0935
HDP → L2	10.4193	0.0012
HDP → L3	12.2583	0.0005

Source: own processing.

Table 3 shows that the effect of the bilateral relationship between gross domestic product (GDP) and long-term bank loans (LTL) has been demonstrated. This means that if there is a change in LTL, GDP will also change. At the same time, on the basis of Granger's causality, the test showed the effect of the unilateral relationship between gross domestic product and the time of receivables turnover, the turnaround time, and liquidity indicators such as immediate, prompt and current liquidity.

For example, in the debt ratio, namely long-term bank lending, there is the fact that companies are more indebted, leading to greater business development, and companies can invest more, which will increase to higher GDP. On the other hand, too high a debt can cause over-indebtedness in the longer term, which can lead to bankruptcy. This will result in smaller-scale corporate investments and activities, which may affect the decline in GDP.

On the other hand, if there is a change in GDP now, this change will affect the amount of receivables turnover, the turnaround time and the liquidity of the enterprises (L1, L2, L3).

5 Conclusion

The relationship between financial development and economic growth has long been an important issue in the European Union. The aim of the article was to find out the relationship between the gross domestic product representing the Czech economy and the micro-environment, which is characterized by indicators of liquidity, profitability, activity and indebtedness for the period 2006-2016. To achieve the objective of the article, variables such as gross domestic product, instantaneous, ready and current liquidity, return on equity and equity, good stock turnover, receivables and payables, the ratio of foreign capital to equity, long-term and short-term bank loans were used.

In the empirical part, the relation of individual microeconomic indicators (immediate, ready and current liquidity, profitability of total and equity capital, good stock turnover, receivables and liabilities, ratio of foreign capital to equity, long-term and short-term bank loans) with gross domestic product. All findings were in line with the findings of the correlation analysis that identified the relationship between GDP and selected microeconomic indicators.

Within the correlation between gross domestic product and selected microeconomic indicators, it has been demonstrated that relationships between GDP and instant liquidity, return on equity, stock turnover time, debt turnover time, turn-over time, the ratio of foreign capital to equity can not be considered statistically significant and short-term bank loans because this link is not at a materiality level of 1%, 5% or 10%.

Within the liquidity indicators, there was a very weak correlation between the gross domestic product and the prompt liquidity (L2). This resulting relationship was confirmed at a significance level of 1%. This means that L2 growth will trigger GDP growth and vice versa. Positive very weak correlation dependence on 1% of statistical significance was also demonstrated between GDP and current liquidity (L3), total equity (ROA) and long-term bank loans (LTL).

The Granger Causality test demonstrated the effect of the existence of a bilateral relationship between Gross Domestic Product (GDP) and Long-Term Bank Loans (LTL). At the same time, on the basis of Granger's causality, the test showed the effect of the unilateral relationship between gross

domestic product and the time of receivables turnover, the turnaround time, and liquidity indicators such as immediate, prompt and current liquidity.

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

ALTERNATIVE APPROACH FOR EVALUATION OF INNOVATIONS: PURE AND COMBINED INNOVATIONS IN SOCIAL ENTERPRISES

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Abstract
The main goal of this paper is to evaluate the current situation of innovative activities in social enterprises. A literature review is made to reflect existing research findings on relationship between innovative activities, social enterprises and social innovations. According those findings, two sets of innovations in social enterprises is theoretically defined as group of pure and combined innovations. Each of these two mentioned groups consists of six innovative areas to be presented and discussed. Every innovative area is described by percentage share on whole group. The main assessment condition is that the sum of all six innovative areas cannot exceed 100%. This paper focuses on the total amount of a pure, employee-focused innovation, because it is the main research problem which solved in social enterprises. The Evaluation is based on qualitative secondary research data of existing social enterprises in the Czech Republic. At the end of the paper possibilities of further primary research in this area are pointed out. This work was supported by the Silesian University in Opava, by the Student Grant System SGS/06/2018 "Economic Literacy of Business Entities".

Keywords
Social enterprise, social innovation, social activities, pure innovation, combined innovation.

JEL classification
O35, P31

1 Introduction

The number of social enterprises, especially in form of work integration social enterprises (WISE) in the Czech Republic is growing and therefore the need to focus on their activities. A major problem is still the insufficient characterization of these concepts. Different views of authors and scientific disciplines often lead to the creation of their own definitions suitable for their research area. In the Czech Republic, the representation of "WISE" is still very small. Despite the small number of WISE, they are so important to society and labour market development. They offer the opportunity to work for disadvantaged people in the labour market, which cannot be employed by ordinary enterprises. These enterprises are different from ordinary enterprises and cannot be assigned to non-profit-making enterprises as they operate for profit. However, their productive activity and effectiveness may be much smaller due to the employment of disadvantaged people. In addition, their innovation activity should not primarily concerned to the production environment but mostly to support employees what is the main social driver of a WISE. Social innovation activity should be a part of this entrepreneurial activity to maintain the social aspect. However, the social activity in the "WISE" in the Czech Republic is mostly unknown and not described in detail in research articles.

The main topic of this paper is to characterize the social enterprises and their innovation activities. However, the question of social innovation and its realization within the social enterprise is debatable within the social enterprise. This paper will focus on the total amount of a pure, employee-focused innovation, because the main research problem is solved in social enterprises. As being mentioned, a work integration social enterprises (WISE) focus only on employment and social inclusion of disadvantaged people on the labour market (Tessea, 2018). Given to a work integration social enterprises the goal, two research questions were formulated. Therefore a first research question arises: *"Are social enterprises in process of creation of social innovation in the Czech Republic?"* The second research question follow as: "*Is the amount of social innovations the largest part of pure and combined innovations?"* The aim of the paper is to evaluate the incidence and frequency of social innovations in social enterprises through pure and combined innovations. This paper explores the gap in social innovation in the Czech Republic. The gap is pure and combined innovations in social

enterprises. In each surveyed enterprise, pure and combined innovations must amount to a hundred percent.

2 Review of literature

Social enterprises and their connection with social innovations is a highly discussed area. Despite this, definition of social innovations is not uniform. (Mulgan, 2006; Loudín, 2015; Baregheh, et al., 2009) Social innovation is becoming a phenomenon of economic and social development of society and social welfare. (Šebestová and Palová, 2016) There are many different views of social enterprises and social innovation around the world. Definitions refer to a process or behaviour, focus on the founder of the initiative and refer to a tangible result. (Mair and Marti, 2006)

Following that, Wildmannová (2017) pointed out that: *"the social enterprises are on the one hand required to achieve business success and on the other hand they are supposed to meet the determined social objectives with democratic involvement while it is necessary to maintain their stability over time and they have to respect boundaries when the business is social and at the same time capable of surviving in the market"*. There are many other pints of view on social enterprise and social innovation, for example that "*social entrepreneurship is based on partnership between the public and private sectors in providing public services and promoting public employment policy"* (Hunčová in Wildmannová, 2017). Opposite to that Gidron et. al. (2012) clarified the situation as "*social entrepreneurship is generally an activity aimed at addressing social goals through market transactions, which corresponds to the operations of private organizations"* (Gidron et. al., 2012).

According to Mair and Marti (2006), definitions of social entrepreneurship usually refer to behaviour or process, and definitions of social enterprises usually refer to the tangible result of social entrepreneurship. Thus, the definitions are usually set up according to the thematic focus.

Mulgan (2007) explained that "*social innovation refers to new ideas that work in meeting social goals"*. Compared to that Šebestová and Palová (2016) points out had shown that, "*in the area of social innovation, it is clear that more institutions will be involved, new standards and procedures may be introduced, and more innovations will be created"*.

Historically, social enterprises and social innovations have a long tradition in the world and this term has been used since the nineteenth century (Loudín, 2015). In contrast to earlier findings, however, the Czech Republic has not such a long tradition in the field of social enterprises and social innovation (Šebestová and Palová, 2016). This can also be caused in the unaccepted legislative documents social entrepreneurship. While legislation is still not available, there are approximately 222 social enterprises in the Czech Republic and their number is still arising. (CSP, 2018) Due to the low awareness of the social entrepreneurial environment in the Czech entrepreneurship environment about "social entrepreneurship", this term often raises negative feelings. In Western Europe it is the opposite. Here the term "social entrepreneurship" generates positive feelings. (Asmalovskij and Sadílek, 2016)

Social entrepreneurship is considered to be an economic activity if it has set social goals. In this case, micro-level and macro-level can be considered for social entrepreneurship. The micro level is an entrepreneurial activity aimed at employing disadvantaged people in the labour market. The macro-level can be seen as a strategy of the state to relieve its budgets. (Gojová, 2014) This paper addresses social innovations in social entrepreneurship at the micro-level. Social, environmental and economic goals are set in the social entrepreneurship market that can provide social benefits and tackle a complex social problem (Leadbeater, 2007).

Due to the aim of the study on social enterprises and their innovative activities in the Czech Republic, this paper will use the definition suggested in Krejčí and Šebestová (2018), which describes social innovation as an employee-focused innovation and will expand these findings. Innovations in the social enterprise can be divided into product-oriented innovations, employee-focused innovations and enterprise-wide innovations. These three innovations have some level of uncertainty about innovation and thanks to this there is an uncertainty about the importance of individual innovations

for enterprises. (Krejčí and Šebestová, 2018) In view of this uncertainty, these three innovations are discussed in detail in this paper.

3 Research methodology

A suitable form of problem solving is the use combination of primary and secondary research. This paper use secondary research data only to help to get the necessary information for the future primary research.

This research methodology had four phases. The first phase of the research consists of the collection of information from the field of social innovations. In the Czech Republic's environment could be found just little research data on social innovations. Based on the data collected, the characteristics of the market for social enterprises and the subsequent distribution of social innovations could be created (see Fig. 1.). A significant part of the first phase of the research is based on the study of Krejci and Šebestová (2018).

The second phase of the research is aimed at exploring social innovations in selected enterprises. Secondary data was used in the form of mini-case studies based on qualitative description. As an output, a obtained a useful set of indicators of social innovations for the second phase of the study. For the correct operation of this model, the following characteristics of the social enterprise were set:

- Innovations are divided into pure and combined in each social enterprise.
- All the examined social enterprises are work integration social enterprises (WISE).
- All social innovations can be divided between pure and combined by percentage share.
- Pure and combined social innovation covers 100% of total innovative activities in every social enterprise.

The third phase of research examined the level of social innovations in social enterprises, with the help of the selection of social innovations to the pure and the combined innovations. According to Krejči and Šebestová (2018), the creation of individual innovations and their typology into three types of innovation cannot be sufficiently assessed in Czech social enterprises. Based on this research, the selection of innovations in social enterprises to the pure and the combined innovations expands this research area.

Pure social innovations are product-oriented innovations, employee-focused innovations and enterprise-wide innovations. Pure employee-focused innovations mean innovation aimed at improvement of the lives of employees in a social enterprise (for example, innovations fully supporting the facilitation of work for disadvantaged employees). Pure product-oriented innovation means innovation aimed at improving the quality of products or services produced by the enterprise (for example the purchase of new technology). Pure enterprise-wide innovation means to be innovation to improve the environment in a social enterprise and around a social enterprise (for example repairing the roof or refurbishing the exterior of the enterprise).

Combined social innovation are product and employee oriented innovations, employee and enterprise wide oriented innovations and product and enterprise wide oriented innovations. Combined product and employee oriented innovation means innovation that partially improves the production of a social enterprise and partially improves the lives of employees in a social enterprise (for example technology that partially improves the efficiency of production and partially relieves the work of disadvantaged employees). Combined employee and enterprise wide-oriented innovation means to innovate partially improving the life of employees in a social enterprise and partially improving the environment in a social enterprise (for example the reconstruction of changing rooms or sanitary facilities). Combined product and enterprise wide-oriented innovation means innovation that partially improves production and partially improves the environment in a social enterprise.

The last phase evaluates the amount of individual innovations in social enterprises and the rate of social innovations in social enterprises. The aim of research to explore social innovations in social enterprises is to find a gap for further research on social innovation. To evaluate the final results, the logic induction method is used (Vaceková et al., 2015).

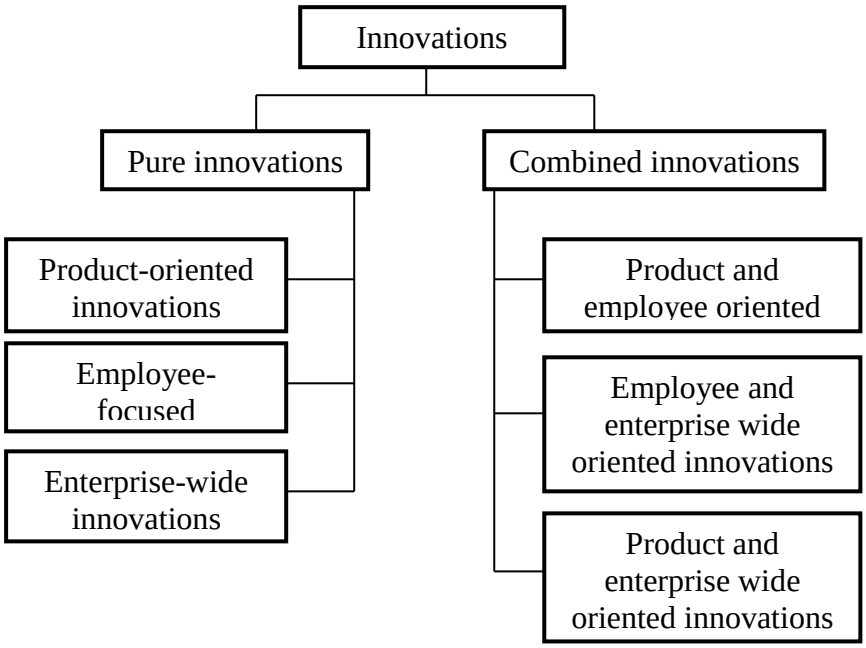

Fig. 1. Partition of innovation in social enterprises

4 Data

A work integration social enterprises (WISE) invest some of their profits in innovation related to human resources management. Innovation within the work integration social enterprises (WISE) associated with human resources management is called social innovation. The only social innovation is pure innovation in employees in wise. Examining pure and combined innovation expands the "type of innovations" that have some uncertainty about innovation and thanks to this there is uncertainty about the importance of individual innovations for enterprises (Krejčí and Šebestová, 2018). Social enterprises may meet the economic, social and environmental principle and at least 50% of the profit is invested back into the enterprise. However, these social enterprises should also have, for example, local or regional ecological orientation or use of a portion of profit to develop services targeted at the target group of beneficiaries (Dohnalová et al.; 2015, Wronka, 2013; Krejčí and Šebestová, 2018).

A work integration social enterprises (WISE) in the Czech Republic very often use public support. If they meet the basic conditions for inclusion among social enterprises, they can use public support. (Wildmannová, 2017) Financial support can also be used for social innovation. Assuming the use of public financial support for social innovation, verifiability of the use of finance is needed. It is necessary to determine whether public financial support is really used for social innovation. So, it is needed to find out if "WISE" really is creating social innovation.

To answer the research questions, five integration social enterprises were selected, which were already researching in Krejčí and Šebestová (2018). A sample of five work integration social enterprises (WISE) meets the conditions set out in the research methodology. Enterprises are qualitatively comparison in the field of pure and combined innovations. Qualitative comparison has provided the opportunity to transfer into quantitative type of research, which has allowed a subjective divided of innovations between pure and combined innovations.

4.1 Main findings

The collection of information on selected social enterprises is based on Krejci and Šebestová stady (2018) and on public information published by selected social enterprises. Mini-case studies focus on the basic description of the enterprises and on the description of the innovations they have carried out. The mini-case studies are based on information about social enterprises and personal experiences with the organization described. In total, five integration social enterprises were selected and qualitatively analyzed as a mini-case study. These enterprises were coded as E1 to E5.

E1: Without Barriers, Without Borders. This company was founded in 2003. In total E1 has 27 employees, where 24 of them are disabled. E1 offers services such as document digitization and shredding, waste separation for recycling and other services. Among the innovations created since the founded of the enterprise are:

- Restoration of the sheltered workshop 1 (modernization of the sheltered workshop)
- Restoration of the sheltered workshop 2 (modernization of the sheltered workshop)
- Restoration of the sheltered workshop 3 (modernizing the workplace for employees)
- Restoration of the sheltered workshop 4 (revitalization of social facilities for women)
- The project 1 "For inspiration beyond borders" (improving work with people with disabilities)
- Restoration of the sheltered workshop 5 (modernization of the sheltered workshop)
- The project 2 "digitization and shredding" (improving work with people with disabilities, buying a new technology and creating a new job for a new employee)
- Production modernization 1 (launch of new technology)
- Production modernization 2 (launch of new scanner)
- Production modernization 3 and modernization of place (buying a new technology and fork-lift)
- The project 3 "Practical program of people education" (supplementary forms of education)

E2: Hand Made Wooden Toys. This company was founded in 1999 and the main mission of it is to offer jobs to people with disabilities. Its main products are wooden toys and traditional board games, the social impact can be seen in saving traditional craft traditions from a mountain region. Their other well-known products are puppet theatres, furniture and pet toys. The company employs 35 people, where 75% of them have some sort of disability. At present, the owners have 2 different companies, where they have 50 employees with disabilities. These employees have mostly physical disabilities and they work in full-time positions as operational staff. Among the innovations created since the founded of the enterprise are:

- The project "Innovative stand up for Social Entrepreneurship" (creating a manual)
- Production modernization (buying a new technology and improving the working environment)

E3: Cardboard Packages. This company was founded in 2010. The company employs 4 people with disabilities (part-time jobs) and 2 people without disabilities. The company is engaged in the production of cardboard and corrugated board packaging. The Social Enterprise is co-financed by the European Union, the European Social Fund and the Human Resources and Employment Operational Program. Among the innovations created since the founded of the enterprise are:

- Production modernization 1 (buying a new technology ARISTOMAT CL 1317)
- Production modernization 2 (buying a new technology LAMBDA 1218)
- Production modernization 3 (buying a new technology SUMBEL CORONEL)
- Production modernization 4 (buying a new technology PD 70/75)

- Production modernization 5 (buying a new technology DAHLE 585)
- Modernization of the workroom 1 (buying a new tables and chairs)
- Modernization of the workroom 2 (buying a new lockers)
- Modernization of the workroom 3 (buying a new racks)
- Modernization of the workroom 4 (buying a new office furniture)
- Modernization of the workroom 5 (buying a new computer, software and printer)
- Modernization of logistics (buying a new car Citroen Berlingo)
- The project "Creating and preserving jobs for a new employee"

E4: Construction Company. A company which aims to achieve new job positions for people with limited opportunities in the job market and who belong to socially excluded ethnic groups. The company has been certified as an Ethically Friendly employer since 2011. They have 18 permanent staff, mostly Roma. The social enterprise project was supported from EU funds, after being completed in 2012. Among the innovations created since the founded of the enterprise are:

- The project 1 "Modernizing the workplace for employees"
- The project 2 "Modernizing of social enterprise"
- Production modernization (buying a new technology)
- The project 3 "Group therapy with a psychologist"
- The project 4 "Effective way to buy material"

E5: Counselling and Training Centre for disabled people. It was founded in 2003. It implements business and social projects, which are for the creation of new jobs and the possibility of the professional and personal advancement of the employee. E5 employs almost 300 employees, of which 84% are people with disabilities. The company does not use public support. The company is financed by its own activities. Among the innovations created since the founded of the enterprise are:

- The project 1 "Education, development and motivation of employees"
- The project 2 "Starting the WISE Human Resources Management Process"
- The project 3 "Back-office for group"
- The project 4 "Starting the e-shop 1"
- The project 5 "Building a training center"
- The project 6 "Building and opening a network of stores"
- The project 7 "Starting the e-shop 2"
- The project 8 "Call a turnkey service"
- The project 9 "Implementation of a unique wise management product"
- The project 10 "Social rehabilitation extending job offer to heavily disabled employees"
- The project 11 "Extending the offer of relaxation and massages"

The following Table 1 was developed on the basis of the above description of integration social enterprises E1 to E5. Table 1 was evaluated on the basis of meeting the conditions described in the research methodology. The criterion is the divided of innovation in "WISE" into pure and combined. Table 1 show whether an enterprise is creating clean and combined innovations. Table 1 was evaluated on the basis of subjective and qualitative evaluation. To identify the existence or non-existence of innovations, tick (√) and cross (X) are used. Where tick mean that an enterprise creates innovation and crosses mean that an enterprise does not create innovation.

Table 1. Qualitative evaluation 1

	Pure	Combined
E1	√	√
E2	√	√
E3	√	√
E4	√	√
E5	√	√

Tables 1 show that all "WISE" described above is creating both pure and combined innovations. All "WISE" therefore fulfil the condition of divided innovations on pure and combined. The Table 2 was also developed on the basis of the above description of "WISE" E1 to E5 and was evaluated on the basis of meeting the conditions described in the research methodology. The Table 2 shows which innovation the enterprise creates and it is based on the division to the pure and the combined innovations. Based on that methodology, three innovations belonging to pure innovations and three innovations belonging to combined innovations were identified.

The pure innovations described in Table 2 include:

- Product-oriented innovations (POI)
- Employee-focused innovations (EFI)
- Enterprise-wide innovations (EWI)

The combined innovations defined in Table 2 include:

- Product and employee oriented innovations (PEOI)
- Employee and enterprise wide oriented innovations (EEWOI)
- Product and enterprise wide oriented innovations (PEWOI)

All six innovations are tested separately for each "WISE". The Table 2 will show whether "WISE" are creating social innovation during their existence. Employee-focused innovations (EFI) are considered as the only social innovation, as described in the research methodology. The Table 2 was evaluated on the of subjective basis and qualitative evaluation again.

Table 2. Qualitative evaluation 2

	Pure			Combined		
	POI	EFI	EWI	PEOI	EEWOI	PEWOI
E1	√	√	√	√	√	X
E2	X	X	√	√	X	X
E3	√	√	√	√	X	X
E4	√	√	√	√	X	X
E5	√	√	√	√	√	X

The Table 2 showed that all enterprises but only one enterprise are creating social innovation. An interesting fact was, that none of the enterprises created product and enterprise wide-oriented innovations (PEWOI). The most involved enterprises in the field of innovation are E1 and E5. However, the table 2 shows the existence of social innovations in the "WISE", not their amount. Therefore, the Table 3, which shows the amount of all innovations in E1 to E5, was created.

The Table 3 was based on the number of innovations of within the enterprises that taking the place since foundation to the present time.

Table 3. Percentage of the frequency of innovations as percentage share

	Pure (%)			Combined (%)			TOTAL
	POI	EFI	EWI	PEOI	EEWOI	PEWOI	
E1	18.18	9.09	27.27	18.18	27.27	0	100.0
E2	0	0	50	50	0	0	100.0
E3	50	8.33	8.33	33.33	0	0	100.0
E4	40	20	20	20	0	0	100.0
E5	45.45	18.18	9.09	18.18	9.09	0	100.0

The Table 3, in line with the enterprise innovations and divided according the methodology, shows percentage share of all six innovations in the E1 to E5. The most common innovations are product-oriented innovations (POI).

