Czech University of Life Sciences Prague

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Bachelor Thesis

Economic Growth: A case study of the Czech Republic

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BACHELOR THESIS ASSIGNMENT

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Economics and Management

Thesis title

Economic Growth: A case study of the Czech Republic

Objectives of thesis

Summarize and analyze knowledge about economic developmnet in the Czech Republic before and after its entering into EU, and to focus on the characteristics of individual macroeconomic indicators.

Methodology

Theoretical part is directed at the description of economic theories and economic schools, analysis and definition of individual factors of production together with measurements of progress. Practical part contains general method, i.e.: comparison, analysis, synthesis. To description, simulation and prediction of economic development on the basis of empirical research, it is used time series data. Furthermore it is used regression analysis and OLS method, box plot and trend graphs. For the future forecast there are applied statistical methods and formulas.

The proposed extent of the thesis

40 – 50 pages

Keywords

Economic Growth, National Economic, Gross Domestic Product, Gross National Product, Business Cycle, Factors of Production, EU.

Recommended information sources

Barro, R.J.: Macroeconomics: A Modern Approach. Mason (USA) Thomson South-Wkestern 2008. OSBM 978-0-324-17810-4

Jurečka,V.: Mikroekonomie. 2., aktualiz. vyd. Praha: Grada, 2013, 366 s. Expert (Grada). ISBN 978-80-247-4385-1

Pečinková,I. a kol.: Budoucnost české ekonomiky, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9

Spěváček,V. a kol.: Transformace česká ekonomiky: politické, ekonomické a sociální aspekty. Vydání první. Praha: Linde 2002, ISBN 80-7201-381-5

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Declaration

I declare I have worked on my bachelor thesis titled "Economic Growth: The Case Study of the Czech Republic", by myself and I have used only the sources mentioned at the end of the thesis. As the author of the given bachelor thesis I further declare that the thesis does not break copyrights of any third person.

In Prague 20th November, 2015   Signature _____

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Economic Growth: The Case Study of the Czech Republic

Ekonomický růst: Případová studie České republiky

Annotation

This Bachelor thesis deals with economic growth within the area of the Czech Republic. Selected time period is dated since 1989 until present. Theoretical part is focused on description of individual economic thinking and theories across the history together with description of factors of production, whereas the economic growth is not possible without them. Economics as a science originates in ancient times and with its evolution testifies a lot about the functioning of nowadays world. In individual chapters there are introduced factors which influence the economic growth together with macroeconomic indicators.

The second part of the thesis is focused on the Czech Republic, there are individually presented basic information about economic and political environment in selected years. In the end of each chapter there is evaluation together with overview of macroeconomics indicators in selected periods of time. The development of economic indicators is described in the thesis since the year 1995 until now.

The next part of the thesis collects and evaluates the empirical research based on the macroeconomic indicators, which include: gross domestic product, inflation, unemployment and trade balance.

The final part of the thesis deals with the summary of findings from practical part in confrontation with the wider point of view from several significant personalities of the Czech economic and political scene.

Souhrn

Tato bakalářská práce se zabývá tématem ekonomického růstu prostředí České republiky především v po-revolučním období. Teoretická část je zaměřená na popis jednotlivých ekonomických myšlenkových směrů a teorií společně s představením výrobních faktorů, bez nichž by byl ekonomický růst nereálný. Ekonomie jako věda má své kořeny ve starověku a svým vývojem vypovídá mnohé o fungování dnešního světa. V jednotlivých kapitolách jsou představeny faktory, které ovlivňují ekonomický růst společně s makroekonomickými ukazateli.

Druhá část práce je zaměřená na Českou republiku, jednotlivě jsou prezentovány základní informace o politickém a ekonomickém prostředí ve vybraných časových obdobích. V závěru kapitoly je vždy zhodnocení společně s přehledem makroekonomických ukazatelů z vybraného období. Vývoj ekonomických indikátorů je v práci zkoumaný od roku 1995 do současnosti.

Další část práce je věnována vypracování a vyhodnocení empirického výzkumu, který je založen na makroekonomických ukazatelích, které zahrnují: HDP, inflaci, nezaměstnanost a obchodní platební bilanci.

Finální část práce obsahuje přehled zjištěných informací z praktické části v konfrontaci se širším úhlem pohledu několika významných osobností české ekonomické a politické scény.

Klíčová slova:

Teorie ekonomického růstu, ekonomický vývoj, hrubý domácí produkt, inflace, nezaměstnanost, obchodní platební bilance, výrobní faktory, EU.

Content

List of graphs

1. Introduction

The concept of national economics certainly evokes a feeling of boundaries, i.e.; examination of the economic problems defined only by national borders. Current trends do not respect the process of internationalization, integration and globalization, which blur the national borders. It should be emphasized that a perfect knowledge of the functionality of complex system of economic relations on national level is the basic prerequisite for understanding these processes at international or global level.

Due to the efforts to explain why some states are developing more successfully than others, there has resulted the emergence of the scientific theory of economic growth. Different views of various economists from diverse schools led to many ideas, but none of them so far has managed to fully answer to all questions. It turned out that economic growth is affected by many factors and therefore it is very difficult to define a simple tutorial that would be guaranteed.

The Czech Republic has become a democratic system after the disintegration of Soviet Union and it has been predicted by domestic economists improved quality of life. This goal should have been achieved by transition from centrally planned economy to a market economy and everything should have led to an early achievement of "Western maturity". However, very soon it showed that the convergence to Western economies would take more time and be more complicated that it had been expected. The most important event in the modern Czech history is the entry to the European Union. The Czech Republic has become a part of the community of developed countries, and this fact undoubtedly contributed to the statement that the Czech Republic is regarded as a modern democratic country with developed economy. Often the Czech Republic is referred to as "assembly plant" of Europe. Thanks to the fact of still increasing production of cars. The current situation moreover signalizes that the Czech economy belongs to the fastest growing economies in the EU.

For better understanding I apply the example from the production of automobiles. *„Per one Skoda car, it is possible to buy still bigger piece of the same type of auto-mobile*

Audi. It is obvious that markets evaluate the Czech products progressively better, although there have not been any change in the production type of Skoda auto".[1]

2. Objectives and methodology

The aim of this thesis is to describe the evolution of the economic situation in the Czech Republic from the year 1989 to 2015 and to focus on the characteristics of individual macroeconomic indicators. The theoretical part is directed at the description of economic theories and economic schools, analysis and definition of individual factors of production together with measurements of progress. Interpretation is performed using the following economic quantities: gross domestic product (GDP), inflation, unemployment and balance of trade.