Resulting from this evaluation could be presented in form of models to calculate individual share of innovations:

$$pure_x = E1+E2+E3+E4+E5 \quad (1)$$

$$combined_x = E1+E2+E3+E4+E5 \quad (2)$$

The calculation model shows that $pure_{poi}$ = 153,63%, $pure_{efi}$ = 55,6%, $pure_{ewi}$ = 114,69%, $combined_{peoi}$ = 139,69%, $combined_{eewoi}$ = 36,36% a $combined_{pewoi}$ = 0%. It is clear from the results that social innovation does not have a high percentage of frequency in individual enterprises.

5 Empirical results

Firstly, the data provided in the above research, has swown that "WISE" create both pure and combined innovations. It is possible to say that these enterprises are capable to create different types of innovation. This information based on the Table 1. In addition to that, it was found that "WISE" do not create product and enterprise wide-oriented innovations (PEWOI).

Secondly, the Table 2 shows that four of the five selected enterprises were able to create social innovations. This analysis could positively support the research question No. 1: *"Are social enterprises in process of creation of social innovation in the Czech Republic?"*

The research question was confirmed, however, for a better view of social innovation, the Table 3 was created. To give a deeper insight into social innovation and its frequency in E1 to E5 integration enterprises. The Table 3, based on the logical induction method, showed that these enterprises are creating social innovations, but their frequency is not higher to other innovations. This analysis could negatively support the research question No. 2: "*Is the amount of social innovations the largest part of pure and combined innovations?"* The results above stemming from the research methodology of this paper and are a good basis for further research. Some of the information obtained was not accurate and was therefore subjectively assessed. Therefore a primary research is a suitable for verifying those results.

Review of literature confirmed that social innovation is not defined in a unified form. Due to this fact, it is appropriate to specify the definition of social innovation based on results from the research methodology, deep literature review and data. A precise and clear definition may be used to the research framework for primary research in the future. Finally, the definition of social innovation is for that case have to be specified as: "Social innovation is observed in work integration social

enterprises (WISE) may be defined term of investment in improvement and facilitation for the lives and work of existing and future employees."

This definition precisely determines which innovative activities, within the research framework of pure and combined innovations created by work integration social enterprises (WISE) are improtant among social innovations.

6 Conclusion and discussion

Social entrepreneurship is an evolving part of the economy in the Czech Republic. Especially in Western Europe, social entrepreneurship is advanced and part of the system. Social entrepreneurship often resolve the unbearable problems of states and is part of their strategy. Innovation is also related to social entrepreneurship. Given the nature of social business, innovation in a social enterprise is called social innovation. Part of social enterprises is also represented by "WISE".

The presented study discussed an unexplored field of innovation types in work integration social enterprises (WISE). Due to the insufficient research issue of social innovation in the Czech Republic, other questions emerged from the study. Whether, primary research will proves that "WISE" are actually doing pure and combined innovations. Whether, social innovation is smaller than other pure and combined innovations in "WISE". Further research on social innovation should focus on a deeper concept of "WISE" and their social innovation.

The same system of data collection methods and data collection have to be used, this research can also be transferred to other "WISE". The results of this paper can be used by managers of "WISE" to evaluate all their innovative activities in Czech Republic. The results can also be compared with their personal knowledge, competencies and experience.

7 Acknowledgement

This work was supported by the Silesian University in Opava, by the Student Grant System SGS/06/2018 "Economic Literacy of Business Entities".

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

THE EMPIRICAL LINKAGES BETWEEN STOCK PRICES OF SWISS FIRMS AND FINANCIAL RATIOS

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Abstract
Investors evaluate the situation of companies based on available information and this is reflected in stock prices. The factors that can influence the stock prices can be defined as macroeconomic variables, industry factors and individual company characteristics. Each of these factors could affect stock prices; this study is focused on the financial ratios reflected business activity of companies. The object of the paper is to examine the relationship between selected financial ratios and the stock prices of energy, metallurgical and chemical companies listed on the SIX Swiss Exchange over the 2009 – 2017 period. The Johansen cointegration test is used to examine the long-run equilibrium relationship between the stock prices and selected variables. According to the theory there is expected positive impact of the ROA, the ROE and the DR on stock prices of selected companies, and negative influence of the ER on stock prices of analysed Swiss companies.

Keywords
Stock prices, Switzerland, Industry, Financial ratios, Cointegration.

JEL classification
L60, M21, O52, G15

1 Introduction

The initial public offer of stocks is source of own capital for companies; but subsequently, stocks are traded on secondary markets. The trading in shares affects value of stock prices and has significant impact on companies; mainly - value of stock prices determines a market value of the companies and bad results make a worse position of companies in getting external financial resource. The information is important factor for investors; because investors with quality and reliable information can make optimal and effective investment decisions. Investors evaluate the situation of companies based on available information and this is reflected in stock prices. According to the theory there are three main categories of factors that can affect the stock prices, and investors are interested about them due to the possibility of using them for the predictions of the stock prices development and achievement the capital income. Categories are usually defined as macroeconomic variables, industry factors and individual company characteristics. The macroeconomic variables are important because they present external environment of the companies; the situation of the national economy is significant in generating profit of companies and it is related to the financial benefits for investors. Industry factors can reflect potential changes in shareholders' profitability; because there is different sensitivity of sectors to the national economy development, and then there are different rate of profitability and legislative regulations in individual sectors. Individual company characteristics are also important variables because they show ability of the company in generating profit in specific national economy and industry sectors. They reflect ability of management to lead companies and be attractive for investors. Many thus far published studies are focused on macroeconomic variables and industry factors due to the availability of dataset, and studies analyse an impact of company characteristics are not so frequently. Therefore, this paper is focused on financial ratios and their impact on the stock prices.

As first studies that emphasized the importance of information in financial statements can be included study of Beaver (1968) that examined the relationship between the stock prices and profit. The Modern portfolio theory and Capital Asset Pricing Model (CAPM) were theoretically usually used. Then, the Efficient Market Hypothesis was formulated by Fama (1970). According to this theory all available information are fully reflect by stock prices. There is no possibility to beat the

market on a risk-adjusted basis since market because the stock prices should only react to new information.

The object of the paper is to examine the relationship between selected financial ratios and the stock prices of energy, metallurgical, and chemical companies listed on the SIX Swiss Exchange over the 2009 – 2017 period. The SIX Swiss Exchange provides a number of financial infrastructure services in Switzerland. The market capitalisation measured by the Swiss Market Index data was reported at 779 402.3 million CHF in 2009, the value of market capitalisation reached at 973 395.04 million CHF in 2017. All selected industries are typical by different business activities that can be related to different information, that investors are interested. The criterions for companies' selection are business profile of companies, year of quotation on the SIX Swiss Exchange, and availability of financial reports. Therefore, the paper is focused on detection which of the selected financial ratios – the return on assets, the return on equity, the debt ratio, the equity ratio; can affect the stock prices of analysed companies. Methodologically, the Johansen test is used to examine the long-run equilibrium relationship between stock prices and financial ratios. Information about variables that can affect stock prices in the long-term can be useful for management of companies to strategic planning.

The paper is divided into several sections; the first is Introduction, the Review of the Literature follows. Then, sections the Data and Methodology, the Results and the Conclusion are included.

2 Review of the Literature

The empirical literature focuses on the relationship between the stock prices or stock returns and the financial ratios; mainly on Asian and US stock markets. The topic is important for investors due to the determination of company characteristics that can influence the stock prices or stock returns of the companies, because variables reflect the company characteristics are one of the factors that can influence the stock prices. The Review of the Literature includes studies that discussed the problematics of the relationship between the stock prices and financial ratios.

Some studies are focused on many types of factors that can affect the stock prices, as study of Drummen and Zimmermann (1992) shows. They analysed the impact of various market and sector factors to European stock prices volatility. They showed that the country factors explains 19 % of the average stock variance, the impact of the world stock market is 11 %, European market trends explain 8 % and the currency factors 2 %. The impact of the industry and country factors on stock returns also examined Isakov and Sonney (2003) who analysed the sample of stocks in 20 developed countries. The results showed the prevailing impact of the national variables on the stock returns; these findings are consistent with the study of Drummen and Zimmermann (1992).

But many studies discuss the relationship between the company characteristics, concretely selected financial ratios and stock prices. There can be included the study of Dima et al. (2013) who focused on selected European stock market indexes, particularly the British stock market index FTSE 100 (market capitalization 163.92 billion EUR, daily trading value 95.52 million EUR) traded on the London Stock Exchange (market capitalization 4.03 trillion EUR, daily trading value 226.04 million EUR), the French stock market index CAC 40 (market capitalization 1.207 trillion EUR, daily trading value 3.421 million EUR) traded on the Euronext (market capitalization 3.6 trillion EUR, daily trading value 157.64 billion EUR), the German market stock index DAX (market capitalization 971.8 billion EUR, daily trading value 0.47 million EUR) traded on the Frankfurt Stock Exchange (market capitalization 1.67 trillion EUR, daily trading value 392.97 million EUR) and the Lithuanian market stock index OMX (market capitalization 3.48 billion EUR, daily trading value 0.94 million EUR) traded on the Baltic Nasdaq (market capitalization 5.43 billion EUR, daily trading value 1.83 million EUR). They examined the impact of selected financial ratios on stock prices of 241 companies included in the FTSE 100, CAC 40, DAX, OMX over the 2003 – 2011 period. The results showed the positive impact of the ROA on European stock prices.

While in the study of Petcharabul and Romprasert (2014) there was analysed the relationship between the selected financial ratios and the stock returns of 22 companies listed on the Stock

Exchange of Thailand (number of companies 768, market capitalization 458.49 billion EUR, daily trading value 1.25 billion EUR) from 1997 to 2011. Their study detected the positive relationship between the ROE and the stock returns. The impact of profitability ratios investigated Hutabarat and Simanjuntak (2013) who focused on the relationship between financial ratios and the stock prices of 3 Indonesian telecommunication companies. The findings of the study confirm the positive relationship between the ROA, the ROE and the stock prices. Their results are in accordance with the study of Martani et al. (2009) who examined the effect of selected microeconomic variables on stock returns of manufacturing companies listed on the Indonesia Stock Exchange (number of companies 615, market capitalization 397.36 billion EUR, daily trading value 661.12 million EUR) between years 2003 – 2006. The study show positive impact of the ROE on the stock returns.

Then, Ozlen (2014) analysed the impact of selected microeconomic variables on stock prices of 48 companies listed on Istanbul Stock Exchange (number of companies 399, market capitalization 115.79 billion EUR, daily trading value 1.15 billion EUR) and his findings show negative impact of the debt ratio on stock prices of chemical and metallurgical companies. The results of study of Ozlen (2014) are in accordance with Dzikevičius and Šaranda (2011). Dzikevičius and Šaranda (2011) examined the relationship between selected financial ratios and stock prices of 5 companies listed on Lithuanian Stock Exchange (number of companies 14, market capitalization 3.48 billion EUR, daily trading value 0.94 million EUR) covers the period of 2007 – 2010. The authors detected the positive impact of the equity ratio and the negative impact of the debt ratio on the stock prices. The effect of the ROA and the ROE were both negative and positive; there are some differences of findings in comparison to the study of Dima et al. (2013).

3 Data and Methodology

The 9 companies listed on the SIX Swiss Exchange are used; there are four chemical companies, three energy companies and two metallurgical companies as Table 1. shows. The criterions for the selection of the companies are follows:
(1) The business profile of companies has to be most similar due to the including companies into groups by sectors;
(2) Quotation on the stock exchange should be by 2005 because of required time series, but the main limitation was availability of financial reports of companies, some of selected companies have available financial reports since 2009;
(3) The selection of manufacturing companies, and not to including financial institutions due to the significant difference of legislative regulatory; that could be misleading in comparing the results.

The Bachem Holding is specialized in the development and the manufacturing of biologically active peptides and complex organic molecules as active pharmaceutical ingredients and as innovative biochemical for research purposes. The Ems-Chemie Holding is active worldwide in the business areas high performance polymers and specialty chemicals. The Givaudan is a manufacturer of flavours, fragrances, and active cosmetic ingredients. The Sika manufactures construction materials and offers related services. The Sika produces concrete and mixtures, mortar, sealants and adhesives, tooling resins, anti-static industrial flooring, acoustic materials for automobiles, and waterproof membranes. The Energiedienst Holding produces, distributes, and sells electricity; the company generates electricity from hydro, natural gas, sun, and wind sources. The Romande Energie Holding engaged in the production and distribution of electricity; the company diversifies its activities into four businesses - distribution of electricity, marketing of energy, environment and energy efficiency. The Zehnder Group manufactures indoor climate solutions for residential and commercial buildings. The Schmolz & Bickenbach manufactures the tool steel and non-corrosive long steel, as well as alloyed and high-alloyed constructional steel. Zwahlen & Mayr engages in steel construction, stainless steel tubes production and general construction businesses.

Table 1. Analyzed Companies

Chemical Companies	Energy Companies	Metallurgical Companies
Bachem Holding	Energiedienst Holding	Schmolz & Bickenbach
Ems-Chemie Holding	Romande Energie Holding	Zwahlen & Mayr
Givaudan	Zehnder Group	
Sika		

Source: Authors´ calculations.

The included financial ratios are ratios of the profitability and ratios of the indebtedness. The financial ratios of profitability are important because they reflect the ability of the company to using its capital in generating profit. The financial ratios of the indebtedness are related to share of the own capital and debt capital that show the capital structure of the company; the increase of debt financing can cause the higher level of the risk or high share of the own capital can make a decreasing in the profitability of the company capital. The financial ratios considered are the return on assets (ROA), the return on equity (ROE), the debt ratio (DR) and the equity ratio (ER).

The ROA that measures the profitability of all capital resources is related to the total effectivity of the company in generating profit; the ROA is calculated as Earnings after Taxes/Total Assets. The ROE is profitability ratio that reflects how much profit a company generates with the money shareholders have invested; the ROE can be calculated as Earnings after Taxes/Equity Capital. The DR is related to the share of the debt capital used by the company. The increase of debt capital can make a higher risk of investors; the DR is calculated as Liabilities/Total Assets. The ER measures the share of the own capital used by the company. The high level of own capital can be related to the decreasing of total profitability of the company; the ER can be calculated as: Own Capital/Total Assets.

The dataset covers the period 2009 – 2017 and all data time series are used on semi-annual frequency. Data on stock prices are from Yahoo Finance and values are calculated as average of semi-annual values, due to the including stock prices volatility during the analysed period. All financial ratios are calculated with using financial statements of the companies and are calculated with using standard methods of financial analysis.

The using methodology follows. First, the stationarity of the time series is verified with using the Augmented Dickey-Fuller (ADF) test. The correlation analyses to determine the linear relationship between the stock prices and financial ratios follows. Then, the Johansen test is used to examine the long-run equilibrium relationship between selected variables. The examination of long-run equilibrium relationship could be useful for the management of companies because they could focus on variables that can influence stock prices and include the expectation of company development to the strategic planning. The VAR model in the mathematical equation is in accordance with (Johansen and Juselius, 1990):

$$\Delta Y_t = C_0 + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-1} + \Pi Y_{t-1} + \eta_t \tag{1}$$

where Y_t is a vector of non-stationary variables, ΔY_t means rate of growth or change of non-stationary variable, C_0 is a constant, p is an order of autoregressive polynomial, i is a number of the periods and η_t is the white noise term. The variables Π and Γ in the matrix contain the value of the cointegrating vectors. The information on the coefficient matrix between the levels of the Π is decomposed as $\Pi = \alpha\beta'$ where the relevant elements of the α matrix are adjustment coefficients, and the β matrix contains the cointegrating vectors. The first likelihood ratio statistics for the null hypothesis of the precise r cointegrating vectors against the alternative $r + 1$ vector is the maximum eigenvalue statistic. The second statistic for the hypothesis of at most r cointegrating vectors against the alternative is the Trace statistic.

4 Results and Discussion

At the beginning the correlation coefficients between the stock prices and selected financial ratios are presented. The correlation coefficients of the Swiss chemical companies Table 2. shows. The stock prices of the company Bachem Holding demonstrate the statistically significant correlation coefficients with the DR. All correlation coefficients are statistically significant for the company Ems-Chemie Holding. The stock prices of the company Givaudan determine the statistically significant correlation coefficients with the ROA and the ROE; then the stock prices of the company Sika show statistically significant coefficients with the ROA, the DR and the ER. Other correlation coefficients are not statistically significant.

Table 2. Correlation Coefficients – Chemical Companies

Variables	Bachem Holding	Ems-Chemie Holding	Givaudan	Sika
ROA	0.2258	0.5472**	0.7867*	0.5732**
ROE	0.2771	0.4557***	0.8380*	0.3870
DR	-0.4156***	-0.5671**	0.0138	-0.7483*
ER	-0.3040	0.7656*	0.1755	0.9141*

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

In the Table 3., the correlation coefficients of the Swiss energy companies are demonstrated. All correlation coefficients are statistically significant for the company Energiedienst Holding. The stock prices of the company Romande Energie Holding determine the statistically significant correlation coefficient with the ROA. Other correlation coefficients of the company Romande Energie Holding and the company Zehned Group are not statistically significant.

Table 3. Correlation Coefficients – Energy Companies

Variables	Energiedienst Holding	Romande Energie Holding	Zehnder Group
ROA	0.4679**	0.5788**	0.2031
ROE	0.4020***	0.3864	0.1541
DR	-0.6701*	-0.2558	0.0102
ER	0.6602*	0.2668	0.2334

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

Further, the correlation coefficients for the Swiss metallurgical companies in Table 4. are presented. The stock prices of the company Schmolz+Bickenbach demonstrate the statistically significant correlation coefficients with the DR and the ER. And the stock prices of the company Zwahlen & Mayr detected the statistically significant correlation coefficients with the DR. Other correlation coefficients of the company Schmolz+Bickenbach Holding and the company Zwahlen & Mayr are not statistically significant.

Table 4. Correlation Coefficients – Metallurgical Companies

Variables	Schmolz & Bickenbach	Zwahlen & Mayr
ROA	-0.1312	-0.1813
ROE	-0.2207	-0.1570
DR	-0.6518*	-0.6794*
ER	-0.5697**	-0.3766

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

The statistically significant results of the Johansen test Table 5. shows. The Trace Statistics and the Max-Eigen Statistics are used to the evaluating of results. When both statistics provide similar outcome the results are consider as significant. For the chemical companies there are detected two cointegrating vectors for two models. According to the results the stock prices of the Swiss chemical company Ems-Chemie Holding were influenced by the ROE and the DR. Despite the fluctuation of the ROE, the ROE has a positive impact on stock prices of the Swiss chemical company Ems-Chemie Holding. This can be caused by the high value of the ROE during the reference period that reflect adequate using of the shareholders 'capital by the company. The DR has a positive influence on stock prices of the Swiss chemical company Ems-Chemie Holding. The findings can reflect that the share of the debt capital is on adequate level and is not threat for the solvency and profitability of the company, or the company can has also a possibility of using higher share of the debt capital and increase of the ROE. The stock prices of the other Swiss chemical companies were not affected by selected financial ratios.

Table 5. Results of Johansen test – Chemical Companies

	r=0	r ≤1
Ems-Chemie Holding		
Stock prices/ROE		
Trace Statistics	25.1081*	10.5344**
Max-Eigen Statistics	14.5737*	10.5344**
Stock prices/DR		
Trace Statistics	36.7335*	10.0498**
Max-Eigen Statistics	26.6837*	10.0498**

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

Then, in Table 6., the statistically significant findings of the Johansen test follows. For two models of the Swiss energy company Energiedienst Holding, two cointegrating vectors are revealed and for four models of the Swiss energy company Romande Energie Holding, two cointegrating vectors are detected. The results show that the stock prices of the Swiss energy company Energiedienst Holding were affected positively by the DR and the ER. And the stock prices of the Swiss energy company Romande Energie Holding were influenced positively by the ROA, the ROE, the DR and the ER. The positive impact of the profitability can be related to the relative stabile development of the ROA and the ROE and can reflect the effectively using firm capital in generating the profit and investing the shareholders 'capital. The positive influence of the DR can be defined the same as for the Swiss chemical companies. The positive influence of the ER can reflect the share of own capital that do not have a negative influence on the capital structure and investors evaluate this share as adequate. The positive impact of both, the DR and the ER can mean the share of the debt capital and the own capital that can be considered as optimal capital structure.

Table 6. Results of Johansen test – Energy Companies 1

	r=0	r ≤1
Energiedienst Holding		
Stock prices/DR		
Trace Statistics	31.1521*	13.3640**
Max-Eigen Statistics	17.7880*	13.3640*
Stock prices/ER		
Trace Statistics	24.5601**	8.9560***
Max-Eigen Statistics	15.6041**	8.9560***
Romande Energie Holding		
Stock prices/ROA		
Trace Statistics	38.8305*	8.5964***
Max-Eigen Statistics	30.2341*	8.5964***
Stock prices/ROE		
Trace Statistics	30.8328*	14.5360*
Max-Eigen Statistics	16.2968**	14.5360*
Stock prices/DR		
Trace Statistics	29.9817*	12.8536*
Max-Eigen Statistics	17.1280**	12.8536*
Stock prices/ER		
Trace Statistics	29.5156*	13.0075*
Max-Eigen Statistics	16.5081**	13.0075*

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

Further, the results of Johansen test for the Swiss energy company Zehnder Group, in Table 7. The findings show that there are detected two cointegrating vectors for two models of the Swiss energy company Zehnder Group. According to the results the stock prices of the Swiss energy company Zehnder Group were influenced positively by the ROE and the DR. The positive impact of the ROE can be related to the development without the significant fluctuations and using the shareholders 'capital and generating profit for the investors. The positive influence of the DR can reflect that the share of the debt capital is on adequate level and is not threat for the solvency and profitability of the company, or the company can has also a possibility of using higher share of the debt capital and increase of the ROE.

Table 7. Results of Johansen test – Energy Companies 2

	r=0	r ≤1
Zehnder Group		
Stock prices/ROE		
Trace Statistics	38.0791*	9.9432**
Max-Eigen Statistics	28.1358*	9.9432**
Stock prices/DR		
Trace Statistics	31.6217*	10.7786**
Max-Eigen Statistics	20.8431*	10.7786**

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

In the Table 8, there are presented the results of the Johansen test for the Swiss metallurgical companies. Two cointegrating vectors are revealed for four models of the Swiss metallurgical company Schmolz & Bickenbach and for one model of the Swiss metallurgical company Zwahlen &

Mayr. The findings show that the stock prices of the Swiss metallurgical company Schmolz & Bickenbach were affected positively by the ROA, the ROE, and negatively by the DR and the ER. And the stock prices of the Swiss metallurgical company Zwahlen & Mayr were influenced negatively by the ER. The positive impact of the ROA and the ROE show the stabile development of the profitability ratios and the adequate level of the profit generating with using the firm capital and the shareholders 'capital. The negative influence of the DR, and the ER indicate the share of the own capital, and the debt capital that investors do not evaluate positively. There is prevailed the financing by the own capital that can have a negative influence on the capital structure and costs of the company because the own capital is usually connected with higher costs then the debt capital. The higher share of the debt capital can support the potential for further growth of the ROE and make better the capital structure.

Table 8. Results of Johansen test – Metallurgical Companies

	r=0	r ≤1
Schmolz & Bickenbach		
Stock prices/ROA		
Trace Statistics	28.7908*	8.5649***
Max-Eigen Statistics	20.2258*	8.5649***
Stock prices/ROE		
Trace Statistics	32.4876*	9.1441***
Max-Eigen Statistics	23.3435*	9.1441***
Stock prices/DR		
Trace Statistics	40.8211*	14.8310*
Max-Eigen Statistics	25.9901*	14.8310*
Stock prices/ER		
Trace Statistics	48.1524*	10.7686**
Max-Eigen Statistics	37.3838*	10.7686**
Zwahlen & Mayr		
Stock prices/ER		
Trace Statistics	26.8280*	10.3518**
Max-Eigen Statistics	16.4761**	10.3518**

Source: Authors´ calculations.
Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.

The results in Table 9. show that there is positive impact of the ROA on stock prices of energy and metallurgical companies. It seems the ability of the total effectivity of the company in generating profit is important factor. But in all three industry sectors there is evaluate positively influence of the ROE, this indicate investors could be interested about value of the profitability that companies are able to generate with using investors´ capital that could be significant investment criterion. The impact of the ROA and the ROE is in accordance with theory. Moreover, the debt financing is considered as important variable. The positive impact of the DR is detected in chemical and energy sectors; results are consistent with theory and can indicate companies used optimal share of debt capital that did not have a negative impact on profitability. The negative influence of the DR in metallurgical sector could be related to the low level of debt capital that could reduce the profitability of companies; and negative impact of the ER is consistent with theory and can mean there was high level of own capital that could have a negative influence on profitability of companies; there can be a room for improving profitability values. The result indicates there can be wrong setting of capital structure in metallurgical companies. The positive impact of the ER in energy companies is not in accordance with theory, and result can mean the share of own capital is optimal for the sector and it

don´t have to have a negative impact on profitability. The findings indicate that there could be different relationships across sectors due to the specifics of individual sectors.

Table 9. Summary of results

Chemical companies	Energy companies	Metallurgical companies
ROE/+	ROA/+	ROA/+
DR/+	ROE/+	ROE/+
	DR/+	DR/-
	ER/+	ER/-

Source: Authors´ calculations.
Note: + denotes positive impact and – denotes negative impact.

5 Conclusion

The object of the paper was to examine the relationship between selected financial ratios and the stock prices of energy, metallurgical and chemical companies listed on the SIX Swiss Exchange over the 2009 – 2017 period.

The findings of the Johansen test detected some relationships between the stock prices of selected Swiss companies and the ROA, the ROE, the DR and the ER. The existence of the linkages is consistent with the studies of Drummen and Zimmermann (1992) and Isakov and Sonney (2003) who showed that there is possible to find some variables that can affect the stock prices. The positive impact of the ROA on the stock prices of the company Romande Energie Holding and the company Schmolz & Bickenbach are consistent with theory and findings of Dima et al. (2013) and Hutabarat and Simanjuntak (2013) who showed that there is positive impact of the ROA on stock prices. Then, the positive impact of the ROE that is detected for the companies Ems-Chemie Holding, Schmolz & Bickenbach, Zehnder Group, Romande Energie Holding is in accordance with theory and Petcharabul and Romprasert (2014) and Martani et al. (2009) whose studies confirmed the existence of the positive relationship between the stock prices and the ROE.

The findings of the Johansen test also show the positive impact of the DR on stock prices of the companies Ems-Chemie Holding, Energiedienst Holding, Romande Energie Holding and Zehnder Group; these results are consistent with the theory. The negative impact of the DR is detected for the company Schmolz & Bickenbach, this is in accordance with Ozlen (2014) and Dzikevičius and Šaranda (2011) who determined the negative relationship between the DR and the stock prices. The negative influence of the DR in metallurgical sector could be related to the low level of debt capital that could reduce the profitability of the company. There is prevailed the financing by the own capital that can have a negative influence on the capital structure and costs of the company because the own capital is usually connected with higher costs then the debt capital.

Furthermore, there was determined negative impact of the ER on the stock prices of the companies Schmolz & Bickenbach and Zwahlen & Mayr, these findings are consistent with theory. The positive impact of the ER is detected for the companies Energiedienst Holding and Romande Energie Holding. These results are in accordance with Dzikevičius and Šaranda (2011) who detected a positive impact of the equity ratio on stock prices. The positive impact of the ER can be related to the level of own capital that is optimal for the sector and it is the share of the own capital that not strain capital structure and do not make a decreasing of total profitability of the company.

But the results show that there are different findings across selected companies. It seems that stock prices reflect specific financial characteristics of individual companies, and influence value of stock prices in selected industry sectors. The findings also indicate that impact of financial ratios do not have to be consistent with theory; the explanation is negative development of variables or different development typical for other companies in individual sectors. It is also impossible to make general

conclusion but despite that, results show prevailing impact of some variables that can affect stock prices in selected sectors; it is an ability of companies in generating profit with using shareholders´ capital (the ROE), and the share of debt capital (the DR) that could support the profitability of companies but, on the other hand, high level of debt capital could be considered as threat. It seems investors are interested about value of the ROE that companies are able to generate for them, and about an effective level of debt financing.

6 Acknowledgement

Publication of this paper was supported by the Student Grant System of Silesian University in Opava within the project "The effect of fundamental factors and corporate governance on stock prices 23/2016". The support is greatly acknowledged.

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

THE RELATIONSHIPS OF CASH CONVERSION CYCLE AND PROFITABILITY

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Abstract
Cash management in each enterprise is a key issue as they are an essential part of fluency and continuity of business activity. Inability to generate cash results in difficulty to carry out operational activities and to realise investments. To plan the financing of investment and operational activities, the enterprise needs information about the amount and frequency of cash inflows and outflows. Indicator cash conversion cycle provides information about the number of days between cash outflow, arising from inventory acquisition and the cash inflow from the collected receivables. In manufacturing enterprises appropriate management of working capital has a significant impact on the fluency of production from which the performance and profitability of enterprise can be derived. In this paper, we will examine the relationship of the cash conversion cycle on profitability of the enterprises on selected sample from engineering industry in Slovak Republic by statistical methods.

Keywords
Cash conversion cycle, Profitability, Working capital management, Engineering industry.

JEL classification
M21, M41, G30

1 Introduction

Profitability and cash matters are key factors of decision-making in accordance to enterprises' short-term objectives and strategic goals. Decision-making is based mostly on data from internal sources of the enterprise, but also external resources provide useful information about competitors, price and market changes. In general, internal information system of an enterprise includes accounting and reporting system which priority function is to provide information for financial management and executives according to Baštincová (2017) and Pakšiová (2017). Information from accounting systems are available not only for the management, referred as internal users, but also for external users. External users such as creditors, shareholders, suppliers (Osadchy et al., 2018) are informed from published annual reports and financial statements. To improve basis for decision-making the data drawn from accounting need to be processed by tools of financial analysis, after which they are suitable for comparison in terms of both time and industry. Basis for the financial analysis Correct and understandable reporting of information in the financial statements is basis for the financial analysis. (Kubaščíková and Juhászová, 2016; Procházka and Pelák, 2016) Information presented in financial statements are sources for assessment, comparison and prediction of financial performance. (Lovciová, 2017; Šlosárová et al., 2016) Assessment of profitability and cash generating ability is based on results of financial analysis supported by various ratios and indicators. According to Šlosárová and Blahušiaková (2017), financial health of the enterprise is best reflected by indicators of liquidity and profitability. The objective of this paper is to examine relationships of profitability and ability to generate cash, referred as cash conversion cycle (CCC) in manufacturing enterprises in Slovak engineering industry. Since similar research about CCC and profitability relationship was not conducted in Slovakia, the basis for comparison are studies from all over the world.

2 Review of literature

For manufacturing enterprises appropriate management of working capital ensures the fluency of production (Majtán et al., 2012), thus the focus is on inventories, accounts receivables and accounts payables (Šlosárová, 2015). The relationship of working capital management, CCC and profitability

was subject to many relevant studies from various periods, countries and industries as shown in Table 1.

Table 1. Review of recent studies about CCC and profitability relationship

Authors	Title	Period	Sample
Afrifa and Padachi (2016)	Working capital level influence on SME profitability	2005 - 2010	160 small and medium sized listed enterprises in the United Kingdom
Al-Shubiri and Aburumman (2013)	The relationship between cash conversion cycle and financial characteristics of industrial sectors: an empirical study.	2005 - 2011	listed enterprises on Amman Stock Exchange in Jordan from 11 industrial sectors
Bagchi (2013)	Working Capital and Profitability - Establishing the Causality	3 months on daily basis	one gas station in India
Chang (2018)	Cash conversion cycle and corporate performance: Global evidence.	1994 - 2011	46 countries, 31 612 companies
Cristea and Cristea (2018)	Cash conversion cycle and corporate performance: evidence from Romania	2002 - 2016	330 listed enterprises from 12 industries in Romania
García-Teruel and Martínez-Solano (2007)	Effects of working capital management on SME profitability	1996 – 2002	8872 small and medium-sized enterprises in Spain
Enqvist, Grahamb and Nikkinenc (2014)	The impact of working capital management on firm profitability in different business cycles: Evidence from Finland	1990 – 2008	1136 enterprises in Finland
Farooq et al. (2016)	Liquidity Risk, Performance and Working Capital Relationship of Cash Conversion Cycle: an Empricial Study of the Firms in Pakistan	2009	200 enterprises, 5 industry, listed in Pakistan
Karim (2017)	Relationship Between Working Capital Management Efficiency and Profitability: A Comparative Study on Square Pharmaceuticals Limited and Beximco Pharmaceuticals Limited, in Bangladesh	2006 – 2015	2 enterprises, pharmaceutical industry in Bangladesh
Kieschnick, Laplante and Moussawi (2013)	Corporate working capital management: Determinants and Consequences	1990 – 2004	1800 public enterprises in the United States, financial service industry was excluded
Nobanee and AlHajjar (2014)	An Optimal Cash Conversion Cycle	1990-2004	5802 non-financial listed enterprises in the United States
Pais and Gama (2015)	Working capital management and SMEs profitability: Portuguese evidence.	2002 – 2009	6063 small and medium sized enterprises in Portugal
Raheman, Udin and Ibrahim (2015)	Working Capital Management and Profitability – Case of Pakistani Firms	1999 – 2004	94 listed enterprises on Chittagong Stock Exchange in Bangladesh
Samiloglu and Agkun (2016)	The Relationship between Working Capital Management and Profitability: Evidence from Turkey	2003 - 2012	120 listed enterprises from Istanbul Stock Exchange in Turkey
Takon (2013)	Does Cash Conversion Cycle Have Impact on Return on Assets of Nigerian Firms?	2000 - 2009	46 enterprises listed on Nigerian Stock Exchange
Ukaegbu (2014)	The significance of working capital management in determining firm profitability: Evidence from developing economies in Africa	2005 - 2009	20 firms each from Egypt, Nigeria and Kenya and 42 from South Africa
Yazdanfar and Ohman (2014)	The impact of cash conversion cycle on firm profitability	2008 - 2011	small and medium sized enterprises 13 797 enterprises from metal, retail, wholesale and restaurant industries

Source: author's processing.

Afrifa and Padachi (2016) entitled working capital as the lifeblood of any enterprise because it affects enterprise's profitability and risk. One of the main objectives of working capital is to ensure enough cash flow to continue operations in a way when risk of inability to pay payables is minimized. Varying features in an operating environment, different industries and periods are the main reasons why the estimation of working capital is a difficult task for managers. (Samiloglu and Akgun, 2016) Most of the studies examined assumption that effective working capital management reflected in the length of CCC shall have positive impact on profitability. Afrifa and Padachi (2016) investigated the optimal length of CCC, which means that an extremely short or long CCC is not desired. According to them, the profitability is maximised by working capital on optimal level. However, Bagchi (2013) says that profitability is not favourably affected by working capital. Bagchi is the only author whose study is based on the shortest period with observations on daily basis. Kieschnick, Laplante and Moussawi (2013) concluded that additional investment in net operating working capital has positive effect on expected future sales, which is in line with findings of Karim (2017) and Raheman, Udin and Ibrahim (2015). The last two mentioned papers found out that efficient working capital management increases profitability. Other papers were focused on the relationship of CCC and profitability, respectively other variables such as productivity, size, debt. Significant negative relationship between CCC and profitability was concluded by García-Teruel and Martínez-Solano (2007), Enqvist, Grahamb and Nikkinenc (2014), Pais and Gama (2015), Takon's (2013), Chang (2018), Cristea and Cristea (2018), Ukaegbu (2014). The relationship between CCC and profitability may vary in different countries, industries and periods, what could be the reason for contradictory result which indicate positive dependence between CCC and profitability found out by Samiloglu and Agkun (2016), Farooq et al. (2016). Nobanee and AlHajjar (2014) identified that shortening of the CCC decreases the profitability, and they suggest to reach optimal CCC in order to maximize the profit. Yazdanfar and Ohman (2014) have similar opinion that optimal CCC improves the performance of the enterprises. In this paper, besides profitability there are investigated other independent variables such as productivity and indebtedness which were also subject of some studies. Al-Shubiri and Aburumman (2013) found out positive relationship between CCC and debt, liquidity and productivity, but the relationship between CCC and profitability is insignificant. Based on recent literature, it can be concluded that most of recent studies found out significant negative relationship between profitability and CCC. However, positive dependence was shown in two studies. Moreover, some papers state that the relationship between profitability and CCC is significant under condition of optimal CCC. Independently from the concrete results of analysed studies, all authors agree on the importance of working capital management regarding to profitability and sustainable development.

3 Research methodology and data

The aim of this paper is to characterize the relationship between profitability and CCC based on correlation of CCC and its components to profitability, productivity and indebtedness. The basis for our examination is that efficient working capital management reflected in CCC improves profitability. Effective collection of receivables increases cash which can be used for purchase of stock, raw materials and other inputs to production process. That is the reason for our assumption defined in hypothesis H_1, according to which shorter CCC enhances profitability.

H_1: There is no statistically significant negative relationship between CCC and profitability.

Profitability measured by return on assets (ROA) can be influenced not only by expenses regarding to costs of goods sold, but by other expenses and losses arising from both internal and external environment. This is, why the productivity as proportion of total sales to total assets is tested. This ratio reflects how many euro of sales is generated by one euro of assets. We expect that higher productivity is accompanied by shorter CCC and by optimal working capital management (H_2).

H_2: There is no statistically significant negative relationship between CCC and productivity.

The last examined characteristic is related to indebtedness which reflects one of the main features about enterprise's financial health. Generated cash is used for debt repayment, thus related to cash management it is important how much cash will be needed and for how long period to keep up acceptable level of indebtedness in accordance with enterprise's strategic goals. In this paper, accounts payable days based on trade liabilities for purchased inputs and services were examined. Higher indebtedness shortens the CCC (H_3), because better payment conditions allows longer period until due date. On the other hand, longer period before setting a payment increases the level of liabilities.

H_3: There is no statistically significant negative relationship between CCC and indebtedness.

Subject of analysis were enterprises of Slovak engineering industry, which is the growing and stable pillar of Slovak economy with automotive industry. Data for examination were drawn from databases Finstat.sk and Financial Statements Register for period 2014 – 2016. The sample consists from enterprises with published financial statements for examined period and with minimum precalculated number of employees more than 200 in accounting period 2016. These two assumptions were fulfilled by 58 enterprises.

To reach the study's goal various methods were used such as selection, analysis, synthesis and statistical methods. Selection and analysis were mainly used in the processing of the literature sources. Synthesis was applied to formulate main findings and conclusions. Among statistical methods descriptive statistics and correlation were used. In the following, formulas used for calculation of variables are characterized.

For identifying the relationship between CCC and profitability independent variables such as CCC and its components were used. Profitability, productivity and indebtedness were dependent variables.

Profitability determined by indicator ROA is the first among dependent variables, which reflects the proportion of net profit not only to invested capital as return on equity, but to total assets, which is the sum of equity and liabilities. ROA calculated as net profit to total assets expresses how many euros of net profit account for one euro of assets (1).

$$Return\ on\ assets\ (ROA) = \frac{Net\ profit}{Total\ assets} \tag{1}$$

The second formula characterises productivity as asset turnover ratio which is a proportion of total sales to total assets (2). This ratio reflects the efficiency of assets on revenue generating and expresses how many euros of sales account for one euro of assets. For calculations the sum of revenues from sales of goods, own production and services is used, excluded are revenues arising from sales of non-current assets, other income, gains, changes in internal inventory and own work capitalized. Only realised revenues from third parties enter to total sales regarding to production activities. According to Chalupa (2017), "the turnover management is crucial for sustainable development, and long-term destination profitability." Asset turnover ratio is highly dependent on industry, because manufacturing enterprises with large asset bases have lower values against service providing enterprises with less non-current assets. This ratio is not suitable for comparison of enterprises from different sectors and industries, but in this paper the use of this ratio is not limited because only engineering industry in Slovak republic is examined.

$$Asset\ turnover\ (AT) = \frac{Total\ sales}{Total\ assets} \tag{2}$$

Debt to equity ratio is the last dependent variable included in examination, because this ratio reflects the amount of debt for one unit of equity (3). Debt to equity ratio can detect the level of risk arising from indebtedness endangering the operation of enterprise.

$$Debt\ to\ Equity\ ratio\ (DER) = \frac{Total\ liabilities}{Equity} \tag{3}$$

In the focus of this research is indicator CCC calculated as sum of account receivable days and inventory days and decreased by accounts payable days (4). CCC is the period between cash outflow for production inputs purchase to manufacture product and cash inflow received from sale of goods and services. (Al-Shubiri and Aburumman, 2013; Akdoğan, 2018) Therefore, CCC is a cash gap, when enterprise have to finance cash outflows from own resources because cash inflows from receivables are not in disposition.

$$\begin{aligned} &Cash\ conversion\ cycle\ (CCC) \\ &\quad = Accounts\ receivable\ days\ (ARD) \\ &\quad + Inventory\ days\ (ID) - Accounts\ payable\ days\ (APD) \end{aligned} \tag{4}$$

To calculate the CCC some additional calculations are needed. Accounts receivable days are calculated as accounts receivable to average daily sales or total sales divided by 365 (5). Accounts receivable days expresses how many days are needed to collect cash from receivables issued to customers. Inventory days reflects how many days takes to sale inventory, thus how many days cash is tied up in inventory (6). The last component of CCC is accounts payable days (APD), where accounts payable, meant trade liabilities are divided by average daily costs of goods sold (7). APD provides the number of days, while payables remain non-paid. Not paid payables toward suppliers are also called as supplier credit and it represent a beneficial tool in cash management.

$$Accounts\ receivable\ days\ (ARD) = \frac{Accounts\ receivable}{Average\ daily\ sales} \tag{5}$$

$$Inventory\ days\ (ID) = \frac{Inventory}{Average\ daily\ costs\ of\ goods\ sold} \tag{6}$$

$$Accounts\ payable\ days\ (APD) = \frac{Account\ payable}{Average\ daily\ costs\ of\ goods\ sold} \tag{7}$$

Appropriate management of working capital and optimal CCC reduces risk and creates bigger space for realization of investment activities and fulfilment of strategic goals. Stated formulas are used for calculation of indicators which are the basis for characterization of relationships between CCC and its components to dependent variables.

4 Results

Before analyses of relationship between dependent and independent variables, the data is described by indicators such as minimum, maximum, average and median. In Table 2. values of independent variables from 174 observations of 58 enterprises from period 2014 -2016 are included. Indicator CCC is in focus of our attention, where lower values are desirable. Negative values inform users about the fact that the cash is collected faster than it should be paid to suppliers. The overwhelming

majority of enterprises have positive value of CCC and extremely high values reflect problems with receivable collection or inventory days. Closeness of average value and median value indicates the normality of data distribution, which mostly characterizes the indicator CCC. Based on the analysed sample, which can be considered to be large enough, it takes 75 days in average for an enterprise to collect cash from provided products and goods after the payment for production inputs are set. The CCC days can be improved by more flexible payment terms such as extending the payables due date. The shorter receivable days and effectiveness of receivable collecting have also positive impact on CCC. Last but not least inventory days can be improved by shortened production process or more effective supply chain management.

Table 2. Descriptive statistics of independent variables

Variable	Minimum	Maximum	Average	Std. Deviation	Median
ARD	11.65	344.13	78.35	48.40	66.59
ID	0.41	415.54	78.53	63.81	64.76
APD	10.90	365.52	81.81	49.73	73.30
CCC	-299.03	405.45	75.07	78.79	71.62

Source: author's calculations.

Basic characteristics of dependent variables are included in Table 3. As it is shown in the table based on average and median values these data are not suitable for advanced statistical analysis in this form, because they may not be normally distributed except indicator asset turnover. According to Šlosárová and Blahušiaková (2017), acceptable level of debt to total resources, meant debt to sum of equity and debt, is up to 70 %. Theoretically, the proportion should be around 2.33, which compared to average 201.55 indicates high indebtedness of analysed enterprises. On the other hand, median of debt ratio is 90.87 which means that 50 % of enterprises reach lower values. It can be concluded that the debt ratio average is distorted by extreme values.

Table 3. Descriptive statistics of dependent variables

Variable	Minimum	Maximum	Average	Std. Deviation	Median
ROA	-42.87	33.26	4.33	7.38	3.62
AT	0.27	4.52	0.94	0.72	0.74
DER	-42.87	3507.11	201.55	459.82	90.87

Source: author's calculations.

In the following, we have a closer look at correlation coefficients, which describes the intensity and direction of dependence between dependent variables and CCC as well as its components. The correlation coefficients are considered as strong between 1 to 0.8, moderate between 0.8 to 0.4 and weak below 0.4.

Table 4. Correlations of CCC and its components to dependent variable ROA

	ARD	ID	APD	CCC
Correlation	-0.11	-0.29	-0.29	-0.12
P-value	0.136	0.000	0.000	0.109

Source: author's calculations.

Firstly, we analysed the dependence between profitability, namely ROA and CCC (Table 4.), where correlation of CCC and accounts receivable days is statistically insignificant on confidence level 95 % and 90 %, because p-value is higher than 5 % and 10 %. In dependence from ROA weak

negative relationship with inventory days and accounts payable days were identified, therefore decrease in these two ratios has positive impact on increase of ROA. Based on the results, we accept the H_1 hypothesis.

In Table 5. results of correlation analysis related to dependent variable productivity measured by asset turnover are included, where p-values indicate statistically significant positive correlation to inventory days and account payable days on 95 % confidence level. As in the previous case, weak relationship between asset turnover and inventory days, account payable days were detected, but the direction of relationship is positive. It means that inventory days and account payable days are increasing proportionally with asset turnover. Based on results, we accept the H_2 hypothesis.

Table 5. Correlations of CCC and its components to dependent variable AT

	ARD	ID	APD	CCC
Correlation	0.11	0.21	0.18	0.12
P-value	0.144	0.006	0.016	0.111

Source: author's calculations.