The second part deals specifically with the history of the national economy. There is mainly described national economic reality of the Czech lands, Czechoslovakia and the Czech Republic in period 1989 – 2015, where each of the aforementioned macroeconomic indicators is monitored separately during those years. Furthermore the practical part is oriented on examination of individual indicators and their development in time together with definition of cause-effect relationship between macroeconomic indicators through regression analysis and related statistical procedures. Characteristic of the economic indicators is drawn from the literature, which is always marked in the text by citation.

In the processing of the thesis it is used scientific literature, articles and studies, numerical series and statistics. There were selected annual data since 1995 until 2015, whose sources are predominantly from Czech Statistical Office database. Another important source on which the work is based contains reports of Czech National Bank, describing developments in selected periods.

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[1]PEČINKOVÁ IVANA a KOL.AUTORŮ, *Budoucnost české ekonomiky*, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9, Miroslav Singer (1968), governor of CNB, p.23

Analysis of evolution is performed by tables and graphs that are processed in MS Office, empirical research is done by open-source statistical package Gretl. In describing the particular theories of the economic growth, it is used the method of description. In characterization of economic evolution across the EU and the Czech Republic it is used general method, i.e.: comparison, analysis, synthesis. To description, simulation and prediction of economic development on the basis of empirical research, it is used time series data. Furthermore it is used regression analysis, OLS method, box plot and trend graphs. For the future forecast there are applied statistical methods and formulas. Due to the reason that these methods are based on calculations of the economic situation in recent years, which have been quite successful in comparison with the current economic situation, there are certain inaccuracies. Therefore it is possible to claim, that these predictions would be fulfilled if the global crisis would not occur and the economy would developed in the same trend. The crises thus leaded to unexpected reversals in developing economies, which are difficult to predict and even experts can only speculate about future developments and changes.

3. Theory of economic growth

Theory of economic thinking has its origins in and ancient Greece and Rome starting with Xenofon, Plato, Aristotle, Later in the Middle Ages in time of scholasticism Thomas Aquinas follows thoughts of the ancient philosophers. In 17th century the official doctrine of economic thinking represents Mercantilism, which emphasizes the positive trade balance and the important role of the state. It influenced economic thinking and official state policy of the majority of European states until the end of 18th century. Then it was refused by Classical political economics.

3.1 Classical political economics
As a founder of classical political economics it is considered Adam Smith, namely in his master piece "*An Inquiry into the Nature and Causes of the Wealth of Nations*". Smith reckoned political economics as a "science which creates the theory of national growth". He also advocates state policy cannot replace the effort of individuals in

enlarging their property. Freedom of trade between nations creates very important condition, and that is also why Smith behaved very sharply against mercantilistics doctrine, which tried to restrict the international trade.

"If the free international trade will not be supported, it can occur the reduction in division of labor for the reason, if the firm does not sell the product on given market, which has been produced thanks to division of labor, there will not be any more reason to divide the production tasks and thus increase the production".[2]

Smith considered as a productive both agriculture and industry in contrast with physiocrats, who considered as a productive only agriculture. According to Smith productivity of agriculture had dominance, although he confessed, that for utilization of division of labor there is more space in production. Smith has also investigated, how it is determined the amount of workers wage, and beside it, he paid attention to changes in size of workers population. If it is true, that natural wage enable workers just to survive and reproduce, then it is also valid, if there is less workers on the side of supply, wages must be increased.

Another significant performer of this economics theory is Thomas Robert Malthus. According to him, the population grows geometrically, while resources of means of subsistence increase arithmetically.[3]

"Malthus thought that improvement of economics conditions is not possible, because the poverty and destitution are irreversible destiny of most of the people in every society". Further he claimed that all attempts to moderate poverty and suffering regardless how well they are considered and intended, situation only get worse. Malthus was convinced, economics growth can be reached only extensively, specifically by increasing the work force, which means the growth of population. However excessive population growth can harm the economics, due to higher demands concerning the means of subsistence. Fortunately Malthus pessimistic outlooks including a wars for resources and famines , did not realized mainly on the grounds that he did not foresee technological advances, which make is it possible to use resources more effective.

[2] PRESSMAN, S. Encyklopedie nejvyznamnejsich ekonomu. 1. vydani, Brno: Barrister&Principal, 2005. ISBN 80-86598-57-8, str. 32-42
[3] PRESSMAN, S. Encyklopedie nejvyznamnejsich ekonomu. 1. vydani, Brno: Barrister&Principal, 2005. ISBN 80-86598-57-8, str. 32-42

3.2 Keynesian economics

Keynesian economics became the contrary to classical economics, as a founder of this economics way of thinking is considered John Maynard Keynes. By respecting and dynamisation of Keynes theory it originated so called Keynesian theory of growth. Representatives of this stream were Harrod and Domar. Until that time theory of economics growth was concentrated only to analysis of aggregate supply and the side with demand was omitted. In 1939 it changed, when Roy Harrod released his book *Essay in Dynamic Theory*. His theory is based on following assumption. The growth rate of investment is equal to the growth rate of national income. However this statement is truthful only when there is provided neutral technological progress. In 1947 Eversay Domar assemble very similar model arising from multiplier effect principle. Both Harrod and Domar achieved the same results, so their theories are explained together like Harrod-Domar theory of growth.

"Harrod-Domar model attributes investments the key role in economic growth. If the economy wants to produce more, it must raise capital. Investment rate can then be understood as an indicator of capital efficiency (the historical experience of that time indicated that capital is roughly constant). For a given level of investment and the initial level of capital, the rate of investment growth is the key determinant of GDP growth."[4]

3.3 Neoclassical economics

As the most important and famous neoclassical model it is considered Robert Solow's model of national growth. Solow who elaborated neoclassical theory of national growth received the Nobel Prize for economics due to this model. It is aimed on increasing role of savings, capital accumulations, population expansion on one side and role of technical development on the other side.[5]

It is based exclusively on analysis of supply side of national economy. Economics growth explains through exogenous growth of individual factors of production, which

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[4] SEDLÁČEK, Petr, Monitorování a analýza investičního cyklu [online], Český statistický úřad, Praha. Dostupné na WWW: <http://www.czso.cz/csu/2005edicniplan.nsf/publ/1121-05->. (cit. 3. dubna 2007).
[5] VARADZIN, František. *Ekonomický rozvoj a růst*. 1. vyd. Praha: Professional Publishing, 2004, 329 s. ISBN 80-86419-61-4, p.150

leads then to greater production possibilities. Influence of aggregate supply is solely omitted.