The last dependent variable is debt ratio which correlation results are included in Table 6. Except accounts receivable days other independent variables are statistically significant on confidence level 95 %, while correlation coefficients values indicate a weak relationship in all cases. Positive weak relationship exists between debt ratio and accounts payable days, while negative relationship is indicated in case of inventory days and CCC. We reject hypothesis H_3, on the ground that the relationship between CCC and indebtedness is significant and negative.

Table 6. Correlations of CCC and its components to dependent variable DER

	ARD	ID	APD	CCC
Correlation	-0.02	-0.16	0.17	-0.25
P-value	0.843	0.034	0.024	0.001

Source: author's calculations.

5 Discussion

The results of this paper differ from expected result based on theoretical analysis and are not in line with most common results of other researches presented in literature review. The relationship between profitability and CCC is negative but statistically insignificant which means that hypothesis H_1 is accepted. We expected that shorter CCC increase profitability as it was concluded by García-Teruel and Martínez-Solano (2007), Enqvist, Grahamb and Nikkinenc (2014), Pais and Gama (2015), Takon's (2013), Chang (2018), Cristea and Cristea (2018), Ukaegbu (2014).

H_2 hypothesis is also accepted, therefore no statistically significant negative relationship exists between CCC and productivity. However, the direction of relationship is positive which is consistent with results presented by Al-Shubiri and Aburumman (2013).

Indebtedness is the only indicator where we found statistically significant negative relationship to CCC. Subsequently hypothesis H_3 was rejected and our expectation was met. This result is not consistent with the findings of authors Al-Shubiri and Aburumman (2013) who reported positive relationship between CCC and debt, liquidity and productivity. To sum up, our findings differ from the results of international researches in some extent. In our case weak relationship related only to hypothesis H_3 was detected and strong statistically significant relationships between variables were not detected.

6 Conclusion

The paper examined subjects which are in focus for the most of enterprises such as working capital efficiency measured by cash conversion cycle (CCC), profitability, productivity and indebtedness. These indicators were subject of many studies in lots of countries, but we have not found any up to date studies in Slovak republic. In research, we focused on engineering industry, because it is one of the most growing industries in the country. Our findings in most cases are not in line with reviewed literature findings, according to which shorter CCC increases profitability. In sample of enterprises from Slovak engineering industry is no significant relationship between profitability and productivity to CCC. From three investigated dependent variables, only relationship between CCC and indebtedness is statistically significant and negative. Most significant negative weak relationship was identified between inventory days, accounts payable days to profitability and between CCC to indebtedness. According to our results, higher profitability can be reached by decrease of inventory days and accounts payable. Although, shorter CCC can be accompanied by higher debt level.

Limitations of study are that data were collected on yearly basis and the period of the study was short. Working capital management should be examined at least on monthly basis, because data from financial statements reflects the situation regarding to one day or one month as the financial statements are prepared. Financial statements do not reflect how was the situation about working capital management and how its efficiency evolved during the accounting period. On the other hand, data for such a detailed analysis is not available for public, just for internal users. Other limitation can be the shortness of analysed period, by which extension arise possibilities to identification of various trends or difference before and after financial crisis.

For further research it would be useful to compare results within industries, therefore significant differences can be expected in non-production industries. Examination of CCC and profitability in retail industry with focus on hypermarkets and supermarkets may provide interesting results.

7 Acknowledgement

This article is one of the partial outputs of the currently solved research grant no. I-18-105-00 entitled "Financial Analysis as a tool of Sustainable Development in enterprises of the engineering industry".

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

THE IMPACT OF CONSUMER MOTIVATIONS ON GIFT-GIVING BEHAVIOUR: A COMPARATIVE ANALYSIS AMONG FRANCE AND TURKEY

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Abstract
Making-sense of cultural includes assessments on consumption traditions and lifestyles. Consumption culture theory provides systematic relations with different cultural processes by ensuring conceptual information on consumption and market behaviours. Studies related to making-sense of social in consumer behaviour and dynamic structure of the market are to become important. In this study, gift-giving theory from consumption culture theories will be examined with a cultural comparison. Within this scope, some important concepts associated with gift-giving motivations of consumers will be analyzed within research model of the study, that has three hypotheses and a cultural perspective on gift-giving behaviour will be presented. Within the model of the planned research, reciprocity, obligation and reputation variables will be considered in the context of "gift-giving motivations". All variables will be linked with importance of the gift, effort shown for the gift, amounts of the gift, and brand orientation of the gift on the basis of "gift-giving behaviour". Within the scope of the study, gift-giving behaviours of consumers in Turkey and France that have different cultures will be investigated. However, this study is a research proposal.

Keywords
Gift-Giving, Cultural Diversity, Collectivist, Individualist, Reciprocity, Reputation, Obligation.

JEL classification
M30, M31

1 Introduction

Analyzing the different cultural structures of societies is important in terms of understanding the behaviour of individuals. Some studies draw attention to the effect of cultural differences on gift-giving behaviour. In terms of cultural consumption researches, various and differences in gifting behaviour of societies are important. Therefore, there are stated that understanding of various cultural taboos and cross-cultural differences are important in gifting behaviour. In this study, a comparative cultural analysis will be presented by examining the effects of gift-giving motivation between two countries that have different cultural structure. Within this scope, the relationship between cultural values and gift-giving behaviour will be questioned in this study. Thus, it will be presented a review on Turkey and France as collectivist and individualist forming the structure of two different societies. Different cultural structures of these two countries will be examined in terms of consumer behaviour within gift-giving theory. However, this study is just a research proposal, but the research of the study will be carried out as soon as possible.

2 Conceptual Framework

In the literature, there are many factors associated with gift-giving behaviour. Within the scope of this study planned, the concept of reciprocity, obligation and reputation in gift-giving behaviour will be associated with the amount, the brand, the importance given and the effort shown for the gift. The reason for the fact that the *reciprocity* factor is included in the research model of the study is because this concept is dealt with in the basic structure of gift-giving behaviour. Regarding *obligation* which is another variable in the model, it is referred that gifting is actually taken from a necessity and that this situation may change in different cultural structures. For this reason, this factor is evaluated within the research model. The concept of *reputation*, which is another variable, in the model of the research figures that gift-giving is seen as a concept of prestige and this perception changes from society to society. Thus, it is included within the model. All concepts,

which are included in the research model of the study, will be associated with the amount, the brand, the importance given and the effort shown for the gift. The differences between Turkish and French societies will be analyzed by using quantitative methods.

Gifts include more than material attitudes. There is an interrelation between ones who give and get the gift. Getting a gift to someone is perceived as getting somethings from oneself. For this reason, gifts are objects that contain many emotional and symbolic meanings. This relationship is based on reciprocity principle (Clarke, 2007). Also, Marcel Mauss, who introduced the process of gift-giving in depth, is addressed this process as a reciprocity model (Anton et al., 2014). Reciprocity is important in gifting, it gives to one who gets it feeling positive thinking. Reciprocity can be considered a cultural norm or activity. This principle forms a moral cultural value among individuals. The gift can reflect emotions of the person who gives it. In this context, the gift given to somebody has a symbolic value rather than an economic value. Moreover, the psychological motivations of the person who gives the gift are generally unconsciously (Nguyen and Tsetsur, 2017; Steidlmeier, 1999). In the concept of reciprocity in gift-giving behaviour, it is argued that the gift should return. In many civilizations, it is stated that given the gift on the basis of volunteerism is a necessity in actual fact (Mysterud et al., 2006). On the other hand, it is emphasized that the western societies do not like the obligatory behaviour (Nguyen and Tsetsur, 2017). It is known that reputation is an important concern in collectivist societies in terms of social norms and roles. Because people in these societies are very much interested in how they are perceived by others. So, it is expected that this situation affects consumers' purchasing decisions (Qian, 2007).

3 Gift-Giving Theory

Consumption starts with the process of goods or services. Whereas consumption was discussed from limited aspects before 1950s, it has been started to be talked about whether consumption is beneficial for society after the Second World War (Belk, 2007). Consumption occurs within the dynamic structure of the market and ideological imperatives and a sociocultural practice that is historically shaped. Consumption theory focuses on the experiential, social and cultural dimensions of consumption. Consumption culture theory contributes to the theoretical explanation of consumption cycle. It also creates a common theoretical orientation for understanding cultural complexity. Making-sense of cultural emphasizes the components of consumption traditions and lifestyles. And, it enables to been understood the values shared by the society or people by markets (Arnould and Thompson, 2005).

Gifting process takes place within the scope of fulfilling an obligation or developing spontaneously. In addition, gift-giving process addresses a conceptual dimension that includes processes of selection, transfer and evaluation of tangible and intangible objects. Gift-giving process has been examined by sociologists and anthropologists and also it has been discussed in the context of consumption studies. Gift-giving is varied with traditions and taboos within a wide range of cultures. Values correspond to the behaviours that reflect one's own self. Classification of cultures clarifies social values. Gifting process includes to take place certain values of ones (Park, 1998). Gift-giving forms are stated as a symbolic ritual in all cultures. Marcel Mauss, who first analyzed gift-giving process in depth, has taken this process as a reciprocity model (Anton et al., 2014). From a social perspective, gifting reflects the cultural and symbolic aspects of social life. For this reason, gift-giving behaviour is discussed as a ritual that reflects and supports social order (Corciolani and Dalli, 2014; Mayet and Pine, 2010). Komter and Vollebergh (1997) have stated that gift-giving is a phenomenon that strengthens social relations. Sherry (1993) has argued that gift-giving motivation of ones is created in a certain time, such as Christmas, or under the condition of a peace proposal, such as flowering. This behaviour can carry out as altruistic or agonistic behaviour. Scammon et al. (1982) have mentioned about the four basic functions of gift-giving behaviour. These functions are expressed as communication, social change, economic change and socialization. Schwartz (1967) has stated that gifting forms an identity for one who gives and gets

the gift, and there is imposed to one who gets the gift an identity. Hollenbeck et al. (2006) have mentioned about two paradigms of gift-giving behaviour. The first paradigm on traditional context, is to focus on decision-making, purchasing and shopping habits, and the second paradigm is the use of it as a tool for reorganizing/improving relations.

Within the framework of the research, gifting is considered within the framework of consumption phenomenon. In this context, the literature review of the study is at Table 1.

Table 1. Literature Review

Nguyen and Tsetsur (2017)	A review of how gift-giving culture in Vietnam affects media relations is presented.
Othman at al. (2005)	Gifting behaviour among Malaysian consumers is investigated.
Beatty at al. (1991)	It is emphasized that social individuals give more importance to the process of gifting than non-social individuals.
Fernandez-Moreno and Jolibert (1983)	As part of gifting, the levels of spending in two different cultures, which are individualist and collectivist, are examined.
Park (1998)	Gifting behaviours of Korean and American consumers are examined.
Kılıçer at al. (2016), Fischer and Arnold (1990), Komter and Vollebergh (1997), Dalakas and Shoham (2010)	It is discussed the role of gender identity in the process of gifting.
Anton at al. (2014)	In a utilitarian value perspective, the perceived value of the gift is emphasized.
Beatty at al. (1993)	The effects of the values and culture of the person on gifting behaviour in the Japanese and American cultures are explained.
Dalakas and Shoham (2010)	Gift-giving process of Israeli consumers is examined. In this context, the role of gender in gifting process is discussed.
Fischer and Arnold (1990)	The effect of gender in gifting behaviour at Christmas is examined.
Mysterud at al. (2006)	Gifting behaviour in Norwegian society is investigated.
Komter and Vollebergh (1997)	It is emphasized that there are differences between genders in gifting process.
Godbout (1998)	It is addressed that gift-giving behaviour is as a moral phenomenon, not as an economic factor.
Hyun at al. (2016)	The gift-giving motivations of the ones who are narcissistic and self-identity are examined.
Tynan at al. (2010)	Gifting behaviours in British (individualist) and Chinese (collectivist) societies are examined.
Rugimbana et al. (2003)	On Valentine's Day, gifting behaviours of young men are examined.

4 The Research

4.1 Purpose and Importance

The aim of this study is to examine motivations and behaviours of gift-giving between countries that have different cultures, and to provide a comparative cultural analysis of this behaviour. In terms of marketing practices, it is thought that the study will help to managers to identify their marketing strategies and better understand their target consumers. Because markets should be positioned and segmented according to consumption habits, attitudes and behaviours of consumers. In relationship between cultural values and motivations of consumers, gift-giving plays an essential role in determining strategic approaches of them. For example, regarding the findings of previous

studies, it is expected that advertising and promotional strategies in a collectivist society are maintained in a way that features prestige and reputation.

4.2 Scope and Limitations

The scope of the research are female consumers in France and Turkey. Most of the sample group planned to be reached in France are female, so this is a constraint in the study. In addition to the scope of the study, survey questions of variables that measure gift-giving behaviour are created by considering the birthday ritual because Belk (1977) has figured that birthdays are the most gifted activity.

4.3 Model and Hypothesis

In the development of hypotheses, different perspectives on gift-giving theory, motivations and behaviours are discussed. And, the variables are formed by considering the cultural structure of the two countries. Within this framework, significant relationships are established between the variables in the model of the study and hypotheses are formed.

Figure 1 contains the model of the research.

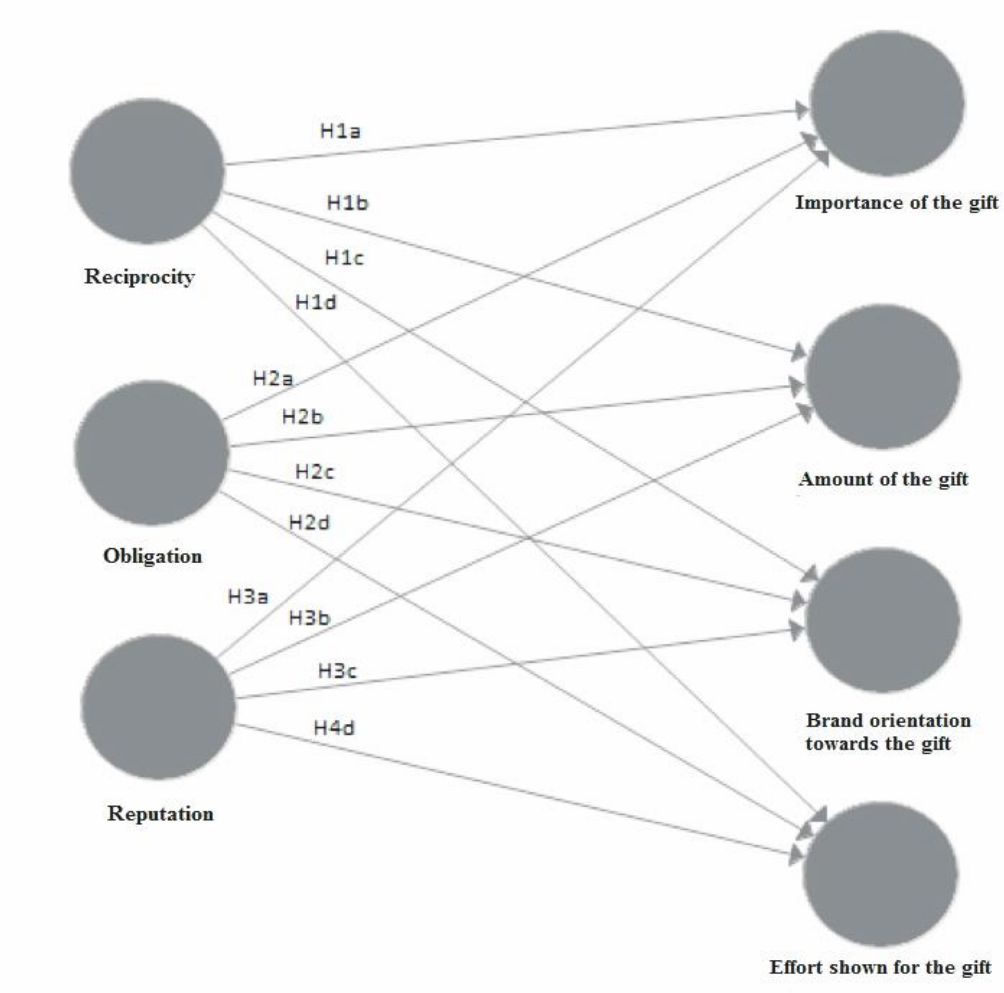

Fig. 1. The Research Model

Table 2 contains the hypotheses of the research.

Table 2. Hypothesis of the Research

H_{1a}. The principle of reciprocity in gift-giving process affects the importance of the gift positively.
H_{1b}. The principle of reciprocity in gift-giving process affects amount of the gift positively.
H_{1c}. The principle of reciprocity in gift-giving process affects brand orientation towards the gift positively.
H_{1d}. The principle of reciprocity in gift-giving process affects the effort shown for the gift positively.
H_{2a}. The perceived obligation in gift-giving process affects the importance of the gift positively.
H_{2b}. The perceived obligation in gift-giving process affects amount of the gift positively.
H_{2c}. The perceived obligation in gift-giving process affects brand orientation towards the gift positively.
H_{2d}. The perceived obligation in gift-giving process affects the effort shown for the gift positively.
H_{3a}. The concerns about reputation felt during gift-giving process affects the importance of the gift positively.
H_{3b}. The concerns about reputation felt during gift-giving process affects amount of the gift positively.
H_{3c}. The concerns about reputation felt during gift-giving process affects brand orientation towards the gift positively.
H_{3d}. The concerns about reputation felt during gift-giving process affects the effort shown for the gift positively.

4.4 Methodology and Data Collection

Quantitative method will be used in data collection method of research. The model of the study will be evaluated by using the PLS-SEM (Partial Least Squares-Structural Equation Model), which is an exploratory analysis method based on the maximization of R2 value, and the data will be analyzed using the SmartPLS program.

The scales of the study are prepared as a result of detailed literature review of the related field. Generally, factor analysis is used to determine the validity of the scales because it provides a basis for meaningful evaluation of data. But, PLS-SEM is an analysis method that provides both reliable and fast results because it uses the analyzes that test the validity of the model at the same period. Also, it is planned that population of the research is female consumers in France and Turkey because of the constraint in the study, which is the fact that most of the accessible sample group in France will be female.

5 Conclusion

Consumption culture theory and its researches present information on consumption and market behaviours and provide systematic relations with different cultural processes. Gifting process takes place within the scope of fulfilling an obligation or developing spontaneously. In addition, gift-giving process addresses a conceptual dimension that includes processes of selection, transfer and evaluation of tangible and intangible objects. Gift-giving process takes place under many motivations. It also differs among societies. Within this scope, some important concepts associated

with gift-giving motivations of consumers will be analyzed within research model of the study, that has three hypotheses and a cultural perspective on gift-giving behaviour will be presented. Within the model of the planned research, reciprocity, obligation and reputation variables will be considered in the context of "gift-giving motivations". This study is planned to be handled France and Turkey. These countries include an individualist and collectivist society. In this context, a comparison can be made in the study. There are studies comparing these two different groups in the literature. But, it has not been a study on Turkey and France. The findings of this research proposal, which is planned to be realized as soon as possible, are expected to contribute to the literature.

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

CYCLES IN PRIVATE CORPORATE INVESTMENT IN THE POST REFORM INDIA

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Abstract
In the late 1970s private corporate investments in India started accelerating. Further, during this period we see cycles in the private corporate investments. We use a "post-Keynesian" framework (specifically Kalecki-Misky) which suggests endogenous cycles in private corporate investment activity when private sector dominates in the economy. We feel demand side framework can turn out useful for policymakers in context of recent upturn and prolonged downturn in private corporate investments. Finally, in the empirical analysis, along with usual demand drivers, for the first time after economic reforms, we see a positive impact of credit on private corporate investments. Further, it appears that the impact of credit is strongest in upturn years and weak during non-upturn years.

Keywords
Investment, India, Post Keynesian, credit, cycles.

JEL classification
E11, E12, E22, E5

1 Introduction

In this paper we model private corporate investments in India using "post-Keynesian" (specifically Kalecki-Minsky) investment framework. We choose a theoretical framework that generates cycles endogenously in the investment activity. We show that from late 1970s when private corporate investment starts accelerating there are cycles in the investment activity. There are two implications of cycles in the private corporate sector investment activity. One, it can generate cycles in overall investments and in the extreme case for economy as a whole. Second, some variables like credit may impact differently in upturn and downturn of a cycle. We define upturns in these cycles and show that bank credit has a positive impact on investment in upturn and downturn only after economic reforms. In fact upturns just prior to economic reform were not financed by credit. Further, lagged value of profit share and government investment expenditure appears highly significant drivers of private corporate investment in both the phases. As per our knowledge this is first India specific empirical work which clearly shows cycles in private corporate investment activity and incorporates this insight into empirical modelling.

Investments in India experienced an unprecedented growth in first decade of 21st century. However, by the end of the decade there is a consistent investment slowdown. Economic survey of 2017-18 specifically looks into investment upturn and downturn post 2000s (GOI, 2018, pp. 43-54). Further, the survey also suggests that downturn which began from 2008 has not yet ended.

Further, the survey does quote Minsky and gives importance to demand conditions. However, it remains short of analysing investments through demand side post-Keynesian models which emphasize on cyclical tendency of private corporate investments. In this context we believe analysis of investment cycles through post-Keynesian framework can complement the findings of economic survey and provide important insights for policy making. We use a demand side framework to analyse private corporate sector investment activity in India. One of the characteristic of demand side framework is rejection of Say's law (Hein, 2018, pp. 84-86). According to Say's law supply of a commodity creates demand for itself. In this context only constraint will be full employment of resources, beyond which no more commodities can be produced (ibid.). Say's law works well in barter economy. However, leakage from circular flow of income is inevitable in case of monetary

economy as money also plays a role of store of value (ibid.). In such situation saving investment balance can occur through some endogenous mechanism like changing interest rate. However, in case of market inefficiency there is no reason for such endogenous mechanism to work. Authors like Keynes, Kalecki, Marx recognized the fact that there can be a consistent divergence between saving and investment in short run as well as long run (ibid.). In such economy supply constraints is not a major issue but the problem is demand. Idle capacity is the norm in such an economy with full employment as an exception. We understand real world lies somewhere in between the two extremes. However, as a result of different assumptions underlying Post-Keynesian models, different insights can be gained (Crotty, 1992). Therefore, for this paper we intend to use a demand side framework to analyse private corporate investments in India.

2 Cyclicality in private corporate investment activity

Mohanty and Reddy (2010) using a demand side framework established that prior to 1991-92 reforms, demand growth was weakly investment driven and this does not change in the first post-reform decade. However, first time in India's post-independence economic history, during the period 2002-03 to 2007-08, when the economy averaged a 9% growth rate, demand growth was strongly investment driven (ibid.). Further, growth remains investment driven till 2010-11 (Mohanty, 2018). Khanna (2015) has established that post-reform investment growth, particularly during the high-growth phase, is driven by the private corporate sector as opposed to the pre-reform period where the driver was public investment. Various economic surveys have noted that the slowing economy in the recent years has been characterized by an investment slowdown, again driven by private corporate investment (GOI, 2015, pp. 7-11, 2018, pp. 43-54). Based on these evidences it is fair to say that the role of private corporate sector is gaining increasing importance in determining growth path of investments in the post reform period.