Forecasts of Solow's model according to long-run growth it is possible to sum up in to several points:

- Total real income increases at a rate that corresponds to the growth rate of extended labor, i.e. rate of population growth plus rate of technological progress.
- Real income per capita increases at a rate that corresponds to the level of technical progress.
- In the successfully emerging economies where growth rate of capital is higher than the growth rate of extended labor, the rate of increasing real income per capita is higher than rate corresponding to long-run constant growth.
- In developed economies, growth in real income per capita will be still positive thanks
  to technical progress.

However Solow's model has several scarcities. I chose the most important ones and described them more in details. These scarcities were pointed out mainly by Mankiw, Romer and Weil. As a fundamental problem it appeared discrepancy in convergence of economics. According to hypothesis countries with lower initial income should grow faster than economically strong countries. Nevertheless this is not true from empirical point of view.

> *„If we calibrate the model, it shows, that model assumes much faster conditional convergence than it really exists".[6]*

Another problem represents huge difference between revenues from capital in particular countries, when calibrated model forecasts multiple differences in rate of returns, than they are in fact.

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[6] VARADZIN, František. *Ekonomický rozvoj a růst*. 1. vyd. Praha: Professional Publishing, 2004, 329 s. ISBN 80-86419-61-4, p. 237

„Basic mistake of Solow's model was an incorrect characterization of technical development as public good. Solow himself confessed technical development as exogenous factor simply because he did not understand reasons of technical change".[7]

3.4 New theory of growth – Theory of endogenous growth

Since the end of 20th century there have been developed new theories of economics growth. They respond to disputable statements of traditional neo classical Solow's model. Theory of endogenous growth tries to explain long term persistence of differences between developed and developing countries. Explanation consists of technological progress in form of quality improvements of both physical and human capital. Technological progress is described as endogenous therefore it is generated by forces inside the economics.

Basic difference between neo classical theory and endogenous growth is in conception of capital. Theory of endogenous growth is based on wider access to the capital, which comprises beside physical as well as human capital, accumulated knowledge, increase in quality of labor and infrastructure. And all these factors impact internally thus endogenously. Capital then much more participates on economics growth in comparison with neo classical models, because investments into human capital are not able to fully capture in national accounting.

As the most significant performer and creator of this new theory of growth it is considered Paul Romer. He elaborated the new theory in article "Increasing Returns and Long-Run Growth" in 1986. He described so called positive externalities as increasing revenues from range of investments into human capital. As mentioned above capital is created from two parts: physical and knowledge-based. Physical capital demonstrates descending revenues from range, whereas investments from knowledge-based human capital demonstrate constant or increasing revenues. Which means investments into physical and human capital create positive externalities that increase production capacity not only in investing firms but also in the whole society in case of poor patent protection.

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[7] ZLATUŠKA, Jiří. *First Innovation Park* [online]. 2000, 9. 10. 2010 [cit. 2011-03-05]. Informační technologie mění ekonomiku. Dostupné z WWW:
<http://www.park.cz/informacni_technologie_meni_ekonomiku/

„If prevails physical capital, while knowledge-based capital is not significant, there will diminishing returns on capital and the economy will behave rather by Solow model. But if knowledge-based capital has more weight the economy will behave more according to the model of endogenous growth – so the economy has to grow indefinitely without reaching a steady state".[8]

Fundamental question for politics oriented in national growth is the stimulation of innovations according to endogenous theory. The role of state should be primarily creating of suitable climate for such stimulation. Which it is possible to reach through:

• tax incentives for expenditures on research and development

• investment support in human capital

• increase in investment in infrastructure

• decline in budget deficits, which displace private investment

• tax stimuli in order to increase the level of investment

• remove excessive regulation of economic processes

Economics is generally understood as a science, which investigates how people and society at large make decisions about the utilization of scarce resources, which have alternative usage. [9]

Economics is divided:

● <u>positive economics</u> – which deals with descriptive side of economy. Examine and describe effects and processes, how they really occur and which regularities are asserted.

● <u>normative economics</u> – this kind of economics also deals with economic processes and effects. Given conditions are for normative economics only initial state. It also includes value judgments and recommendations for improvements of the state of current economic system. It recommends methods for reaching the targeted state.

[8] HOLMAN, Robert. *Makroekonomie: středně pokročilý kurz*. Vyd. 1. Praha: C.H. Beck, 2004, xiv, 424 s. Beckovy ekonomické učebnice. ISBN 80-7179-764-2.p.204
[9] Fuchs, K. a kol. *Ekonomie*. Plzen: Ales Cenek, 2008. ISBN 978-80-7380-126-7, p.29

Economics is split into microeconomics and macroeconomics. Microeconomics deals with behavior of individual market subjects – individuals, households and companies. Typical example of microeconomics investigation is analysis of consumer's behaviour on the market. How the price of particular products is created and how consumers react on the change of price.

Macroeconomics deals with behavior of economic system as a whole. Typical fields of macroeconomics are issues concerned with employment, economic growth, economic policy of the state, development of foreign trade, international economics and integrated processes and many other fields.

The term "economy" comes from Aristotle, he used this term as administration of house (esp. household). Within the very general meaning we can understand the word economy as a:

- scientific and specialized discipline, which deals with development of economy in particular section or branch,
- economic set of rules for given society,
- historically given system (complex) of social production relations which are either territorially or sector bounded.

National economy is characterized as a summary of branches and spheres of economics of given country, which are mutually connected by social division of labor. It is also possible to describe national economy as an organism, in which there are performed processes that ensure functionality of social system. National economy is relatively closed system, which has formed during the time of industrial revolution (end of 18th and beginning of 19th century). There is created mechanism by connection of capital into the cycle of economics processes. This mechanism is capable to manage economics processes on the bases of market rules.

Natural pre-conditions for creating national economy are:

- development of production forces in time of industrial revolution,
- deepen concentration and specialization of production,
- formation of national markets with the participation of the state.

Exchange community controlled by the state power is termed as the national economy.[10]Performance of national economy depends on quantity and quality of factors of production. There are three main factors of production including: land, labor and capital. For the factor of production – land, we can also use more general term „natural resources", because except the land itself, the term includes mineral resources, rivers or lakes as well.[11] Labor or human resources are not freely substitutable and have form of various professions. Special feature of capital as a factor of production is that it creates the result of previous "production". Capital, thus, may take the form, for ex. machinery, buildings, materials but also knowledge of people. As the fourth factor of production it is considered entrepreneurship. Recent authors have added this term to the classical list from various reasons which are described below.