Till now we have seen that private corporate investment has emerged as an important driver of investment activity in the post reform India. Further, the post-Keynesian theory which we are following suggests that, if in an economy the private corporate sector plays a leading role, then investments by this sector will show a cyclical pattern. Further, this cyclicality emerges endogenously out of the process of investing. In fact a closer look into private corporate investment activity does indicate cyclicality in the investment process. Especially, from late 1970s when private corporate sector starts gaining importance. Let us now define upturns in the cycles.

First, we smoothen the natural log transformed value of private corporate investment. Second, after visual examination of smoothened graph, we try rigorously defining cycles. Now let us look at smoothening procedure. Y_t is the time series and we fit a trend component τ to this series. τ is constructed to minimise the following expression[1],

$$\sum_{1}^{T}(Y_t - \tau_t)^2 + \lambda \sum_{2}^{T-1}[(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2$$

The first term in the above expression is the sum of squared deviations of time series from trend component. Second term in the bracket is square of difference in the change in trend component. Lambda is a penalty for change in the trend. Our objective here is to smoothen the time series based on a particular rule and then observe the characteristics of the smoothened time series. We define upturn and downturn using the smoothened values of investment series (τ_t). Whenever, $d\tau$ and $d^2\tau$ is greater than zero we define that year as an upturn year. Any year which does not fall in upturn is considered as downturn. Another property of upturn is consecutive years with upturn property. We conduct empirical analysis for years 1973 to 2013 in this period upturn intervals are 1978 to 1981, 1989 to 1993, and 2002 to 2006.

[1] The smoothening technique is exactly same as HP filter methodology. However, our notion of cycle is very different that cycles defined by HP filter.

3 Major institutional changes in India

Let us now look at some of the important institutional changes which may have led to change in behaviour of private corporate sector investments. Just after independence, India accepted planning regime as it was the widely accepted model at that time (Subramanian, 2008, pp. xvii-xviii). In fact up to 3rd five year plan that is till 1965 economy performed decently under planning regime (Chaudhuri, 2002). However, thereafter as a result of failure of planning process along with external factors like droughts, wars, and negative price shocks; led to poor growth performance. This led to rethinking about planning process by policy makers, slowly from late 1970s. As suggested by Rodrik and Subramanian (2005) prior to 1980s Indian industry was shackled by "licence-permit-quota" Raj. Attitude towards Indian industry started changing in 1980s and a complete shift towards market oriented economic policy took place after economic reforms of 1991-92.

Let us now look at some institutional changes related to banking and debt market. Just after independence it was felt that the agriculture and other priority sectors were neglected (Mohan, 2004). To achieve allocation of funds based on planned objectives nationalization of banks took place in two phases in 1969 and 1980 respectively (Chakrabarti & Mohanty, 2009, p. 180). To address need of long term project financing Development Financial Institutions (DFIs) and State Finance Corporations (SFCs) were set up by RBI (Ray, 2015). Till late 1980s interest rate structure in India was highly administered with different rates associated with different activities (Mohanty, Chakraborty, & Gangadaran, 2012). Prior to 1991-92 reforms the government securities market was a captive market primarily to fulfil financing needs of government (Mohan, 2004). Banks were required to hold certain proportion of their liabilities in the form of government securities. Statutory Liquidity Ratio (SLR) was raised on various occasions to meet the financial needs of government (ibid.). To facilitate large borrowing needs of government interest rate was pegged at artificially lower level. RBI introduced ad hoc treasury bills at 4.6 per cent interest rate to accommodate fiscal deficit requirements. However, this led to very high level of monetization of deficit in majority of 1980s (Jadhav, Ray, Bose, & Gupta, 2003). Rise in government expenditure was also accompanied by shift from capital expenditure to current expenditure, which is unsustainable (Chakrabarti & Mohanty, 2009, p. 182). Increased liquidity in this process was controlled by frequently increasing CRR (Mohan, 2004). Money market which facilitates meeting of demand and supply of funds in interbank market was narrow and illiquid due to controlled interest rate (ibid.). It was in late 1980s that interest rate on call money market was deregulated and the new instruments like commercial papers and certificate of deposits were introduced (ibid.). At the end of 1980s Indian financial system had segmented financial markets, with control over price and quantity. Fragmented nature, controls and government interference led to various inefficiencies. There was a major boost to financial sector Post liberalization of 1991-92. In the 1st decade after liberalization banking sector saw improvement in efficiency, profitability, and asset quality (Chakrabarti & Mohanty, 2009, p. 185). There was almost complete deregulation of lending rates by October 1994, barring interest rate on small loans (Mohanty et al., 2012). Government stopped monetization of debt almost completely during this period and restrictions were placed on government deficit through Fiscal Responsibility and Budgetary Management Act, 2003. At the backdrop of improved asset quality and conversion of DFIs to universal banks we see an increased credit disbursement by scheduled commercial banks from 2003-04 up to 2007-08. The same period also sees a strong rise in private corporate investments financed by these credits. Since there are plethora of institutional changes after economic reforms in early 1990s, we feel it is essential to divide the time interval from 1973 to 2013 in two parts. We chose year 1993 for this division. A dummy variable D94 is created which will take value 1 for all the years after 1993.

4 Theoretical framework suggesting endogenous cycles in the private corporate investment activity and literature

To explain cycles in investment and output, Kalecki uses the circular relation between profits and decision to invest and the relation between investment and output.

$$g = \frac{I}{K} = f(\frac{P}{K}, i) \quad (1)$$

The growth rate of capital stock (g) or a ratio of investment to capital stock (I/K) is a function of profit rate (P/K) and interest rate (i). Kalecki further assumes that usually interest rate is positively related to the ratio of profits to capital stock, and hence can be ignored[2] (Kalecki, 1971, pp. 7, 13-14). Therefore, above function can be rewritten as,

$$g = \frac{I}{K} = F(\frac{P}{K}) \quad (2)$$

The decision to invest depends on the profit rate. Now profit in the closed economy without government depends on investments. Therefore, equation 2 can also be written as follows

$$g = \frac{I}{K} = F(\underset{+}{I}, \underset{-}{K}) \quad (3)$$

The growth rate of capital stock is positively related to investments but negatively related to capital stock.

One of the aspects missing in above discussion is role played by capacity utilization. Changes in capacity utilization can enrich understanding of endogenously generated cycles. If there is excess capacity in the economy, firms will adjust inventory investments to accommodate changes in aggregate demand rather than changing prices. During recovery phase, profits begin to increase. In the beginning rise in aggregate demand will lead to rise in capacity utilization. So there are two reasons why rise in profitability dominates for some time. One, rise in capital stock takes place, after two lags from decision to invest. Second, in the beginning some adjustment happens in capacity utilization so there may not be many new investment plans. As a result for some time rate of growth of profit rate is higher than rate of growth of net capital stock[3].

Now why this virtuous relation reverses? One, purely based on lag structure after some time capital stock starts building up. Second, as capacity utilization start rising there may be rise in prices of some raw materials, wages etc. This will put downward pressure on profits. Now fall in current profits, negatively affect expectations about future profits. This will lead to reduction in new investment plans. However, as delivery of capital stock depends upon past investment plans, there will be a time when growth rate of net capital stock exceed growth rate of profits. This is the investment downturn. Finally, this process will again reverse after some time period as a result of fall in new investment plans, fall in prices of raw material, wages etc. According to Kalecki phases where growth rate of profits higher than growth rate of net capital stock and vice-versa keep on happening simultaneously and this creates cycles endogenously in in investment process. In fact, Matias (2018, pp. 363-365) explains Kalcki cycles through interaction between multiplier and accelerator mechanism and entrepreneurs focus on maintaining a particular level of capacity utilization.

Minsky does not explicitly mention real variables leading to cycles in the investment process as determined by Kalecki. The investment process explained by Minsky is in nominal terms. Minsky gives importance to the determination of demand and supply price of investment and risk perceptions. Minsky (1986) makes the role of external finance pivotal in the process of investment. According to

[2] There are few implicit assumptions such as there will be no central bank intervention during business cycle and there will not be crisis of confidence during down turn. Further, interest rate will not be too high at any particular point of time.

[3] Net capital stock is capital stock remaining after adjusting for replacement requirements.

him, not all the investment can be financed by internal sources of funds. As a result corporates need to borrow[4]. Demand price of the investment good depends on expectations about future and preference for liquidity. If equity stocks of a company are traded, then this price can be considered equal to the market price of the equity. This is nothing but the present value of expected future returns. Now if a company starts borrowing, the present value of future returns start falling as there is increase in debt servicing cost. Further, there is increase in need for margins by borrowers to accommodate borrower's risk i.e. risk of default. As a result demand price is constant till the time firm is relying on the internal fund and falling after that. Supply price of a capital asset is determined by technological constraints like labor productivity, availability of fixed capital, etc. Further, even lenders of money require a margin to cover for lender's risk, i.e. risk associated with adverse selection. Both these factors raise supply price after a certain point. Interaction of demand and supply price determine the market price of a capital asset which in turn determine the level of investment. To accommodate borrowers and lenders risk entrepreneurs are expected to keep excess cash over and above working capital and debt servicing requirements. These excess cash flows are considered as buffers. During tranquil times usually there is a regular debt repayment. This results in a perceived reduction of borrower's and lender's risk and reduction in buffer requirements. The gap between supply and demand price reduces when buffer requirements are high, which leads to a reduction in investments. Similarly, the gap between demand and supply price of investment widens, post tranquil period, when buffer requirements are low. This leads to higher investment. Changing risk perception in the upturn and downturn and cost of borrowing associated with it, generates cycles in the investment activity.

5 Data and methodology

Our dependent variable is investments by private corporate sector. This data field is extracted from National Account Statistics (NAS) published by Ministry of Statistics and Programme Implementation (MOSPI). First, based on NAS different components of investment (i.e. machinery and construction) for each sector are extracted at current prices. Different deflators are used to calculate real values of investment in construction and, machinery and equipment. Retained profits of private corporate sector are savings of private corporates. It comprise of operating profits and consumption of fixed capital. Again the value is extracted from NAS published by MOSPI. Deflator based on GDP at market price is used to generate real values of the retained earnings. Debt includes bank debt to commercial sector and disbursements from development financial institutions (DFIs) outstanding at the end of the year. The indicator is extracted from Data Base on Indian Economy published by reserve bank of India. GDP at market price based deflator is used to calculate the real debt outstanding at the end of the year. Credit is nothing but change in the natural log transformed debt values. GDP, Public sector investment, exports and imports data is extracted from prowess economic outlook data set published by CMIE. GDP is nothing but GDP at factor cost and export, import values are deflated using GDP at market price deflator. Other than a dummy variable taking value 1 from 1994, one more dummy variable "UP" which takes value 1 for upturn years is created.

As suggested by Kalecki investments are strongly related with profits. Profits depend upon two components profit share and output (Profit/Output*Output). If firms are able to extract higher profit share for a given output, then profits will increase. Output of private corporate sector on the other hand is related to aggregate demand. Current profit share and aggregate demand together sets up expectations about future profits. We incorporate these two components of profits in the regression equation. Public investment expenditure has a peculiar role in Indian context. As per various authors public investment expenditure has a crowding in effect on private corporate investments (see for example, Athukorala & Sen, 2002; Chakraborty, 2016, chp. 3; Sen, 2007). The crowding in may

[4] Corporates may not be able to raise finances through issuing equity because of multiple reasons. For smaller firms access to equity market may not be possible. For firms which may access equity market may not want to raise equity because it results in dilution of ownership. Further, debt can be preferred over equity as it provides tax advantage.

happen as a result of impact of public sector investments in improving infrastructure as well as its impact on aggregate demand. As a result we add separately public sector investments in our model. In fact, after initial model rather than adding GDP as a whole we add different components of GDP viz. public investments, exports and imports to check the impact of individual component on investment. Bank credit usually enters in investment models to explain financial deepening (for example see Sen, 2007). However, it enters as a central argument in the Minsky process. In Minsky process upturns in investment are debt financed. As a result we add credit to our model as well. We are also, interested in finding out phases where credit is leading investment upturn. Finally, we set following equation as a base model to analyze investment process,

1) $I_t = \alpha + \beta_1(\text{Retained earnings/GDP})_{t-1} + \beta_2 GDP_{t-1} + \varepsilon_t$

We set a cointegrated model as shown in equation 1, where I_t is dependent variable and it denotes natural log transformation of private corporate investments. Retained earnings/GDP is nothing but natural log transformation of a version of profit share. The correct measure of profit share would have been ratio of retained earnings with contribution to GDP by private corporate sector. However, data for exact contribution of private corporate sector to GDP is not available. Subsequently, rather than adding GDP we add different components of GDP in the model like public investments, imports, exports etc. Finally, we also add credit in equation 1. To analyze differential impact of various variables in different phases we use interactive terms with dummy variables. In the case of credit we use two dummy variables, one for economic reform and another for upturn in investments.
For instance to analyze differential impact of credit we use following equation:

2) $I_t = \alpha + \beta_1*(\text{Retained earnings/GDP})_{t-1} + \beta_2*Pub\_inv_{t-1} + \beta_3*D94*UP*Credit_{t-1} + \beta_4*D94*(1-UP)*Credit_{t-1} + \beta_5*(1-D94)*UP*Credit_{t-1} + \beta_6*(1-D94)*(1-UP)*Credit_{t-1} + D94 + UP + \varepsilon_t$

Pub_inv is nothing but public investments. Above equation provides a clear interpretation of all the slope coefficients. β_1 and β_2 measures impact of lagged value of Retained earnings/GDP and public investments on private corporate investment respectively. B_3 can be interpreted as impact of bank credit on private corporate investments post liberalization during the investment upturn ($E[I_t|D94=1,UP=1]$). Similarly β_4 measures impact of credit on private corporate investments post economic reforms in non-upturn years. B_5 and β_6 measure impact of credit in pre-reform period in upturn and non-upturn years respectively. Similar dummy variable interactions are used to check differential impact of profit share, GDP and components of GDP in pre and post reform period.

In all the equations we check if error terms are stationary. If error terms are stationary then we can say that time series are co-integrated. Stationarity is checked by standard Augmented Dickey-Fuller (ADF) test. An important assumption under Dickey-Fuller (DF) test is that the error terms are independent and identically distributed. Under ADF test usual DF test is augmented by adding lags of dependent variable. We add two lags of the dependent variable in all our models. Null hypothesis under this test is that there exists a unit root in the equation. If we are able to reject the null then time series are co-integrated. Philip Perron (PP) test uses nonparametric statistical methods to take care of serial correlations in error terms. As a robustness measure we check stationarity of error terms using PP test as well. Again the null hypothesis under this test is unit root and if we reject the null then series is stationary. We use Durbin-Watson statistics to check if there is any autocorrelation in the error terms. The null hypothesis is there is no autocorrelation in error terms. Further we use heteroskedasticity and autocorrelation consistent covariance matrix for calculation of standard errors (Newey & West, 1987; Zeileis, 2004).

6 Empirical findings

As suggested by Kalecki we find positive and significant impact of lagged value of profit share, GDP and different components of GDP. Positive impact of imports is perhaps due to influence of capital goods imports. When we incorporate credit into models, results are interesting. There is a negative

relation between lagged value of credit and investment prior to economic reforms. This relation turns positive post reforms and liberalization in banking sector. For the first time in the early 2000s the upturn in investments seems strongly driven by bank credit (model 6 in table 2). Further, in the downturn years the relation between lagged value of bank credit and investment become insignificant. This perhaps hints at inability of corporates to reduce debt at the same pace in investment downturn years.

Table 1. Determinants of private corporate investments

Variables	(1)	(2)	(3)	(4)
(1-D94)*lag[log(Retained earnings/GDP)]	0.51	0.988***	1.000**	1.064*
	(0.45)	(0.28)	(0.451)	-0.563
D94*lag[log(Retained earnings/GDP)]	1.050***	1.059***	0.867***	0.909***
	(0.116)	(0.158)	(0.082)	-0.067
(1-D94)*lag[log(GDP)]	2.121***			
	(0.237)			
D94*lag[log(GDP)]	0.763***			
	(0.043)			
(1-D94)*lag[log(Pub_inv)]		1.373***		
		(0.152)		
D94*lag[log(Pub_inv)]		0.775***		
		(0.166)		
(1-D94)*lag[log(Imports)]			1.072***	
			(0.252)	
D94*lag[log(Imports)]			0.477***	
			(0.018)	
(1-D94)*lag[log(Exports)]				1.031***
				(0.107)
D94*lag[log(Exports)]				0.553***
				(0.020)
D94	21.115***	7.746**	6.526	4.809
	(4.763)	(3.652)	(4.345)	(3.043)
Constant	-16.915***	-1.786	2.295	3.311
	(4.681)	(2.653)	(4.333)	(3.196)
Adjusted R2	0.971	0.98	0.971	0.951
F Statistic	270.842***	387.023***	272.415***	155.599***
Dickey-Fuller	-3.525.	-3.886*	-3.051	-3.010
Phillips-Perron	-23.142*	-25.789***	-21.328*	-14.924
Durbin-Watson	1.09***	1.292**	0.469***	0.6689***

* indicates level of significance '***' if P<0.001 '**' if P<0.01 '*' if P<0.05 '.' if P<0.1. Paranthesis contains standard errors which are consistent for autocorrelation and heteroskedasticity. Dickey-Fuller indicates test statistic based on augmented Dickey-Fuller test where the null is unit root and lag order is 2. Phillips-Perron indicates test statistics for Phillips-Perron test again null being unit root. Durbin-Watson indicates D-W statistic based on Durbin-Watson test, where null hypothesis is no autocorrelation. All the tests are conducted on the residuals from respective model.

Table 2. Impact of credit on private corporate investments

Variables	(5)	(6)
lag[log(Retained earnings/GDP)]	0.599***	0.656***
	(0.21)	(0.17)
lag[log(Pub_inv)]	1.285***	1.305***
	(0.12)	(0.12)
(1-D94)*lag[log(credit)]	-1.954***	
	(0.70)	
D94*lag[log(credit)]	1.268	
	(1.07)	
(1-D94)*UP*lag[log(credit)]		-2.744***
		(0.69)
(1-D94)*(1-UP)*lag[log(credit)]		-1.009
		(0.72)
D94*UP*lag[log(credit)]		3.075**
		(1.46)
D94*(1-UP)*lag[log(credit)]		0.781
		(1.07)
D94	0.402***	0.328**
	(0.11)	(0.13)
UP		-0.035
		(0.13)
Constant	(2.18)	(2.18)
	-1.948	-1.784
Adjusted R^2	0.978	0.981
F Statistic	350.887***	255.229***
Dickey-Fuller	-4.109*	-4.034*
Phillips-Perron	-22.592*	-31.694***
Durbin-Watson	1.171***	1.610.

* indicates level of significance '***' if P<0.001 '**' if P<0.01 '*' if P<0.05 '.' if P<0.1. Paranthesis contains standard errors which are consistent for autocorrelation and heteroskedasticity. Dickey-Fuller indicates test statistic based on augmented Dickey-Fuller test where the null is unit root and lag order is 2. Phillips-Perron indicates test statistics for Phillips-Perron test again null being unit root. Durbin-Watson indicates D-W statistic based on Durbin-Watson test, where null hypothesis is no autocorrelation. All the tests are conducted on the residuals from each model.

7 Conclusion

India is a case of newly liberalized developing country, which experiences cycles in the investment activity as private corporate sector start dominating. In the beginning we show increasing importance of private corporate investments based on acceleration in absolute values of private corporate investments and increasing share of private corporate investments in overall investments. Similarly, share of overall investments in GDP seems increasing. This is similar to findings of various India specific studies (Khanna, 1999; Mohanty, 2018; Mohanty & Reddy, 2010). Secondly, we show that from late 1970s when private sector start gaining importance and corporate investments start accelerating there is a clear cyclicality in the investment process. We define upturn in these cycles based on a specific criterion. We believe endogenous forces in the investment activity are at least partially important for generation of these cycles. We also provide theoretical frameworks developed by Kalecki and Minsky which elaborate on mechanism that can generate cycles endogenously in the investment process. Finally, we divide the whole period in two phases around economic liberalization. We set a simple linear investment model in which private corporate investments are determined by profit share, Public investment, and bank credit. We also check separately impact of overall GDP, export and imports. We find that profit share and public investment expenditure have a consistent positive and significant impact on private corporate investments across all the phases. In case of credit we find a differential impact on private corporate investments. Further, lagged value of credit starts showing a positive relation with private corporate investment only after economic reforms of 1991-92. The upturn during 2002 to 2006 is the only upturn in which lagged value of credit shows a positive and significant relation with private corporate investments. All these aspects also tell a broader institutional story. Private corporate investments start accelerating in late 1970s, as a result of attitudinal changes towards private sector in initial years and reforms subsequently. Further, as importance of private corporate sector start increasing, investment by this sector shows a cyclical pattern. Bank credit does not show any positive relation with private corporate investment when banking sector was segmented and controlled. However, the relation turns positive after liberalization in financial market and a shift towards universal banking system.

We believe it is essential for policy makers to consider cyclicality in private corporate investment in an economy dominated by private sector. In such situation "post-Keynesian" framework can provide a useful set of models to analyze and manage growth process. Further, it appears bank credit led growth is one of the possibilities. This means availability of bank credit will not necessarily result in growth of private corporate investments. On the contrary, private corporate profit share and public investments are significant drivers of private corporate investments across all time periods.

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

USE OF BROWNFIELDS FOR BUSINESS ACTIVITY

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Abstract
The content of the present paper is relevant to the search of domestic, foreign literature and other sources related to the use of brownfields for entrepreneurial activity. Unused and abandoned buildings and sites constitute an internal resource that is usable by the private sector for the potential of their activities, with the general public interest in restoring business activity to brownfields instead of initially starting on a greenfield. Comparison of expert texts will allow to define, determine and classify the key factors that are precisely those characteristics of brownfields that make attractive brownfields in the investment decisions of entrepreneurs. These identified brownfield features will be critically compared to the factors that characterize the selected brownfields in the Czech Republic.

Keywords
Brownfields, literary review, foreign experience, regeneration, Moravian-Silesian Region.

JEL classification
L70, Q20, R11, R33, Y10

1 Introduction

Abandoned buildings and areas, or brownfields, are nowadays a very debatable subject not only in the Czech Republic. The Brownfield National Regeneration Strategy (2008) or older Alker (2000) defines brownfield as a real estate (land, object or area) that is underutilized, neglected, and may be contaminated, agricultural, military, or other. In addition, it must be borne in mind that although regeneration of brownfields can offer enormous development potential including economic, social and environmental benefits (De Sousa, 2002, Carrol and Eger, 2006, Strazzera et al., 2010, Schädler et al., 2011, Wang et al., 2011), the continued use of these benefits is preventing uncertainty and information asymmetry (Gross and Bleicher, 2013, Bartke, 2011, Schädler et al., 2012). Environmental contamination may not be clearly revealed, attitudes of stakeholders in redevelopment may not be in the interests of communities and investors. In spite of social demand, brownfields are not seen as an economically attractive solution for regeneration in the eyes of investors compared to greenfield sites, as these areas do not require private or public intervention (Thornton et al., 2007, Bartke, 2013).

The aim of the work is to provide an overview of the basic factors that reflect the possibility and success of regeneration of abandoned objects and complexes for the business environment. The post presented is then structured. At the beginning is the second chapter. The theoretical basis of brownfields on transversal research literature on various relevant themes, conceptual planes associated with brownfield regeneration. The third chapter provides examples of good practice within the regenerated brownfields in the Moravian-Silesian Region. Finally, the conclusion summarizes the most important conclusions resulting from the analysis and contribution in general.

The author of the paper deals with this issue because he wants to deepen the awareness of the approaches of other authors and researches focusing on brownfields. Abandoned buildings and facilities are opportunities for investors and entrepreneurs, as most of them are located in urban or rural areas where they have built-in infrastructure and are close to their canters. On the other hand, they can pose a risk that discourages entrepreneurs from using them because they have a problem with contamination, technical status and, last but not least, unresolved property rights problems. Properly set compromise when using brownfields should lie in public and private sector cops and take advantage of a given brownfield for the benefit of not only the investor, but also the nearby residents who are affected by the unregulated brownfield.

2 Literature review

Literature reviews on the use of frontier analysis techniques typically follows a paradigm that first defined the methodological considerations in selecting the measurement technique and specifying the variables. Twenty-five journal articles on the subject has been selected for this review. These papers have been listed in Web of Science, SCOPUS, and ScienceDirect database as of writing. Below are the key factors that lead to the importance of assessing brownfields regeneration.

2.1 Social and economic factors

There are dominant factors that stimulate and hinder the development of brownfields. These include, above all, social and economic factors. Regeneration of brownfields can bring a number of environmental, economic and social benefits, including cleaning contaminated plots, increasing real estate values, expanding the tax base, creating jobs, and promoting a revitalized and positive image of urban life (Wang et al., 2011). Rehabilitation and rebuilding together have a positive impact on brownfield communities through job creation, health and safety risks, the construction of safe, affordable housing (Yacovone, 2011, Greenberg et al., 2000).

2.2 Contamination

Contamination is often associated with brownfields that can cause risks to the environment and human health (Wang et al., 2011). Many of these sites and the risks they represent are unknown (Schnapf, 2010). Contaminated brownfields in the immediate vicinity of residential homes and dwellings is a major problem for local residents where their mental and physical growth may be affected as a result of a contaminated site or area (Carter and Hackett, 2014).

2.3 Re-use of brownfields

In recent years, in many countries, brownfield redevelopment has become a sustainable land use strategy and one of many ways to prevent urban sprawl and promote economic development through the creation of new jobs (BenDor et al., 2011). Sustainable brownfield rebuilding strategies can help companies reduce inefficiency and waste of free and abandoned sites. The most commonly cited barrier to brownfield conversion is the lack of funding, the limitations associated with uncertainty about possible costs of environmental assessment and remediation. Some argue that the "best" regeneration from an economic point of view is usually the demolition of brownfields and the further rebuilding of these areas by building new commercial facilities or houses, especially in and near urban centers (Kunc et al., 2012).

2.4 Business activity

For business purposes, business taxpayers should focus primarily on the efficient use of brownfields, which will also benefit those living in their vicinity. Regularization and entrepreneurial activities are particularly encouraged by mutual communication between investors and citizens (Hackwort, 2014). In connection with the regeneration of brownfields, some tax measures that may be used by entrepreneurs such as tax incentives and other options are possible (Adams, et al., 2000).

2.5 Summary of empirical results and theoretical review

The fifth subchapter will focus on a more detailed analysis of the theoretical contexts of brownfield regeneration that are suitable for business development. To solve this problem, a total of 50 expert articles were selected and the key factors influencing their potential use were identified and focused on possible use for business purposes. The aggregate empirical results are shown in table 1. and theoretical review in table 2.

Table 1. Summary of results of empirical literature

No.	Author (Publication year)	Selected methods	Social and economic factors	Contamination of brownfields	Re-use of brownfields	Business activities
1.	**Green, T. L., 2018.**	Statistical analysis (ANOVA, regression).	The incidence of pathogenic phenomena affecting the development of the city or municipality where brownfields are located. It is necessary to support the region in regeneration of brownfields.	The high incidence of brownfield contamination complicates process of regeneration.	Use of abandoned buildings and areas of energy-saving buildings that mitigate the burden on the environment.	x
2.	**Doick, K. J., 2009.**	Case Studies.	Brownfields focused on recreation have a positive impact on the municipality or city where they occur.	Effect of a given brownfield affected by contamination is influenced by another way of its use.	Use of brownfields for recreation.	x
3.	**Greenberg, M. et al., 2000.**	Case Studies.	In the case of brownfields there is a greater concentration of pathological phenomena (criminality) that reflects their economic development.	A brownfield contamination rate is dependent on further use by the prospective candidate.	Changing brownfields based on the views of respondents.	x
4.	**Limasset et al., 2018.**	Group interviews with experts.	Implementation of regional instruments for possible regeneration.	An occurrence of contamination the brownfield should be accessible and should reflect the reality.	For brownfield use a financial and business plan is required to their operability.	x
5.	**Doick, K. J., 2009.**	Structured questionnaire.	A conversion of abandoned objects for recreational purposes it will reduce the incidence of pathological phenomena and transforms the affected area on economically developing.	Future use is influenced by contamination issues.	Reclamation of brownfields on a forest park with a recreational use for local residents.	Ecological focus of brownfield use for business purposes.

6.	**Mahzouni, A., 2018.**	Case Studies.	Changing objects which appear near home units, they should be transformed into new residential energy-efficient neighbourhoods.	Contaminated brownfields reduce the value of the property in their vicinity.	Use of abandoned areas and buildings for the construction of new residential units (energy efficient).	Planning procedures for revitalizing brownfields should focus on business activities.
7.	**Hartmann, B., S. Török, E. Börcsök and V. O. Groma, 2014.**	Brownfields analysis of energy utilization. Case studies.	The construction of energy-saving power plants has a favourable economic impact on the development of the region.	Use of brownfields for gentle energy plant alleviates the risk of further contamination of the affected land.	Converting brownfields for use of energy production.	Proper re-use of an abandoned object or area and the involvement of stakeholders can contribute to the development of the area.
8.	**Sardinha, I. D., D. Craveiro and S. Milheiras, 2013.**	Case studies. Structured interviews.	Brownfields occurrence affects the development of the sites and last but not least an occurrence of pathological phenomena.	Soil contamination appears to be a dangerous factor in human health.	Revitalization of abandoned rural brownfields to tourist attractive places.	x
9.	**Hartley, W., N. M. Dickinson, P. Riby and B. Shutes, 2012.**	Case studies.	When converting brownfields, the state (government) should focus on supporting affected areas in the process of regeneration through various financial assistance.	Contaminated brownfields are less used for a future use.	Building green in deserted places and localities.	x
10.	**Page, G. W. and R. S. Berger, 2006.**	Analysis of selected brownfields of the VCA program (New York, Texas).	Effect of contamination force the abandoned building or the area to the development of city (less interest of investors in the locality, moving people to attractive areas, etc.).	The industrial history of regions reflects the impact of brownfields contamination.	Focus on former industrial sites and the associated development of the site (housing units, commercial use, etc.)	x
11.	**Sparke S., P. Putwain and J. Jones, 2011.**	Case studies on selected brownfields.	Ripe compost reduces the economic impacts of brownfields on their regeneration.	The use of mature compost can have a positive effect on reducing mild contamination of damaged soil.	The basic use of damaged soil should be early vegetation and the promotion of plant and animal health.	x

12.	**Lafortezza R., R. C. Corry and R. D. Brown, 2008.**	Ecological models, case studies, structured questionnaires.	Socio-economic factors are dependent on brownfields on political factors that reflect the structure and the possibilities given region.	Contaminated soil has an impact on local ecosystems that reflect possibilities their use.	Less contaminated areas are recommended to return to their original character. More contaminated brownfields are recommended for a soil remediation and use it for possible industrial zones.	Revitalizing brownfields should be according to the highest standards and business entities should use them for biotypes that would bring environmental functionality.
13.	**Nijkamp P., C. A. Rodenburg and J. A. Wagtendonk, 2002.**	Case studies, analysis methods for brownfield contamination cleaning.	Reclamation requires high economic costs, which need to be co-financed with government funds there.	Contamination of brownfields should not be dependent on their potential use. If there is an abandoned object or area contaminated, timely remediation should be done.	The force of contamination reflects the ability of brownfields to use them.	x
14.	**Otsukaan, N., D. Timothy and A. Hirokazu, 2013.**	Comparison of brownfield study between the UK and Japan.	The UK is doing well to transform certain brownfields into economically prosperous buildings. In Japan is the problem of financing the regeneration of the abandoned objects and areas, their ownership.	Both countries have contaminated areas. England tries to eliminate incidents from public and private sources. Japan resolves small-scale issues, here are smaller brownfields on a larger scale than in the UK.	In the UK there is a database of abandoned ones objects and areas for possible potential use. In Japan no government database exists, even though there is an obvious occurrence of objects.	x
15.	**Adams, D., A. Disberry, N. Hutchison and T. Munjoma, 2000.**	Case studies, structured questionnaires.	Greater opportunities to brownfields regeneration they have abandoned objects and areas that are socially and economically more advanced.	Contaminated soil that would cost the decontamination would be exempt from the tax for the new owner.	The use of brownfields depends on the availability of a grant or grant option.	Fiscal measures to rebuild brownfields in taxes and subsidies is an acceptable tool that should be supported for those interested (investors) in the given brownfields.
16.	**Wernstedta, W. and R. Hersh, 2006.**	Case Studies.	Brownfields are mostly unattractive to potential prospects.	The force of contamination reflects its potential prospects.	Use regenerated brownfields in a meaningful way that would not be subject to contamination.	x

17.	**Qiyan W, X. Zhang, Ch. Liue and Ch. Zhou, 2018.**	Case Studies.	Government pitfalls to focus on rebuilding brownfields in the urbanization process and their beneficial effects on economic consequences. Involvement of local public participation throughout the recovery process brownfields and the use of independent assessment institutions for their use.	The impact of strong, unsecured contamination results in undesirable effects that are not easy to repair. If possible, the original owner of the object should be sanctioned.	Conversion of abandoned objects and areas on green development zones (parks, forests). Avoid building industrial zones within or near towns. Keep the environment for the next generation.	Linking stakeholders to a given business plan to revitalize brownfields.
18.	**Adelajaa, S., J. Shawb, W. Beyeaa and J. D. Ch. McKeowna, 2010.**	Case Studies.	Regenerated brownfields have a positive impact on the creation of new jobs and to improve the living situation of people around.	Contaminated brownfields should be regenerated into renewable energy.	Use of abandoned buildings and sites for energy-renewable sources.	The regeneration and reclamation of brownfields for business purposes should be directed towards the energy direction and supported by interested groups.
19.	**Zhang, L. et. al., 2016.**	Case Studies.	Converting brownfields to new industrial zones can have a negative impact on the population (noise, pollution, etc.)	Contamination is mainly related to past exploitation.	Converting abandoned buildings and areas into energy-saving solutions.	The occurrence of brownfields in urban areas should be transformed into housing units and development projects.
20.	**Albanese, S. et al., 2010.**	Chemical analysis and granulometry. Case studies.	Living in severely contaminated brownfields appear to be dangerous which reflects the development and expansion opportunities in the region.	Certain contaminated brownfields contain heavy metals that are life-threatening.	Converting brownfields to renewable energy sources.	x
21.	**Martinát et al., 2018.**	Case studies, structured questionnaires.	In certain areas where brownfields are located, there are certain pathological phenomena and other social problems that are associated with the local site.	Contaminated brownfields are less used for future use.	Transforming brownfields should correspond with the views of people who live in its vicinity.	Impacts of revitalization of brownfields and their business plans should be debatable with the general public

22.	**Casadoa, M. R., J. Serafinia, J. Glen and A. Angus, 2017.**	Case studies. Model HPM.	The impact of incinerators on social impacts is mainly for local residents living near them. On the other hand, under the economic impact, this situation is acceptable for the development of the city where the incinerator is located.	The construction of incinerators on brownfields increases the level of contamination in the air.	Converting brownfields to energy-efficient solutions.	Proper re-use of brownfields can contribute to improving the pricing policy of housing units in their vicinity in the rhythm of entrepreneurial activity.
23.	**Navrátil, J. et al., 2018.**	Case studies. Structured questionnaires.	Conservation historic buildings in brownfield regeneration can increase the economic development of the area, which will be more attractive for tourists.	Historical preservation of brownfields can help speed up the regeneration of contaminated sites and once again make them useful and safe for the public.	The regeneration of brownfields should be focused on historical heritage. Potential investors should use existing buildings that are of some value and can contribute to development.	Business activities on brownfields in the historic part of the city should focus on the historical heritage of the given buildings.
24.	**Klusáček, P. et al., 2018.**	Structured interviews.	Regenerated brownfields reflect the development of the regions where they occur. It is necessary to support the development of the given area, where brownfield problems are covered by regional and cohesion policy.	Brownfieldy, which reflects the contamination, comes from previous activities, reflecting higher costs of their early regeneration.	Re-use of brownfields should be reflected in market investments in the given regions and cities. Less developed cities and regions are trying to use brownfields rather than green areas.	It should lead a dialogue between the public and interested parties when preparing projects to restore brownfields and their intentions.
25.	**Feng, H. et al., 2016.**	Case studies.	The occurrence of affected areas, which is harmful, can affect the health of the population and requires considerable economic means.	Brownfields, a deserted industrial zone, are environmentally friendly because they contain anthropogenic metal particles.	Remediation using natural plants that can help restore damaged soil and can be reused.	x

Source: own survey (2018); x = does not contain

Table 2. Summary of results of theoretical review

No.	Author (Publication year)	Social and economic factors	Contamination of brownfields	Re-use of brownfields	Business activities
1.	**McCarthy, L., 2002.**	Greater government support of brownfields for the private sector. Reconstruction of brownfields by private investors reflects social concerns about their potential use.	Most potential investors will not be interested in contaminated brownfields, where they usually have to financial burden on their decontamination.	Use of abandoned objects for potential investors.	x
2.	**Thornton, G. et al., 2007.**	Brownfields present significant social as well as environmental problems worldwide.	A soil contamination has long been a consequence – intended or not – of land use.	Integrated urban land management policies related to brownfield regeneration policies should focus on market-led incentives (indirect incentives, gap-funding, etc.).	x
3.	**Bartke, S. and R. Scharze, 2015.**	The authors highlight public participation in spatial planning during brownfield reconstruction, as local residents are the cornerstone of demoralization and are enriched economically and socially.	Indirect impacts on the health of local people or the ability of future generations to use limited land resources are often neglected in practical decision making based on simple business accounting rules.	Land on unspoiled natural or estuarine areas (often referred to as green areas), which include sealing these areas for residential or commercial development, they are in significant contrast to sustainable land management.	Developer projects and home construction for brownfields regeneration.
4.	**Kovalick, W. W. and R.H. Montgomery, 2017.**	Soil sealing has been increasingly seen as a major cause of soil degradation.	Polluted sites related to economic growth and growing urbanization are rising public health, environmental, economic and policy challenges, especially in low and middle income countries.	Financing of the contaminated land use program, especially as regards the redevelopment of former industrial / abandoned sites (also called brownfields), may require unique special arrangements that allow for public-private partnerships.	Brownfields are generally loose or unused properties that the owner or buyer wishes for new commercial purposes but for which perceived contamination may be an obstacle.
5.	**Schädler, S. et al., 2011.**	Brownfields affect land and earth's water resources and cause environmental and health risks as well as economic and social costs.	The extent of soil contamination reflects the ability of investors to take on brownfields.	Re-use of brownfields in the public interest of towns and municipalities.	x

6.	**Norman, J. et al., 2016.**	A difficult approach to brownfields in urban areas is the fact that urban planning / design and subsurface engineering take place with each other in isolation, although the practical result of the site's rehabilitation depends heavily on both.	A fully holistic approach to redevelopment of brownfields requires new legislation and national policies that allow the explicit inclusion of subsurface aspects in the planning process.	Planning the reconstruction of brownfields is an elusive field and is difficult to understand because it is changing all the time. Planning conditions for the process of city reconstruction are the result of laws, regulations, policies and institutions that interact and work together at different scales (local, regional and national).	x
7.	**Pizzol, et al., 2016.**	Regeneration of brownfields can offer enormous development potential including economic, social and environmental benefits.	The reluctant attitude combined with the uncertainty surrounding brownfield risk areas may represent a high cost for a regeneration and reduced property value for decontamination costs.	In the last decade, the regeneration of brownfield sites has become a more common practice, since free developable land (or so called "greenfields") has more and more become a scare and hence a more expensive resource, especially in densely populated areas.	x
8.	**Rizzo, E. et al., 2015.**	Brownfields contamination reflects the socio-economic nature of brownfield regeneration.	Environmental contamination may not be clearly revealed, attitudes of stakeholders in the area of redevelopment may not be in the interests of communities and investors.	Participation of stakeholders is beneficial to brownfield regeneration. Stakeholder involvement can actually contribute to identify more sustainable regeneration options.	x
9.	**Linn, J., 2013.**	Brownfields literature suggests that these programs can remedy market failures that cause poor social redevelopment.	Brownfields' failures can adversely affect the environment and the environment, many states have created voluntary programs that reduce the risk of accountability and support brownfields redevelopment.	Brownfields are features whose conversion is limited by known or suspected contamination and fears of related liability.	For business activities, investors should focus on brownfields that reflect housing policy in their vicinity.

10.	**Gallagher, J. F. et al., 2008.**	In many areas around the world, industrial activities have led to contaminated urban landscapes. While many heavily polluted sites were identified and solved, less polluted sites (brownfields) proved to be more difficult to remedy.	As a result of industrial land use, they typically contain a large number of trace metals such as cadmium, copper, zinc, lead and others and more. These elements are often adsorbed or closed by carbonates, organic matter, iron oxide and magnesium oxides and primary or secondary minerals.	For re-use of abandoned areas, it is necessary to look for solutions in vegetation systems, which bring economic benefits for their recovery.	x
11.	**Lord, A. R., 2015.**	Cultivation of biomass on selected brownfields can have a favourable economic impact on the development of the site.	Various neglected exploited and neglected types of soil are potential candidates who share a number of challenges for agronomy, including contaminants in soil, potential intake and scattering through energy use.	Growing biomass on non-agricultural land could potentially provide services in the field of renewable energy sources without relocating land from food production and avoiding social and environmental conflicts associated with bioenergy.	x
12.	**Hackwort, J., 2014.**	Land abandonment is an urgent problem in declining cities. As residents leave, as well as demand for residential, commercial and industrial real estate.	Contaminated soils and abandoned buildings reflect developmental capabilities for the locations where they occur.	Most abandoned urban land gets into the process of tax evasion where a city or county places a lien on property and eventually takes over the property.	The regeneration of abandoned sites and their proper policies through business collections and developers can have a positive effect on the price of land and the potential for development of the area.
13.	**Glumac, B. et al., 2015.**	In most cases, the revival of brownfields is a form of partnership. Public private partnership (PPP) is often used in practice development.	Access to the remediation of contaminated brownfields can be a public private partnership.	Renovation of brownfields can provide a wide range of social, ecological but also economic benefits for a number of entities.	x

14.	**Osman, R. et al., 2015.**	A properly regenerated brownfield reflects the possibility of raising the standard of living of the population.	Environmental pollution (site contamination) and previous brownfield use are important factors influencing potential rebuilding.	In general, brownfields have gained growing political confidence over the last decades, as loose agricultural or natural mature land is less available, more expensive and protected in densely populated areas.	The re-use of brownfields in rural areas should focus on the public's interest and the possibility of supporting business activity.
15.	**Enenegel, B. el al., 2012.**	Socio-economic factors that are reflected in brownfields have negative effects on the population, and the attractiveness of the area may decline.	Contaminated objects are often omitted by developers due to the problematic situation of property rights.	Deserted objects and areas should be used for the needs of the population where they occur, because the unrecoverable regenerated brownfield may not be beneficial for the area.	x
16.	**Nijkapmt, P. et al., 2002.**	In general, land use has a specific economic function in that it is derived in nature; land use is needed for human activities (production, consumption, investment, recreation, etc.).	Externality in the urban area raises many interesting research and policy issues, especially the re-use or redevelopment of contaminated land for various purposes.	In the context of sustainable city planning, we have seen growing political interest in urban management over land use in recent years. The potential for sustainable land use in urban areas is often severely disturbed by the existence of an unacceptably high level of soil contamination.	The urban land market in almost every country is based on the power field between private initiatives and public concerns. In general, land is rather a unique good because of its geographical location or its original quality, so the landowner can have a "natural" danger of monopoly power. Land use for business purposes should be in the public interest.
17.	**Hands, E. D. and R. D. Brown, 2002.**	The deserted landscape has the potential to improve biodiversity and environmental performance in the area and also to provide accessible "natural" areas for public use.	High portions of heavy metals in contaminated soil can damage the health of the lover, and their inappropriate remediation can have more damage than benefits.	The use of brownfields should focus on promoting the environment.	x

18.	**Chang, F, H. and H. Sigman, 2007.**	Economists have acknowledged that land prices may include discounts reflecting environmental responsibility for clearing contaminated property. This responsibility, therefore, may not affect the incentives for developers to purchase these sites.	Proper policy can contribute to the decontamination of brownfields and their development in a given locality.	The re-use of brownfields should focus on the right choice of all stakeholders.	x
19.	**Chen, I-Ch. and H. Ma, 2013.**	In order to reduce the uncertainty of the social costs of brownfields, including health care and damage to the value of land, decision makers may use risk maps to set remediation goals and control financial risk.	Whether contaminated land is motivated for the regeneration and redevelopment depends on whether the value of soil development is sufficient to justify remedial and social costs.	Renovation of brownfields involves a number of uncertain financial risks associated with market demand and land value.	However, private landowners and banks are reluctant to support brownfield rebuilding policy due to the uncertainty of social and political responsibilities.
20.	**Alberini, A. et al., 2005.**	High soil contamination and small back-up of intentions are devastated and ineffective within developers. This is a minor concern about brownfields.	Brownfields contamination is a somewhat negative phenomenon for stakeholders and developers.	Developers find contaminated sites less attractive and appreciate responsibility for damage. Additionally, developers with previous experience with contaminated sites are highly responsive to government subsidies, while inexperienced developers respond more responsibly to responsibility and regulatory relief.	Unattractive incentives for contaminated brownfields reduce developmental intentions.
21.	**Prato, T. 2007.**	Human use of land increases the supply of socio-economic goods and services that bring significant socio-economic benefits in terms of income, employment and well-being.	Incorrect land use can have negative impacts on the environment.	Designers and stakeholders are required to develop land-use plans to mitigate the negative environmental impacts of growth.	x
22.	**Tedd, P., J. A. Charles, and R. Driscoll, 2001.**	Brownfields reflect the economic situation of the area, which is unattractive.	For many years, the dominance of abandoned land and brownfield sites has been dominated by the dangers of contamination and the risk to human health.	The use of brownfields should be in the public interest and should be properly promoted through various co-operations and subsidies.	x

23.	**Wernsted, K. et al., 2013.**	Given that the so-called brownfields can threaten public health and the environment, and suppress the economies of local neighbourhoods while providing potential opportunities for compaction and the fight against enlargement, their reconstruction combines elements of current practice in development and environmental protection.	Literature on contaminated properties has grown, and professional journals for planning and vocational education, environmental and economic developments have periodically revealed specific problems for brownfields over two decades, but professional volunteer publications are relatively sparse and largely involve empirical site investigations.	Restoration of contaminated properties includes attention in all regions of the world, a product that is interested in revitalizing poor performance, previously developed land and environmental concerns.	x
24.	**Burke, H. et al., 2015.**	Highly contaminated brownfields and underground mines have a negative impact on the lives of their inhabitants.	To identify potential geological hazards, understanding of previous developments in coalfields is required, so proposals for regeneration include measures that address these issues.	Planners and developers need to have access to accurate information describing the shallow subsurface area and to explore the use of publicly available information to better characterize previously developed areas and mined land.	Underground land of brownfields can serve to discourage regional redevelopment and investment. Therefore, it is beneficial for regions with the potential for conversion to identify and mitigate any barriers to improvement.
25.	**Capobianco, O. et al., 2014.**	Deserted objects and places that are contaminated are, in turn, a threat to development and residents.	Incorrect acceptance of landfill and the impact of this management practice on the environment, together with its excessive costs in the case of large quantities of material to be disposed of, call for the identification of alternative integrated approaches to contaminated soil management within the brownfield recovery framework.	Brownfield, which is highly contaminated, reflects the potential for development and interest of potential invaders in the site.	x

Source: own survey (2018); x = does not contain

2.6 Empirical results from the literature review

The sixth subchapter will focus on the empirical results of selected contributions and authors dealing with brownfields and their potential use for business purposes. Figure 1 shows the results of the methods used in each post. It should be noted that the authors used several methods in some articles. The results show that the most widely used method is case studies for certain brownfields. Relative frequency is 54%. The second most commonly used method is the individual statistical analyses, mainly in the context of soil contamination analysis. In this case, it is 20%. Structured questionnaires can be considered the third most popular way that article authors use about brownfield regeneration, 14%.