Quantity and quality of factors of production represents so called production possibility frontier. It means that under certain conditions, there is maximum achievable performance of national economy. Production possibility frontier represents the combination of estates which are possible to produce in economics with given production resources and technology. Production possibility frontier supposes all factors of production are used effectively.

4. Factors of production

4.1 Materials – Land
It is almost impossible to boost the amount of land in the Czech Republic, unless we buy some area from another state. That is why we rather speak about increasing or at least preservation of the quality of land than its quantity. It is possible to influence the quality of land, however very often more likely negatively. Land it is connected with the quality and quantity of mineral resources which are found in land. Natural resources can be characterized by following way:

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[10] ENGLIŠ, Karel. Národní hospodářství. 2. vyd. V Praze: K. Engliš, 1946, vi, 313 s.., p49
[11] Holman, R. *Ekonomie*. 5. Vyd. Praha: C. H. Beck, 2011. 691 s. ISBN 978-80-7400-006-5. s. 245

- Agricultural land, areas convenient for development of technical infrastructure (bridges, routes, reservoirs).
- Quantity of exact type of land appropriate to for ex.: sowing, settlement, industrialization
- Natural resources (precious metals, mined raw materials – oil, gas, etc.).
- Renewability or non-renewability of natural resources.
- Quality of natural resources from the point of view of fertility, climatic conditions, etc.
- Disposable quantity of increments of natural resources leads ceteris paribus to shift in production possibility frontier.
- Extract natural resources the way, which will lead to satisfaction of needs of present and future generations.

Economics theory distinguishes as well:
- Exogenous technological changes, that are given from the outside and independent on economic development.
- Endogenous changes, which happen under the influence of economic development, these include investments into both human and physical capital.

It is important to mention that even though natural resources are relevant, they are not essential for reaching high economic performance. As an example of this it represents Japan, which belongs to the most powerful countries in the world, however it is relatively poor on natural resources.

Nevertheless many countries are being judged according to their natural resources, which is not sufficient assumption to perform high economic power. Natural resources bring with themselves risks as well, that can lower economic growth. Nowadays it is very often spoken topic wasting of non-renewable natural resources and devastation of environment. On the whole world the quality of fresh water reduces, there is air pollution, waste is recycled in very small amount and still there is increasing share of chemicals used in agriculture, which inevitably destroys the soil. The key solution to this problem can be new impulses to restrict the wasting of energy and material which happen on the global level. From this point of view it is necessary to introduce and support new technologies and innovations.

4.2 Manpower – Labor

Changes in size and composition of population can influence significantly economics growth. Many authors consider experiences, knowledge when speaking about human capital. It is not just about quantity of labor itself, which is dependent on number of persons in productive age. This quantity of people is able to influence by for ex.; job offerings specified for international workers. Furthermore it is very important to pay attention to quality. In this case we talk about qualifications. Labor in high qualified professions cannot be substitutable.

Human resources include:

- Quantity of labor (in days, hours, …)
- Influence of labor qualification (achieved level of education)
- Lifelong achieved skills
- Technological development embodied in capital goods
- Investments into human capital – value of human capital grows together with ability to produce more goods and services, whose quality is increasing

4.3 Money - Capital

The term capital denotes "goods of long-term utilization, through which we can produce other goods". Capital includes entire machines, equipment, facilities and technical level. From all factors of production capital is the one, which quality and quantity can be the most easily affected. The Czech Republic has also tried to bring the foreign capital into the country in past to revive domestic economics. However in several cases these state incentives for foreign investors had destructive character for domestic businesses.[12]

If the economics growth is based on growth of quantity of factors of production, we speak about extensive growth. And if the country decides to increase quality of individual factors of production, thus increase qualification of workers, quality of land and usage of natural resources together with increase in technological level of capital. Then we speak

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[12] Barro, R. J. Macroeconomics: A Modern Approach. Mason (USA): Thomson South-Western 2008. ISBN 978-0-324-17810-4.

about intensive growth and reversely these changes positively influence labor productivity.[13]

Capital resources can be described as:

a) financial (instruments of money, capital and credit market) and real (tangible and in-tangible property),

b) economics theory assumes, that capital is being accumulated always when the present consumption is postponed, in order to reach higher consumption in the future,

c) reserves of real capital are registered (increments – restoration, extension, decline),

d) liquidity on factors of production is ensured thanks to financial capital,

e) technical level of capital goods – performance, demands (labor, energetic,…), accuracy.

Important term related with economics growth is deepening of capital that occurs when the volume of capital per worker increases in time.

4.4 Management – Entrepreneur

The term entrepreneur was introduced as a fourth factor of production in the beginning of 18th century. It symbolizes a person who uses and combines other factors of production in order to earn profit. It includes organizational and management skills together with considerable initiative and risk to get profit. Nowadays the most important thing for entrepreneurs is the innovation. Entrepreneurs represent relevant element of economic growth. Without them many of the innovations around us would not exist. It is about combining land, labor and capital in new ways and inventing new products for the market.

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[13] Fuchs, K.; Tuleja, P.Zaklady ekonomie. Praha: Ekopress, 2005. ISBN 80-86119-94-7.

5. Macroeconomics Indicators

5.1 Gross Domestic Product (GDP)

The performance of national economy is flow quantity, during the time there are changes in quantity of produced estates. That is why the process of national economy performance is expressed for specific period of time. The most frequently used period of time is one year and the mostly used indicator of national growth is gross domestic product (GDP), which measures the flow of outputs on the market of final production. GDP is possible to perceive as "total value of final products and services produced in given period on area of given state".[14] Besides GDP it is possible to meet with gross national product (GNP), which is however used less, because of the difficulty of obtaining data for bases and computing of GNP.

Gross domestic product can have one relatively big disadvantage. Although it testifies, how many new estates have been produced, there is no information about how many of these goods have been produced as a replacement for the same or similar goods, which ended their functionality or were devastated. This disadvantage removes the indicator of net national product. The difference between gross and net product represent so called restoring investments. Where, unlike from gross product there are included only net investments. Due to difficulty of calculation values and ratio of restoring and net investments, it is possible to get net investments by subtraction or depreciation from total gross investments. Nevertheless this calculation and determination of needed figures is not so easy. That is why the gross national product is still used for statement of national growth, even though the net national product would be from above described reasons more appropriate. Another limitation of GDP is that relatively large part of national economy creates shadow and underground economy (eg. tax evasions, illegal sale, sale of drugs, prostitution, organized crime, mafia, etc.), which is not included in indicator of GDP, because it is almost impossible these activities statistically notice and they are sanctioned by criminal code.

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[14] Liška, V. a kol. *Makroekonomie.* 1. vyd. Praha: Professional Publishing, 2002. ISBN 80-86419-27-4, s. 359

The size of the shadow economy is the most commonly estimated between 8 and 14 % of gross domestic product. However, these estimates are very often even higher. According to some sources, underground economy and tax evasion in the EU made the universe 3.55 trillion dollar which is about 19 % of GDP.[15] If the shadow or gray economy succeeded from one hundred percent to be converted to the formal economy, then in sixteen countries of the European twenty-seven would disappear budget deficit.

In the Czech Republic, the amount of shadow economy is estimated at around 600 billion, which in conversion creates 16 % of GDP and about half of the state budget for 2013.

Various goods and services are expressed in monetary units. Price is the factor which may due to inflation distort the GDP. Therefore there is a distinction between two categories of gross domestic product according to the way of its appreciation: Nominal GDP and Real GDP. The main difference between nominal and real values is that real values are adjusted for inflation, while nominal values are not. As a result, nominal GDP will often appear higher than real GDP.[16] In other words, whilst nominal GDP is an indicator of current (real) prices, real GDP is an indicator comparable (constant) price e.g. price of certain default, base year. The indicator is therefore adjusted for inflation and an increase in real GDP implies a real increase in the volume of the product during the period.

From the point of view, monitoring the product in time, it is needed to exclude influence of changes in prices, which means, it is necessary to use real GDP, i.e. product expressed in constant prices.

For concrete analysis in particular year, for ex. sector analysis, which means share and benefit of individual branches it is more appropriate to use nominal GDP, i.e. product expressed in real, current prices.

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[15] Sneider, F. Size and Development of the Shadow Economy of 31 European and 5 other OECD Countries from 2003 to 2003" A Further Decline. [online] Retrieved from www<http://www.econ.jku.at/members/Schenider/files/publications/2013/ShadEcEurope31_Jan2013.pdf>

[16] *Investopedia.com: Macroeconomics - Nominal vs. Real GDP, and the GDP Deflator* [online]. [cit. 2015-10-25]. Retrieved from: http://www.investopedia.com/exam-guide/cfa-level-1/macroeconomics/nominal-real-gdp-deflator.asp

1. Expenditure approach

Includes spending on all final products and services, which are not simultaneously inputs for another production, thus they do not create added value. GDP is obtained by summing: (C) personal expenditures on spending + (I) gross investments + (G) government purchases + (X) export – (I) import

C, **G**, and **I** are expenditures on final goods and services, intermediate goods and services are not included. They are used by businesses to produce other goods and services within the accounting year.

2. Income approach

Product is calculated as a sum of all incomes. Added value is the base of incomes. In simple terms it measures the total incomes earned by households in a nation in a year. The formula for calculating is following:

GDP = wages and salaries including all other expenses on labor (social and health insurance) + rents + net interests + enterprise revenues + devaluation of capital (depreciation, amortization) + indirect taxes. [17]

3. Production approach

GDP is calculated by summing of all gross added values (gross value of output – value of intermediate consumption) in given location and period together with net taxes for products. In other words, it is the sum of values of all final products and services produced in given year.

5.2 Inflation

Inflation is one of the most commonly used terms in economics. Generally it is perceived that it is strongly negative phenomenon and has negative impact on life of people. Inflation means the growth of price level. Therefore inflation occurs when overall price level grows. Price increase in food, petrol, housing and other goods is a result of the change in price level, thus inflation.

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[17] HOLMAN, R. *Ekonomie*. Praha: C. H. Beck, 2001. ISBN 80-7179-387-6, pg. 419

Causes of inflation:

1. Demand pull inflation

It is caused by positive demand shocks, for example: increase in price of popular product.

2. Cost push inflation

In other words expense inflation it is the most frequent inflation causes by negative demand shock, for example: increase in price of raw materials.

3. Inflationary spiral

Inertial inflation represents unavoidable rate of inflation. For instance if workers negotiate higher wages, then they do not realize, that subsequently there will be increase in prices of all products in economics cycle.

Anti-inflation policy

Inflation projects negatively in purchasing power of households, fight with inflation brings decline in production. Thus it is essential for central bank to choose appropriate monetary tools, which will not lead to irrelevant deceleration of economics.

1. Monetary restrictions

Objective of this politics is to decrease the amount of money on the market and attain through this decline in aggregate demand. Reaching of this situation can be done via central bank namely by increasing of interest rate or increase in compulsory minimal reserves.

2. Fiscal restrictions

By decreasing of government investments or by increasing of taxes it is attained the decline in amount of money on the market like in the monetary restrictions. Total volume of money lowers and aggregate demand declines.

3. Remove expectations

It is operated by governmental credible policy, for ex. government declare in advance, it make restrictions to reduce inflation. If the government really manages to reduce inflation, economic

subjects change their expectations. If not government fulfills its promise, inflationary expectations will not change and inertial inflation problem will continue.[18]

Deflation

The exact opposite creates the deflation, which is defined as a decline in the price level. Deflation is the reverse phenomenon. Money supply is growing more slowly than the product. The supply in the money market is below the demand, because there is pressure on the revaluation of currency. However on the market for goods and services there is contrary situation. The supply is above the demand there is downward pressure on price. In simple terms people either want to spend money, but they don't have them or they do have enough, but don't want to spend. Deflation can behave the same way like inflation, and so it can cause the deflationary spiral.

Deep deflation then can in extreme cases lead to complete freezing of credit flows to zero consumer deposits in banks and ultimately to the elimination of the banking system from the economic processes.

Measuring of price level

GDP deflator

In comparison of both nominal GDP and real GDP the deflator of GDP is obtained, which is frequently used to calculate inflation and ratio between nominal to real GDP. It is calculated by dividing nominal GPD by real GDP and then multiplied by one hundred.

CPI

Another way to get level of inflation or rather cumulated inflation in relation to current period and period which creates the price basis, we can use other common measures of inflation for instance: consumer price index (CPI), that measures changes in the price level of a market basket of goods and services used by households. It is calculated by dividing the "updated cost" by "base period cost" and then multiplied by one hundred.[19]

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[18] PAVELKA, Tomáš. *Makroekonomie: základní kurz*. Vyd. 1. Slaný: Melandrium, 2006, 278 s. ISBN 80-86175-45-6, p.149

[19] Source: Boundless. "Defining and Calculating CPI." *Boundless Economics*. Boundless, 06 Oct. 2014. Retrieved from https://www.boundless.com/economics/textbooks/boundless-economics-textbook/measuring-output-and-income-19/the-cost-of-living-95/defining-and-calculating-cpi-360-12457/

PPI

Produces price index (PPI) measures the average changes in the selling prices received by domestic producers for their good and services. It is the measure of change in price from the perspective of the seller.