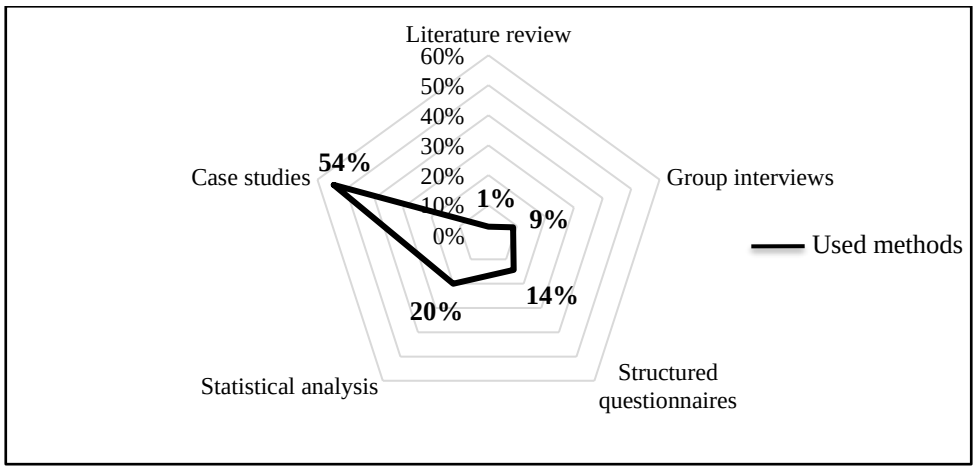

Fig. 1. Using methods (Source: own survey)

The second picture focuses on the future use of brownfields within empirical findings. The results show that, according to the authors and their findings, regeneration of brownfields should be focused on energy-conscious environments, and this at 30%. Another suitable way of using abandoned buildings and facilities is to build opportunities for recreational purposes. Relative frequency is 26%. Another way to make use of brownfields is how to obtain financial assumptions about their possible contamination, reflecting greater financial prerequisites for their regeneration. This is 15% in the empirical analysis. The fourth most common way to use abandoned buildings and sites is to build on these plots or units of housing.

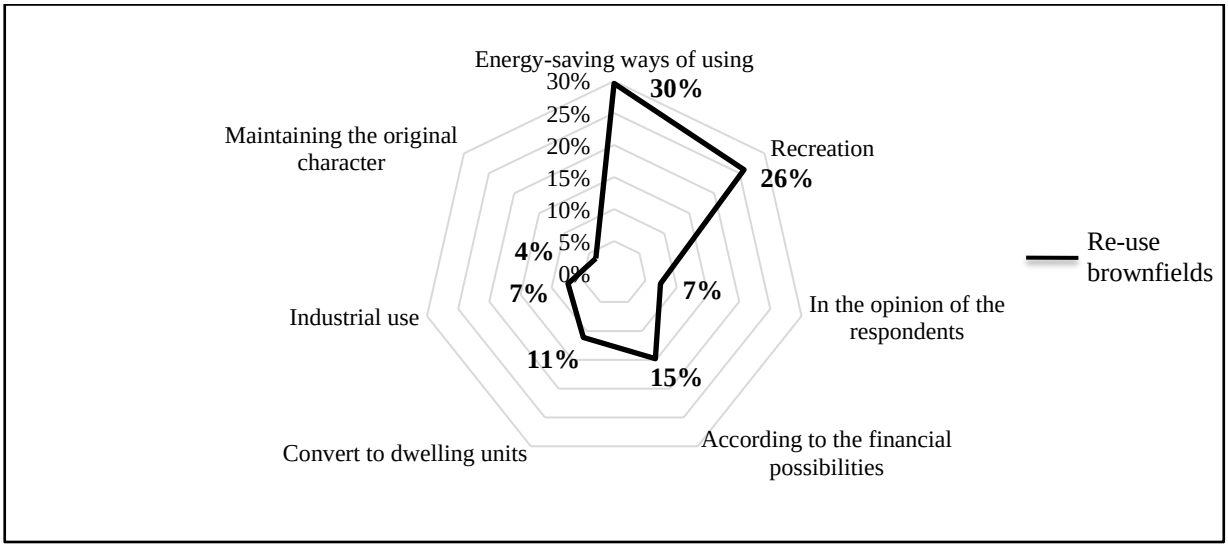

Fig. 2. Possible ways to re-use brownfields (Source: own survey)

3 Examples of regenerated brownfields

The third chapter will focus on selected regenerated brownfields that have been regenerated in the Moravian-Silesian Region. Altogether, for the purposes of this paper, 10 objects and sites have been selected that currently have potential use by the public or private sector. Table 2 shows selected regenerated brownfields where reclamation or regeneration has taken place over the last 8 years and are currently being used. Information on brownfields was provided through the Regional Development Agency located in Ostrava. The table next to the brownfield name is their size. The total area of these selected abandoned buildings or areas is 185 hectares.

Table 3. Name and size of unused regenerated brownfields

The name brownfields	Size in (he)
Mine František	16
Mine Dukla	30
Military barracks	2.3
Business Zone Třanovice	29
Castle Kunín	8
Janečkův Mill	0.4
Golf Resort Lipiny	65
Dinopark Ostrava	35
Waschhaus Raduň	0.061
Water reservoir tower Bohumín	0.013

Source: Regional Development Agency Ostrava

Figure 3 shows previous brownfield contamination. From the picture below, it is clear that most brownfields were not previously contaminated, at 60%. For the remaining 40% of the abandoned buildings and sites, it was necessary to carry out the remediation and remediation of the contaminated soil. This is a significant factor, as the incidence of soil pollution reflects the costs of revitalizing or regenerating brownfields.

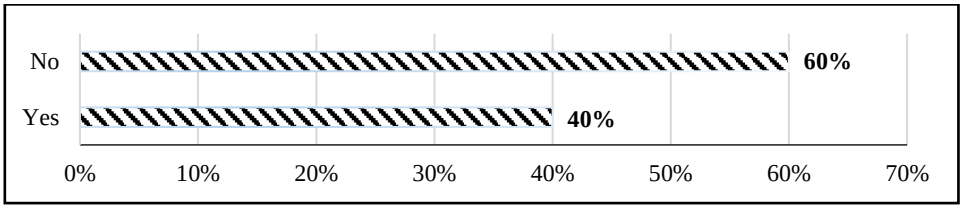

Fig. 3. Contamination of brownfields before regeneration (Source: Agency for Regional Development Ostrava)

The fourth picture deals with the current use of selected regenerated brownfields. The chart shows that most of the abandoned buildings and facilities are currently equipped for civic amenities (50%). In the latter case, it is an industrial activity where 40% of regenerated brownfields are involved. In the framework of successful regeneration, these are mainly new industrial zones on the outskirts of the city districts in the Moravian-Silesian Region. The last option is to use sports. Within the graph, this is only one selected regenerated brownfield.

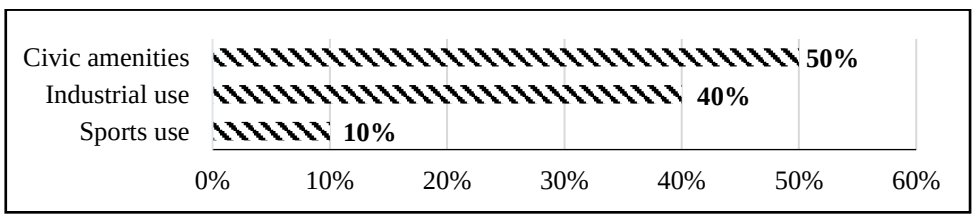

Fig. 4. Current use of brownfields (Source: Agency for Regional Development Ostrava)

Table 3 shows the brownfield names with costs associated with brownfield regeneration. In total, CZK 604.8 million was spent on selected buildings and premises. This was supported by public subsidies of 5 brownfields. CZK 174.6 million was drawn from subsidy titles. It can be said that the amount of regeneration costs reflects the previous use and contamination of abandoned buildings and complexes.

Table 4. Costs of brownfield regeneration

The name brownfields	Total costs in millions of CZK	Subsidies in millions of CZK
Mine František	150	-
Mine Dukla	27	-
Military barracks	15	12
Business Zone Třanovice	127	102
Castle Kunín	75	-
Janečkův Mill	40	-
Golf Resort Lipiny	63	-
Dinopark Ostrava	77	37
Waschhaus Raduň	5.8	5.3
Water reservoir tower Bohumín	25	18.3
Total	**604.8**	**174.6**

Source: Agency for Regional Development Ostrava

The table below falsifies the original and current use of abandoned brownfields. It can be seen from the table that selected regenerated brownfields were formerly used mainly for mining and civilian purposes. After regeneration or recultivation of brownfields, the use is mainly focused on new industrial zones or for use for the inhabitants living near the regenerated brownfield.

Table 5. Previous and current use of brownfields

The name brownfields	Original use	Current use
Mine František	Mining	Industrial activity
Mine Dukla	Mining	Industrial activity
Military barracks	Army purposes	Industrial activity
Business Zone Třanovice	Agricultural	Industrial activity
Castle Kunín	Former civic amenities	Former civic amenities
Janečkův Mill	Agricultural	Former civic amenities
Golf Resort Lipiny	Mining	sporting use
Dinopark Ostrava	Dump	Former civic amenities
Waschhaus Raduň	Former civic amenities	Former civic amenities
Water reservoir tower Bohumín	Former civic amenities	Former civic amenities

Source: Agency for Regional Development Ostrava

4 Conclusion

The issue of brownfields is nowadays a very topical theme. Brownfields are a weak point and a threat to towns and villages where they occur as they reduce the development of regions and can have a negative effect on the public budget of the territory. On the other hand can be said that the brownfield with some potential can contribute to the development of regions and increase not only the economic but also the standard of living of the population.

This paper looked at a literary review and factors that reflect the possibility of re-using brownfields for business purposes. A total of 50 contributions from both domestic and foreign literature have been analyzed. The first part of the theoretical analysis was devoted to empirical literature, where 25 authors were examined. The following part was focused on theoretical review, where the author of the work dealt with 25 foreign authors. It has been found that most of the work methodology uses case studies on selected brownfields, which predominantly combine with other methods, mostly statistical ones. It has been found, following an empirical study, that the incidence of brownfields reflects development and affects the occurrence of pathological phenomena in given areas. It also reflects the price of properties that are close to it. Another finding is that the effect of contamination on brownfields is significant as the level of contamination reflects the interest of potential investors, but on the other hand, strong contamination can damage the quality of the soil and the most serious way of influencing is the influence on humans and their health. For re-use of brownfields, most of the contributions put emphasis on turning brownfields into energy-saving buildings and further building up opportunities for free time activities. This finding is interesting as the second part of the paper deals with selected regenerated brownfields within the Moravian-Silesian Region. A total of 10 abandoned buildings and facilities were selected. It was found that these 10 regenerated brownfields are predominantly used for civil and industrial purposes. As a result, re-use may differ in empirical findings and in facts. The author of the paper pointed out that each country has a different approach within the brownfield area. It is appropriate to extend this issue to other results and to support this by further research suitable for business purposes.

5 Acknowledgement

This paper was kindly supported by the project with title Brownfields in urban and rural space: geographic, economic, historical, legal contexts and their importance for regional development (BURAN) (SGS/21/2016).

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11th International Scientific Conference
"Karviná Ph.D. Conference on Business and Economics"
November 7-9, 2018, Karviná, Czech Republic

Conference Proceedings
Silesian University in Opava, School of
Business Administration in Karvina, 2018

DETERMINANTS OF FINANCIAL STRUCTURE IN CZECH ENERGY COMPANIES

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Abstract
The issue of capital structure is still a highly debated and unresolved topic in corporate finance. Most studies on this topic are addressed by companies in the United States, the United Kingdom, and other countries of predominantly Western Europe. This article deals with Czech enterprises, as they are not so often the subject of research. The paper aims to determine the influence of three determinants on the leverage ratio of energy companies during the period from 2009 to 2017. Energy companies were selected for their influence on all other industries. Moreover, the energy sector itself is affected by some factors – raw material prices, energy policy and legislation in Europe and the world. There is a survey of the relationships between the share of fixed assets, return on assets, and macroeconomic development, which is represented by GDP growth rate, on total, long-term and short-term debt of the companies. A negative relationship is expected for economic growth and more profitable firms, a positive relationship for the structure of assets. The research of the companies is performed by correlation analysis and Generalized Method of Moment in econometric software EViews. The findings of both analyses indicate a positive relationship between asset structure and almost all forms of debt. A strong relationship is observed mainly for total and short-term debt. GDP growth has a significant negative influence on total and short-term debt. Found impacts live up to expectations. Unfortunately, the impact of profitability was not proven in one case.

Keywords
Financial structure, capital structure, profitability, asset structure, GDP.

JEL classification
G32

1 Introduction

The choice of the ratio of internal and external sources of funding is so important and discussed that for over half a century, theoretical models have emerged that seek to find the patterns and determinants according to which companies decide on their capital structures. The basis for these models is the work of Modigliani and Miller (1958), from which two main streams were created. The trade-off theory, the authors of which are Brealey et al. (2011), determines the optimal capital structure by seeking a balance between the cost of financial distress and tax shield. On the other hand, the pecking order theory assumes the use of internal rather than external sources of funding (Myers, 1984).

A large part of the studies is focused mainly on large and listed companies in countries such as the United States, the UK, and other mostly Western European countries. However, in recent decades, research has been devoted to companies of all sizes all over the world. Despite the considerable amount of literature, it is still necessary to analyze the determinants of the capital structure that can influence decisions' managers. The results depend mainly on the chosen industry and the country, and therefore there is considerable scope for research.

The contributions of this study to the current literature are twofold. Firstly, there is a limited number of researches regarding the impacts of some factors on capital structure in the Czech companies. Many times, examined companies are part of the one panel, and we cannot see the influences of determinants in individual countries.; in this paper is the Czech Republic examined separately. The sample size, which contains over 1,000 companies, is also beneficial for a longer period than usual. Secondly, the research uses, in addition to standard correlation analyses, the two-step system Generalized Method of Moment to explore dynamic interactions between selected determinants and capital structure.

The results suggest that Czech energy companies with more tangible assets tend to use more debt. At the same time, companies tend to use their resources in GDP growth. The most significant findings are for total and short-term debt.

The remainder of this paper is organized as follows. In section 2 is discussed a brief overview of the literature concerning the determinants of capital structure. In the following section, we introduce the data collection, variables, and methods used in the research. Section 4 outlines the findings of correlation analyses and GMM model, and finally, Section 5 concludes the findings of the research.

2 Overview of the literature

Managers' decision on optimal capital structure is influenced by a variety of determinants that can be tied to either the business itself or its external environment. Both groups of determinants are represented in this paper, namely, the profitability, asset structure, and macroeconomic developments. It is worth mentioning the studies of these factors. The application is particularly important for the Czech Republic, as the assumptions differ according to the choice of countries.

Profitability is part of many studies, but its effect on debt is not unambiguous. Expectations depend on what capital structure theory we are inclined. As mentioned above, the pecking order theory prefers the use of internal funding sources. Therefore, it can be assumed that more profitable companies will have a larger amount of retained earnings, so they will rather use this source of funding and debt should decrease. On the contrary, more profits can bring a lower risk of bankruptcy, as well as lower costs of financial distress and hence the possibility of debt growth. Bauer (2004), Weil (2004), Nivorozhkin (2005), Delcoure (2007), Mokhova and Zinecker for long-term debt (2013) confirm the pecking order theory. And vice versa the results of Pinková (2012), Aulová and Hlavsa (2013), Růčková (2015a, 2015b, 2017) correspond to expectations of trade-off theory. The contradiction may be because the second group of authors deals with certain sectors in their studies, while the first group is not.

If we leave the assumption of the Czech Republic, most of the research clearly shows the negative link between profitability and indebtedness (e.g., Wald, 1999; Chen, 2004; Bokpin, 2009; Handoo and Sharma, 2014; Öztekin, 2015).

The opposite effect can be observed in the case of often used determinant – tangibility. From one point of view, it can be argued that with the increasing amount of tangible assets, which can be used as collateral to protect the lender, the debt is increasing. This statement is especially true in countries with a banking-oriented financial system. Antoniou et al. (2002) were investigated companies in Germany, the United Kingdom, and France. In the case of the UK, which is focused on financial markets, a negative relationship between the ratio of fixed assets and debt was found. While Germany tends to the bank, it has been a positive link.

Another argument for the positive relationship between variables is the position of intangible assets that can hardly be sold during the bankruptcy of a company; usually, it is necessary to sell the whole company or with a considerable loss. This statement is confirmed by Stulz and Johnson (1985), Titman and Wessels (1988) and many others.

Overall, more positive-bound studies predominate. In the case of the Czech Republic, it is very important to choose companies, respectively industry. Nivorozhkin (2005), Delcoure (2007), Prášilová (2012), Mokhova and Zinecker (2013) did not distinguish the sector in their research and confirmed the positive influence of tangibility on indebtedness. However, for example, Aulova and Hlavsa (2013) and Růčková (2015a) focused on specific sectors – agriculture and construction, which are characterized by a large volume of inventories that have the same effect as intangible assets, and therefore a negative link has been found.

Needless to explain how an important factor is the state of the economy and what each stage of the business cycle carries. The expansion increases corporate profits, declines bankruptcy risk, outlooks are optimistic, and debt itself does not seem to be so risky and can grow. In the recession, companies have difficult access to loans thereby indebtedness reduces. Several studies are dealing

with this factor, and their results are different. E.g., Bastos et al. (2009) in Latin America and Mursalim and Kusuma (2017) in Indonesia revealed the negative impact of GDP.

On the other hand, Mursalim and Kusuma (2017) in Malaysia, Çekrezi (2013) in Albania, Saledi and Manesh (2012) in Iran found out a positive impact of GDP. Cheng and Shiu (2006) tested a sample of 45 countries and found a negative link between the state of the economy and the total and long-term debt.

On the contrary, Gajurel (2006) and Yinusa et al. (2017) found a positive relationship for long-term debt. However, in the case of total debt Gajurel and Bokpin (2009) confirmed findings of Cheng and Shiu. Gajurel and Bokpin indicated the same, negative, link for short-term indebtedness. Unfortunately, no previous research was found for the Czech Republic, but Hanousek and Shamshur (2011) and Jõeveer (2012) have included the Czech Republic in their panel. Both studies agree with a negative relationship for listed companies. Unlisted are either statistically insignificant (Jõeveer) or show a positive impact. Hanousek and Shamshur even found a positive link in the case of non-distribution of a sample of companies.

3 Data and methodology

In total, 1,268 Czech energy enterprises were found during the period 2009–2017. The data used for the analysis was extracted from the financial statements from the Orbis database. About 80 % of these enterprises are engaged in electricity, 2.5 % in gas manufacture and distribution, and 17.5 % in steam and air conditioning supply.

This article aims to determine the influence of the chosen determinants on the capital structure of energy companies in the Czech Republic. Based on a review of earlier studies dealing primarily with the Czech Republic's environment we suggest the following relationship between debt and three determinants:

1. Leverage is negatively related to profitability.
2. Leverage is positively related to asset structure.
3. Leverage is negatively related to GDP growth.

3.1 Variables

Regarding variables, first, it is necessary to determine the dependent variable, which is the three forms of debt. The first is the debt-equity ratio (DER), which is defined as the proportion of the company's total liabilities and total equity. Total liabilities are the sum of long-term and short-term liabilities. The remaining two dependent variables divide total debt into long-term (DER_L) and short-term debt (DER_S).

As determinants of the capital structure and independent variables were selected profitability, asset structure, and macroeconomic developments. The first two variables were selected because they are most commonly found in earlier surveys, for example Toy et al. (1974), Rajan and Zingales (1995), Wald (1999), Antoniou et al. (2002), Anderson and Submitter (2002), Gaud et al. (2003), Cheng and Shiu (2007), De Jong et al. (2008), Kayo and Kimura (2011) etc.

The development of the economy can be found, for example, in these studies Gajurel (2006), Cheng and Shiu (2007), Bokpin (2009), Hanousek and Shamshur (2011), Jõeveer (2012). The reason for selecting only one macroeconomic variable was the frequent statistical insignificance of these variables. In this research, we only wanted to test whether in the future we should add these variables. Given that GDP growth is statistically significant, further macroeconomic variables will be added to the follow-up surveys.

Profitability is represented by the ROA, which in this case is the share of earnings before interest and taxes and total assets. In consideration of the impact the asset structure should have on the growth/reduction of debt, there are several possible variables. Our indicator is the share of fixed assets

and total assets (SA). The final variable in the model is the state of the economy, which will be represented by the growth rate of GDP at market prices.

3.2 Methodology

Several methods can be used to analyze the relationship between debt and selected determinants when processing the empirical part. The first method for assessing dependence is a correlation coefficient that has the following equation and should take values in the interval <-1;1>:

$$\rho_{XY} = \frac{cov(X_i, Y_j)}{\sigma_X \sigma_Y} \quad (1)$$

Values closer to 1 indicate positive dependence, on the contrary -1 negative dependence. For values around zero, there is no dependence between variables.