5.3 Unemployment

Employment is in a sphere of labor market very important indicator of health level of economics in a given country. This matter does not have purely economics character, but it also influences both social and political climate.

a. The rate of unemployment (u)

The rate of unemployment helps to demonstrate the percentage level of unemployment in the national economy. It is the percentage ratio between unemployed people and work force.

b. The natural rate of unemployment (u*)

We can consider the lowest rate of unemployment that an economy can sustain over the long run as the natural rate of unemployment. Labor market is in equilibrium and from long time point of view u* grows, which affects several factors, for example:

- Demographical changes (ageing of population)
- Structural changes on the labor market (termination of certain profession)
- Hysteresis on the labor market (loss of qualification in spite of long term unemployment)
- Regulatory interventions

Economically active and inactive population

Economically active population

a. Employed (E) people who are older than fifteen years old, having the paid job or self-employment, including currently absent (illness, maternity leave).

b. Unemployed (U) people older fifteen years old, who are unemployed or not self-employed, actively searching the employment, capable and willing to begin employment in fourteen days.

Economically inactive population

It includes people who do not meet criteria of employed or unemployed persons. Particularly it covers children, pupils, students, old age and disabled pensioners, persons on parental leave and long term ill.

Types of unemployment

1. Frictional

This kind of unemployment rises in spite of certain time gap, which is necessary in searching new job opportunities, exactly the demand (work position) and supply (work force). In continually pulsing economics there is always specific frictional unemployment as a component of natural rate of unemployment.

2. Structural

There exists demand and supply of employment however it is not the same kind that is why there arises qualification discrepancy. It is caused by structural changes in economics (expansion and recession in industry). As a possible solution it can be requalification, nevertheless it is time demanding.[20]

3. Cyclic

This type of unemployment is narrowly bounded with cyclic character of economics that means, if GDP decreases, number of unemployed people increases and vice versa. During the depression in economics, there is excess in work force and this undesirable phenomenon lasts until the phase of recovery. [21]

4. Seasonal

It is unemployment due to seasonal changes in the offer of employment or work, caused by seasonal character of some economic activities. It is absolutely inevitable in some industries such as: agricultural, building industry.

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[20] [20] PAVELKA, Tomáš. *Makroekonomie: základní kurz*. Vyd. 1. Slaný: Melandrium, 2006, 278 s. ISBN 80-86175-45-6, p.119

[21] PAVELKA, Tomáš. *Makroekonomie: základní kurz*. Vyd. 1. Slaný: Melandrium, 2006, 278 s. ISBN 80-86175-45-6, p.120

5.4 Trade balance

The trade balance is the difference between exports and imports. Imports - goods or services purchased abroad. Exports - goods or services sold abroad. If exports exceeds over imports, it is a positive balance, otherwise the balance is negative. In the case of a balanced export and import balance is then even.

Barriers of trade

The trade must be controllable. Because of this reason there exist barriers of trade.

- Embargo - trade with certain goods is forbidden. Embargo can be applied on import as well as on export.
- Custom tariffs - increase in the price of imported goods and thereby domestic producers are admired ahead of foreign.
- Quotas - limit of quantity or amount of imported good per certain time period

Economic cycle

The term business cycle means alternation of periods of economic growth and decline. The variation is caused due to the impact of aggregate supply and demand. Phases of economic cycle are:

- Recession - Companies accumulate stocks, they begin to limit their investments and production. Unemployment rises and people have lower incomes. They limit their consumption. There is decline in real output.
- Expansion - Companies recruit new, there is increase production and investments. Employee's revenues grow and because of that they spend more. At this stage the real product grows.
- Top and bottom - alternating of expansion and recession. The government can influence these cycles with various policy strategies.
  For instance: through classical approaches – let the aggregate supply and demand operate freely, which has as a result equalization of the level without intervention of the state. Or use the government intervention via public budget. The target is to ensure macroeconomics balance, which means constant economics growth, low unemployment and permanent price level. Another policy strategy which can influence economic cycle consists of affecting of macroeconomics indicators

through money and loans. Or by increasing/decreasing of international trade barrier, which subsequently increase or decrease supply.

Aggregate supply and demand

Aggregate demand - the total amount of outputs (real GDP) which consumers wanting to buy at various prices during the period.

Aggregate supply - the total amount of outputs that producers willing to offer at different prices in given period.

6. Economic development of the Czech Republic

To understand the economic development in the Czech Republic, it is necessary to glance back to the historical development before and after the year 1989, when after the fall of the communist regime the Czech economy has undergone a process of transformation. The goal was the transition from a centrally planned to market economy. Czech economy went through a series of radical changes - *„Transformation of property relations and economic institutions, creating of juridical environment, based on respect of private property and contractual relation*".[22]

6.1 Situation in the Czechoslovakia before 1989

Czechoslovakia was one of totalitarian regimes, ruled by the Communist Party there was the absence of political rights and civil liberties. State sovereignty was limited and submitted to the influence of the Soviet Union. State had the dominant influence, and the private sector did not actually exist. The economic system was based on the so-called Referendum ownership of the means of production. This system did not respect the natural actions of market relationships of supply and demand, which lead to inefficient allocation

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[22] SPEVACEK, V. a kol. *Transformace ceske ekonomiky: politicke, ekonomicke a socialni aspekty.* Vydani prvni. Ptaha: Linde 2002, p.18.

and use of resources, economic stagnation and privileged monopolistic producers who were not interested to produce efficiently.

Supply was guided by the state, did not satisfy the needs of the current market. As a result on one hand there were surplus goods, about which customers did not show any interest. And on the other hand lack of other goods which led to queues, waiting lists, black market and bribery.

Consumers did not realize the scarcity of some goods and wasting emerged. Drop in performance of the economy contributed to lag behind developed countries. Underdeveloped sector of services and vice versa excessive share of heavy industry contributed to the bad state of environment. *„The Communists have imagined that people will work happily and with maximum effort, regardless of their material evaluation. Working morale was not high and state responded to it by restrictions - for example, it was illegal to be unemployed".*[23]

The prices were in fact fixed and determined by the state. *„Investments were centrally managed and bank officials did not examine the ability of businesses to repay loans or credibility of the borrower. Enterprises simply had eligibility on loans".*[24] Conditions for businesses were not unified, e.g. different taxes or subsidies. There were no benefits for more efficient companies right contrary there was effort to maintain mediocrity.

Between advantages of the local economic situation it belonged: high economic and living standards, developed infrastructure and minimal government debt.

6.2 Transformation of the economy after the year 1989 to 1996

„Transformation of the Czech economy was in comparison with other transitive countries the most successful. Nowadays however, it must face the problem, that the political establishment is strongly infected by collectivistic visions and social engineering, that has to seemingly contribute to the increase of standards of living. In my opinion the

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[23] ZIDEK, L. *Transformace ceske ekonomiky* 1989-2004. Vydani prvni. Praha: C.H.Beck 2006, p.10.
[24] ZIDEK, L. *Transformace ceske ekonomiky* 1989-2004. Vydani prvni. Praha: C.H.Beck 2006, p. 18.

Czech *Republic belongs to 25 the most developer economies of the world. To this statement is has indisputably contributed the process of transformation, which started on the basis of social changes in CSSR* or rather CSFR*".*[25] After the year 1989 there was a large-scale transformation changes. The main ones include: three times currency devaluation in 1990, a year later, followed by Small and Large privatization and subsequently it came the restitution of nationalized property. On 1st January 1993, the independent Czech Republic was established and a new tax system was introduced. The next year economic recovery came, the second wave of large privatization continued and there has reflected crisis in the banking sector. **CSSR - The Czech Social Republic, official name of Czechoslovakia since 11.7.1960 until 28.3.1990* ** CSFR - The Czech Federative Republic, official name of Czechoslovakia since 29.3 until 22.4. 1990, The Czech and Slovakian Federative Republic since 23.4.1990 until 31.12.1992.*

6.3 Recovery and Growth in 1996

In 1996, the Czech economy grew. Demand exceeded the production performance of the Czech economy, which led to inflation and imbalances in current account of balance of payments. The central bank considered this development as disturbing and introduced restrictive measures which have resulted in slowdown of monetary growth, high interest rates and the economic recession. Foreign investors considered the Czech economy as a stable and perspective which has led to an influx of foreign capital, which covered the deficit of the current account of balance of payments. In late 1996, the Czech economy got into phase of recession, the characteristic feature was decline in economic growth, macroeconomic imbalances that showed as discrepancy between growth of domestic aggregate demand and growth of GDP.

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[25] IVANA PEČINKOVÁ a KOL.AUTORŮ, *Budoucnost české ekonomiky*, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9, Miroslav Ševčík (1958), the dean of National EconomicS faculty, University of Economics, Prague | VŠE, p.49

6.4 Recession (1997 – 1999)

In 1997 there was a significant decline in GDP, which was caused of many reasons:

- monetary restrictions imposed by the end of 1996
- decline in growth rates in Germany and other EU countries
- adverse weather in January 1997 (decrease in building industry, the February rail strike

  and nominal appreciation of the Czech crown)
- public finances deficiency - the government responded to this situation in April 1997 by adopting a package whose official name sounded "Correcting of economic policy and other transformation measures". The aim of package was to improve macroeconomic equilibrium, namely: reduce budget expenditures, moderation of wage growth, import restrictions of foreign goods.

The government strived to devaluate the crown, but the central bank did not approve this restriction due to the fear of capital outflows. *„Crisis in Southeast Asia joined to the problems within the Czech economy, which contributed to an increase in distrust of foreign investors in all emerging market. As a result there was the attack on the fixed exchange rate of the Czech crown - foreign and domestic subjects began in anticipation of devaluation to massively sell and buy foreign currencies".*[26] Increase in interest rate was also significant.

In 1997 the system of investment incentives was approved, it included discounts on income taxes and several subsidies – for creating of new job positions, training courses, requalification of employees, technical equipment of towns and villages.

Central bank started to lower interest rates. And by the end of the year the whole system of monetary policy has changed. The attention was paid to inflation targeting. In 1998 the economy fell even deeper due to decline in confidence of economic performance and rapid growth in unemployment, which forced households to increase reserves. On the other hand the imbalance in economy was lowered which was represented by decrease of deficit in current account of balance of payments and by the drop in wages. Due to the

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[26] ŽÍDEK, L. *Transformace české ekonomiky 1989-2004.* Vydání první. Praha: C.H.Beck 2006, p.84

incentive system that was introduced in the previous year there was a sharp increase in foreign direct investment.

6.5 Renewal and Growth (1999 - 2008)

In 1999 there was a revival of the economy which greatly influenced the growth of exports, mainly to EU countries, a moderate growth of unemployment and household consumption. There was significant decrease in net investment, which was the result of high interest rate and the unwillingness of banks to lend money. On the other hand, there was reduced outer imbalance and inflation.

The next year the economy was fully in the recovery phase. Growth factors included: investments in fixed capital - machinery and technological equipment, the expansion in consumption where an important role played consumer loans. The increase in labor productivity caused a significant boom in industry.

In subsequent years, the economy continued to grow. Among the main factors belonged the development of domestic demand. However the negative impact had floods, which among other things caused a large decline in tourism from abroad. These adverse natural conditions caused a slowdown economic growth in 2002. The major growth factor was the continued consumption of

Households, where there was an intensive usage of consumer and mortgage loans. Industrial production became as another driver, where a large share was represented by foreign owners. At this time it external demand was very low, which resulted in a record low inflation. There has been an increase in unemployment.

The beginning of 2003 is characterized by a downturn of the economy, which was caused by a decrease in production performance, low investment and moderate growth of consumption expenditures of households.

„Gradually, however, the development began to strengthen which was positively influenced in the 2nd half of the year. GDP growth in the first quarter of 2003 slowed down even more but then progressively accelerated. Increase in GDP in the second half of 2003 was twice larger than a year ago. The difference between faster growth in the Czech

Republic and slower in the EU-15 has led to increasing of economic position in the Czech Republic".[27]

This positive development was followed and intensified by increased household consumption and supported by the growth in household disposable income.

In 2004 growth trend continued and was enhanced due to the entry of the Czech Republic to the European Union. Annual growth exceeded the development of last year, and thanks to that international economic positions strengthen. Another positive impact had foreign capital inflow after the entry of the Czech Republic to the EU, which enabled the introduction of new technology. A typical example of a modernized sector was the automotive industry. The Czech Republic has reached a leading position in the world. As a result of free movement of goods it expanded the trade in border areas. Supermarkets and hypermarkets in urban areas broaden and vice versa retail centers in countryside disappeared. Some certainty stability has attracted foreign investors to the Czech Republic. Negative impact showed in agriculture and food processing industry because the limits of production and subsidies were determined.