The second possible method is the using of panel data. Due to the number of companies and determinants, it is more appropriate to create panels that allow us to create a more dynamic model and to control heterogeneity. However, using simple panel regression with fixed or random effects, we could get ambiguous results, and therefore the alternative solution of Arellano and Bond (1991) is used in this research to overcome least squares shortcomings. The two-step system Generalized Method of Moments (GMM) incorporates error correlation control, the lagged value of the dependent variable due to the presence of firm-specific effects and not strictly exogenous variables. The model is suitable for short time series. We estimate the parameters of this regression model:

$$DER_{it} = \alpha_0 + \beta_1 * DER_{it-1} + \beta_2 * ROA_{it} + \beta_3 * SA_{it} + \beta_4 * GDP_{it} + \varepsilon_{it}; \quad (2)$$

where α_0 is a constant, ε_{it} is a disturbance term, β are unknown parameters, and DER_L_{it-1} is a lagged value of the debt-equity ratio. Other abbreviations are defined above.

To test robustness, the model is tested by Sargan's test. If the values are higher than 0.05, the model can be considered robust.

4 Analysis of variable dependencies

In some analyzes in this chapter, the year 2017 is not included, as there are not so many available data as in previous years, and the results would be very different.

Figure 1 shows the share of debt and equity, which is almost balanced. Energy companies use about 54 % of debt and 46 % of own sources of funding. This composition of resources is also reflected in the debt-equity ratio, which is above the value 1 for the followed period. Given that there is a debt, it is worth mentioning the composition of total liabilities (Appendix 1). The graph shows a slight predominance of long-term sources of financing, thanks to companies engaged in other activities than just the distribution of energy. For distribution companies, short-term liabilities dominate and mainly consisting of advances for energy sales received from final customers, which are very advantageous concerning funding.

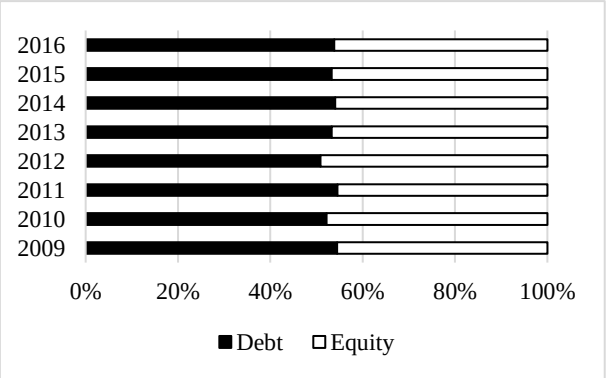

Fig. 1. Debt-equity ratio (Source: author's calculations based on data from the Orbis database)

Group of charts in Appendix 2 captures certain links of total liabilities to other variables. In the following paragraphs, electricity is mainly mentioned, because as mentioned above, most of the companies in the sample are dealing with electricity.

The graphs show a negative bond between total liabilities and economic development – when the economy is successful, companies' liabilities decrease. We can find the reverse link with liabilities and demand for electricity. When allocating liabilities to long-term and short-term ones, it is clear that a stronger bond (nearly four times) is associated with short-term sources. This bond can be explained by the fact that, as demand grows, advances from customers grow, which along with more or less declining prices over the period from 2009 to 2017, may cause a higher increase in these resources, because people can consume more at a lower price. The relationship of long-term liabilities is linked to the business cycle – when expansion takes place, banks are either willing to loans or people are willing to invest in financial markets, such as bonds that can often be issued by large energy companies.

It is also important to break down what has an impact on the demand for electricity. The three main influences can be seen in Appendix 3. The basis is the impact of GDP on demand. It is obvious that the economic recession in 2009 caused a decrease in electricity consumption (=demand). In 2010 and 2011, consumption grew with economic recovery. Also, the return of the economic crisis in 2012 and 2013 was accompanied by a moderate decline in electricity consumption. The recession was mainly due to a decline in household consumption and investments. The construction industry, the automotive industry, and agriculture suffered the most. The only year that does not correspond to the economic situation is 2014, in which consumption has reached almost the same values as in 2009. The reason for this significant decline was very warm weather and energy savings. Two thousand fourteen was the warmest year in the last 25 years. After this unique fluctuation, GDP and consumption evolved again in the same direction. Energy is, therefore, a cyclical sector.

The second important factor is industrial enterprises – wholesale customers. The correlation of these customers' consumption with total electricity consumption is 0.85, indicating a certain dependence on the industry. On the chart, we can see a very similar development of consumption of wholesale customers and the economy.

Appendix 3 also shows the development of electricity prices, which mainly depends on the development of oil, natural gas, coal and emission allowances. The dependence of these determinants and the consumption of electricity is shown in Appendix 4. The electricity price has reached 26 EUR/MWh from 58.5 EUR/MWh since 2008 and reached the 12-year minimum. Over the last two years, there has been a renewed increase in prices. The fall, of course, had its causes in commodity price movements. The first of these is Brent oil, which was quite recently around 100 USD/bbl. Thanks to new technologies (shale extraction), oil supply exceeded demand, and in 2015 a barrel cost 37 USD. Gas price development is also related to new technologies, declines in demand, more moderate weather, and mainly to the development of oil. However, the most important raw material is coal, which has fallen continuously from 2011 to 2016 and has been looking for its minimum. The decline was caused, for example, by shale gas substitution, the weakening of the currency of some major coal exporters, efforts to improve the environment in China, etc. On the other hand, in 2016 China caused an increase in imports due to mining constraints. Last year's rise in the price of coal again helped increase demand from China and outages of major exporters.

The last important determinant of the electricity price is the emission allowances, which have declined significantly since 2010. Only when the European Union's struggle for structural reform on emissions trading raised prices.

4.1 Descriptive statistics

Table 1 depicts descriptive statistics of variables. We can see that the average of all the variables expressing the debt is negative, over -426 %, while the median is positive between 17 and 206 %. Negativity, in theory, means that the shareholders owe it. It is not. Most often, it is the accumulation

of losses from previous years, which will be a liability until it is repaid. On closer examination of the financial statements, this explanation is applicable in our case as companies showing a negative debt-equity ratio have multi-year losses. Both the median and the total debt mean the high indebtedness of the energy companies.

For asset structure, over 66 % of total assets are fixed assets that can be used as collateral, and thus companies have better access to loans. It is necessary to take into account the possibility of doing business in the energy sector, when energy can be produced, which involves more tangible assets, and we can only distribute energy.

The average profitability is around 4 %. If the economic crisis does not exist in years 2009/2010, the return on assets would be around 5.5 %. Of course, the pace of GDP growth was also affected by the 2009 crisis, where is a minimum -2.33 %. However, profitability quickly recovered, while GDP growth was hit by the recession of the Czech economy in 2012 and the ongoing debt crisis in the euro area in 2013.

Table 1. Development of average values of variables

	DER	DER_L	DER_S	ROA	SA	GDP
Mean	-41.3823	-4.2620	-37.1202	0.0399	0.6654	0.0234
Median	2.0619	0.1793	0.3938	0.0515	0.8294	0.0180
Maximum	7333.7420	5300.2070	7333.7420	3.0000	1.1533	0.0654
Minimum	-209273	-16359.8800	-202412	-43.7318	-0.8328	-0.0233
Std. Dev.	2823.4590	317.4511	2699.1550	0.6083	0.3310	0.0259

Source: author's calculations based on data from the Orbis database.

4.2 Results of correlation analysis

Table 2 shows the result of the correlation analysis between dependent and independent variables. Profitability is negatively correlated with total and short-term debt; positive with long-term debt. Unfortunately, the coefficients are not statistically significant, so it is not possible to confirm the dependencies with certainty. Similar results are in the case for GDP, which is negatively correlated with all forms of debt. However, this also is not a statistically significant finding. Only the correlation coefficients of total and short-term debt with the structure of assets show statistical significance at the 10 % limit. Both coefficients indicate positive dependence, which corresponds to our expectations.

Table 2. Correlation matrix

	DER	DER_L	DER_S
ROA	-0.0001	0.0007	-0.0001
SA	0.0240[c]	-0.0046	0.0257[c]
GDP	-0.0057	-0.0036	-0.0055

Source: author's calculations based on data from the Orbis database.
Symbol [c] indicates significance at 10 %.

4.3 Results of GMM

Table 3 presents the panel regression results using the GMM model. The positive fact is that the models for all three forms of debt can be considered robust because the Sargan test values exceeded the required threshold of 0.05. Above mentioned was a structure of debt sources dominated by short-term liabilities. This fact is reflected in the coefficients of profitability, asset structure and GDP growth, that are higher for total and short-term indebtedness than for long-term.

As with the correlation analysis, the panel regression pointed to a possible negative relationship between indebtedness and profitability. However, again without statistical significance. Similar results in the Czech Republic were achieved by De Haas and Peeters (2006), Mokhova and Zinecker (2013) for total and short-term debt and Prášilová (2012) for long-term debt.

The tangibility coefficients are positive for all forms of debt, which confirms the results of the correlation analysis for total and short-term indebtedness. Important is the magnitude of the coefficients, which exceeds 2 500 in the total and the short term, which together with the significance at the level of 0.01 means a strong dependence on short-term sources of financing. The reasons were mentioned above.

The last observed relationship was between the development of the economy and the debt. The analysis revealed a negative statically significant influence of the GDP growth on total and short-term indebtedness. Again, it is important to note the amount of the coefficients that exceed the -800 value. Therefore, it can be assumed that companies with GDP growth use more own resources. The results agree with the findings of Cheng and Shiu (2006) for total debt, Gajurel (2006), Bokpin (2009) for short-term debt.

The model also included a lagged dependent variable. Their coefficients are positive and statistically significant in all cases which means that the use of debt sources of financing in the past period leads to their further growth in the following period. However, looking at the amount of the coefficients, it is obvious that the impact is small.

Table 3. GMM model

	DER	DER_L	DER_S
$DER_{(t-1)}$	0.0206[a]	0.0270[a]	0.0167[a]
ROA	-4.7582	-0.1628	-4.9977
SA	2528.8650[a]	54.0676[b]	2569.8250[a]
GDP	-843.7117[a]	30.9032	-1051.7800[a]
J-stat.	28.4566	13.8428	27.3087

Source: author's calculations based on data from the Orbis database.
Symbols [a] or [b] indicate significance at 1 % or 5 %.

5 Conclusion

The article dealt with the influence of selected determinants on the capital structure of energy companies in the Czech Republic. In total, 1,268 energy companies were tested. The specific factors were profitability, asset structure, and economic development. The debt-equity ratio for total, long-term and short-term debt was selected as the dependent variable.

Based on the research of previous studies devoted primarily to the environment of the Czech Republic, a positive relationship between the indebtedness and the share of fixed assets was expected; on the other hand, a negative link was assumed for the profitability and the state of the economy. Correlation analysis and panel regression using the GMM model were used to investigate the expected relationships. As regards the results of the first analysis, the statistical insignificance for all variables, except the structure of assets for total and short-term debt, was found. In this case, our expectations of a positive relationship have been confirmed. The same conclusion was reached by the regression, which confirmed this relationship for all forms of debt. It is obvious, given the economic development, which was very much in favor of investments that are reflected in the structure of assets, except for the years 2012 and 2013 in which the economic recession took place. The analyzes above have shown that the capital structure of companies predominantly consists of debt resources, which, among other things, finance these investments.

Also, the impact of the growth rate of GDP was also negative for total and short-term debt. The explanation may be that companies in the economic expansion are more profitable and prefer their resources rather. On average, shareholder's funds grew more than total liabilities.

Unfortunately, in both analyzes, the profitability was statistically insignificant and cannot confirm or disprove the original assumption.

Sector of business is also important, as it is beneficial in the energy sector to use short-term funding sources in the form of advances from final customers, which is reflected in the results.

Further research could consider using other variables instead of return on assets. Consideration should also be given to dividing companies by size and adding additional determinants.

6 Acknowledgment

This article was supported by SGS/7/2018 Analysis of the influence of selected aspects on the financial structure of enterprises in the conditions of Central and Eastern European countries.

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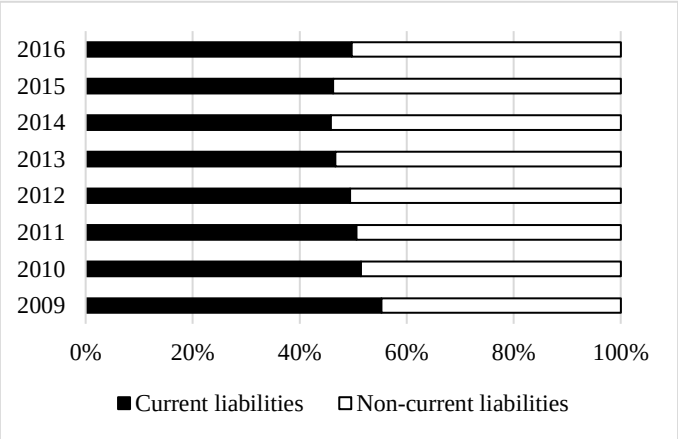
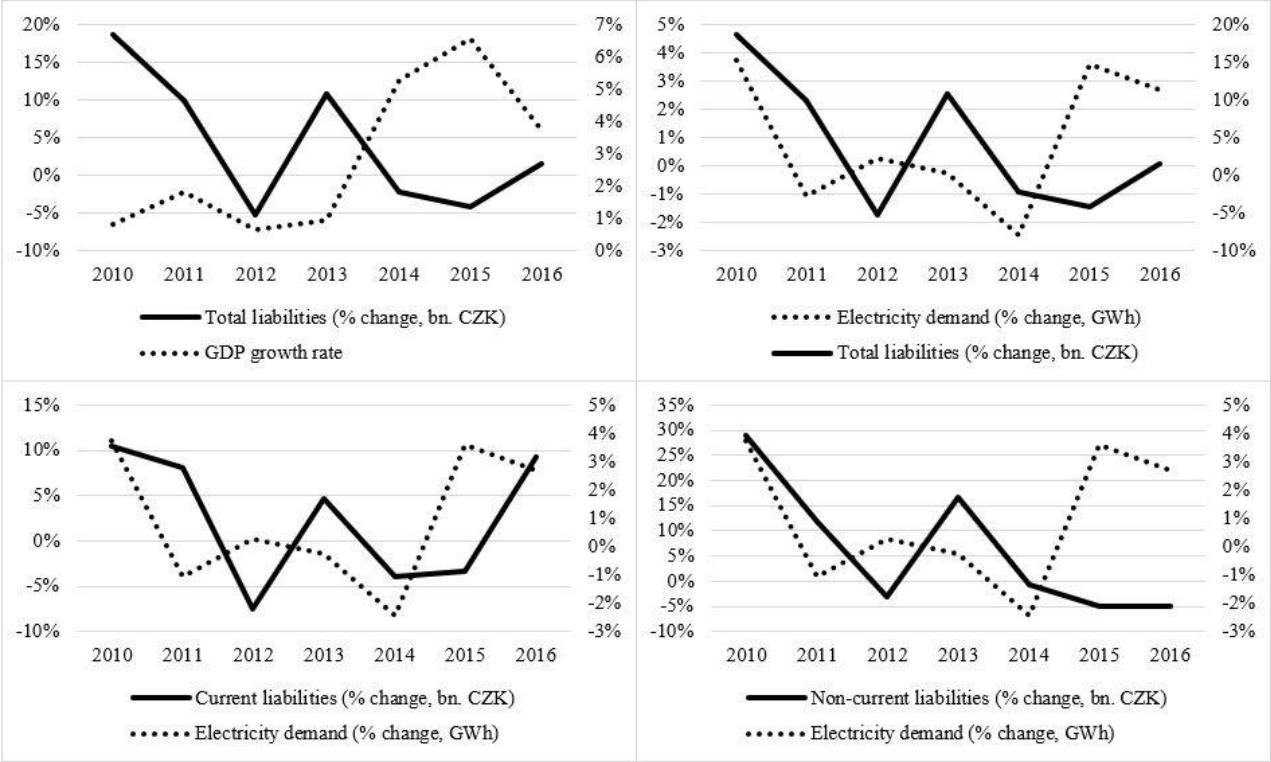
Appendix 1 Composition of total liabilities



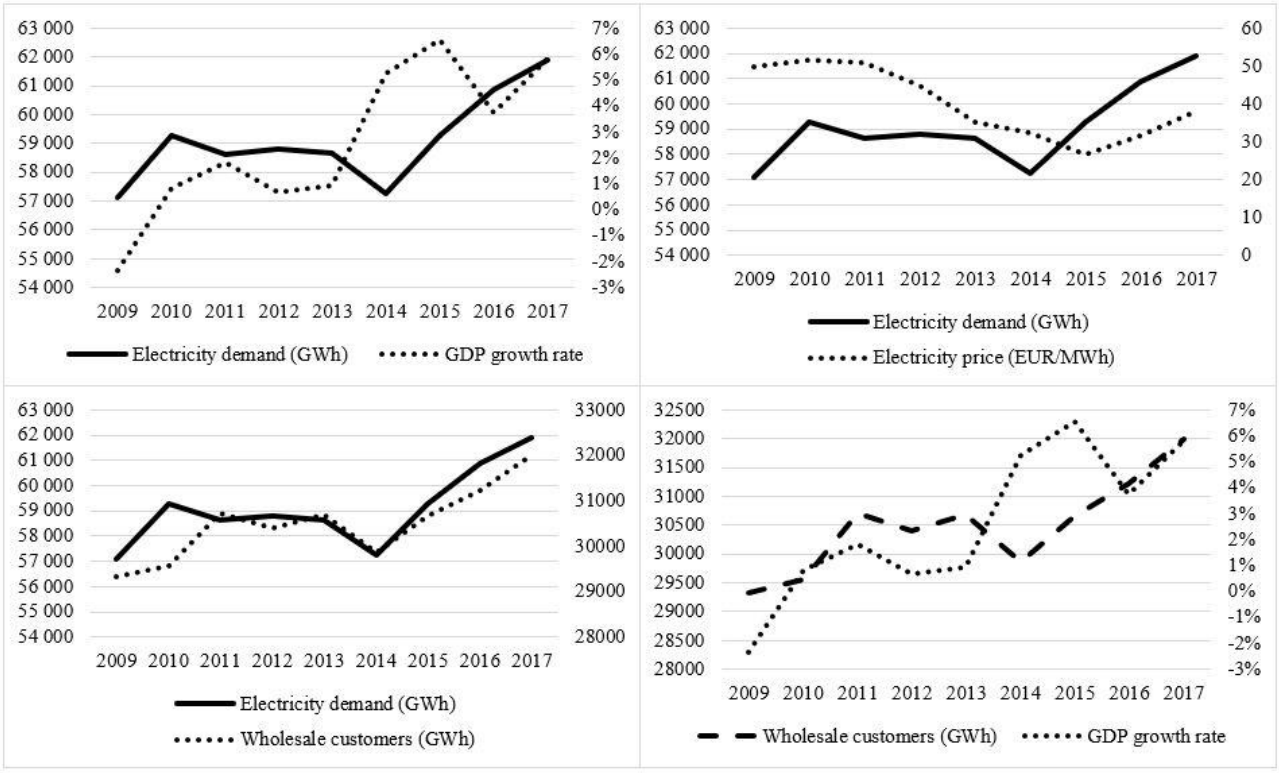
Source: author's calculations based on data from the Orbis database

Appendix 2 The relationship between liabilities and GDP and electricity demand



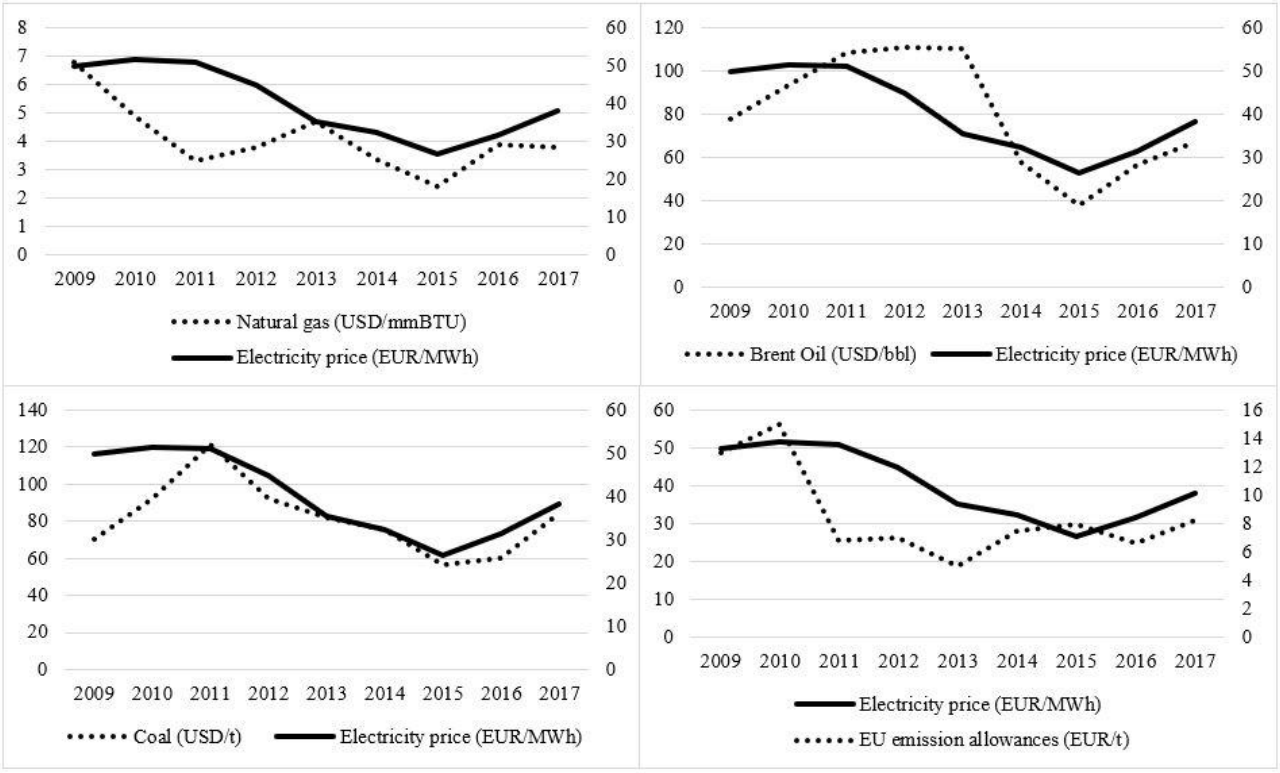
Source: author's calculations based on data from the Orbis database, Czech Statistical Office and Energy Regulatory Office

Appendix 3 The links of electricity demand



Source: author's calculations based on data from the Orbis database, Czech Statistical Office, Energy Regulatory Office, and Power Exchange Central Europe

Appendix 4 What affects the electricity price



Source: author's calculations based on data from Power Exchange Central Europe, European Energy Exchange, BP Energy Report and Investing.com

Title: **Proceedings of 11th International Scientific Conference "KARVINÁ PH.D. CONFERENCE ON BUSINESS AND ECONOMICS".**

Editor: Michal Tvrdoň

Publisher: Silesian University in Opava
School of Business Administration in Karviná

Number of pages: 113

Printing Office: Silesian University in Opava
School of Business Administration in Karviná

Karviná 2018

ISBN 978-80-7510-322-2