The following year continued by the upward trend which was caused by structural change - predominance of exports over imports. The Czech Republic ranked among the fastest growing economy states of EU. Between the most important sectors belonged engineering industry, which satisfy both domestic and foreign demand. In 2006 the development continued favorably, but with lower intensity. Industry represented the strongest sector.

In this spirit it continued also the year 2007, when the national economic imbalances mitigate:

- labor productivity growth and employment,
- financial account surplus covered the current account deficit of the balance of payments,
- state budget deficit was reduced.

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[27] *Český statistický úřad: Česká republika od roku 1989 v číslech* [online]. [cit. 2015-10-25]. Retrieved from: https://www.czso.cz/csu/czso/ceska-republika-od-roku-1989-v-cislech#05

In 2008 it was a turbulent year for the global economy, when there were abrupt changes in the economic growth rate due to fluctuations in oil prices on world markets together with the development of exchange rate of crown. The first half 2008 is characterized by very favorable economic situation - strong crown versus other currencies and inexpensive fuel. Too large commodity specialization of exports was the only lack. The main export commodities were machinery products. By the end of the year economy reached the top, and then fell into recession. At the end of the year it started to penetrate the impact of the global crisis, characterized by weakening of the crown exchange rate and again increasing of fuel prices. This year, many businesses ceased its activities and dismissed plenty of their employees, which increased unemployment. The inflation rate has become the highest in the past ten years.

6.6 Crisis in 2009 and revival in 2010

In 2009 the Czech Republic was in deep decline due to the global recession. During the whole year the GDP descended by 4.1% in comparison with previous year. After the huge decline in first and second quarter following two quarters technically confirmed the end of recession in the Czech Republic. Turn into better times was however very weak and fragile so far. Within the first quarter of year GDP represented the factor which stabilized the turbulent economic development. This role was consequently taken over by the international trade in the second quarter. Company's investments and reserves significantly fell down during the whole period with the certain stabilization at the end of the year.

The key factor of unfavorable development was industrial sector. The total year by year decline of industrial production reached 13.4%. Decline of industrial production was in 2009 caused the most of lowering the production of machines and equipment, manufacturing of metal constructions and metal products, together with the production of engine vehicles, trailers and semitrailers. A positive result was noticed in production of food, beverages and tobacco products.

Number of unemployed people reached the symbolic border of half mill and the rate of unemployment raised from 6.8% in January to 9.2% in December. In average the rate of unemployment raised up to 8.1%. Number of unemployed people grew. Per one

vacancy work place there was 17.4 persons which represented the new record in the history of the Czech Republic.

Inflationary pressure in the Czech economy were during the year 2009 weak – still lasting decline in agricultural prices did not put pressure on prices of food, wages inflation was low, international development together with the enforcement of Czech crown did not caused yet in favour of import. Domestic and foreign recession reached 1.0% in 2009, and that is the second lowest number in the whole Czech history. Prices of industrial products monitored in year-by-year comparison the negative trend in 2009. In average prices of industrial and manufacture production declined by 3.1% in contrast with the year 2008. Furthermore average prices in agriculture dramatically declined by 24.8%.[28]

In 2010 real GDP raised by 2.2% in comparison with the crises year 2009, when the Czech economy deepened annually by 4%. Households consumed only by 0.3% more than in 2009, the same situation was at state institutions. Right opposite it was with the capital, there was positive grow +4.2%. Which was caused not by the influence of investments that lowered by -4.6% from previous year, but thanks to rust of reserves after empting their stores in previous crises period. Fast grow in imports and exports of goods and services (17.6%) approached after the decline the pace of growing from the time of conjuncture of the Czech economy. In European comparison the Czech economy had a better position than the EU in 2010. GDP was from the estimation of Eurostat raised year-by-year by 1.8%. Export of goods and services was in comparison with EU average twice faster in the Czech Republic. There was also favourable development of unemployment rate (7.4% against 9.6% in 27 countries of EU). Performance of individual sectors accelerated according the GDP both in CZ and EU. On the contrary side the decline in investments in economy of the Czech republic was in 2010 deeper that EU average (-4.6% in contrast with 0.4%). Although the slump in investments in EU 27 was in 2009 almost on the same level like in the Czech Republic. Substantially worse situation was in consumption comparison – whilst the expenses of EU households ascended, since the half of the year its increments stabilized above 1% with the same growth of government

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[28] *Český statistický úřad: Česká republika od roku 1989 v číslech* [online]. [cit. 2015-10-25]. Retrieved from: https://www.czso.cz/csu/czso/ceska-republika-od-roku-1989-v-cislech#05

consumption. In the Czech Republic the gradual decline in dynamics of the economy caused year-on-year drop (-0.4 %, resp. -0.6 %).

Dynamic growth of production selected for export showed by surplus in trade balance in international trade at the level of 123bill.CZK (common prices). Compared to the previous year though it was 27 bill. CZK less, still it is the second highest value since the last five years, when the balance turned into assets. Export of goods exceeded the frontier 2.5 bill. CZK like for the first time in the Czech history. The level of import reached 2.4 bill. CZK, which signifies the level from 2008. Import (20.3%) grew faster than export (17.6%) primarily due to increasing prices of oil and other commodities. [29]

6.7 Period 2011 - 2012

Czech economy in the long term actually converges to the developed countries of the EU. The impact of the recent financial and economic crisis has interrupted the process of convergence and the current level of GDP per capita (in purchasing power parity) ranged of about 80% of the EU average. Since the crisis escalated at the same time chances to succeed in the world markets, it is an essential assumption for further convergence to adapt to changes of the competitive environment. Domestic economic growth of 1.2% secured solely the foreign trade, while domestic demand had a deterrent effect. Household spending limited by fiscal restrictions strongly restricted the scope for price increase, so the average inflation rate since mid-2011 was flat at 1.9%. On the supply side of the economy, the industry sector was gradually losing the performance. Nevertheless it was still continuing to fulfill the role of the main growth factor. Its gross added value increased year on year by 4.7%. Total employment increased by 0.3%, both due to the growth of the business and number of employees. The average inflation rate in June was primarily at the level of 1.9% (where it remained until November). Its source remained the global commodity prices, especially oil and agricultural crops, which were gradually reflected in producer prices and subsequently spilled over into consumer prices. Compared with the world, however, domestic inflation was still very low.

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[29] *Český statistický úřad* [online]. [cit. 2015-10-25]. Retrieved from:
https://https://www.czso.cz/documents/10180/20549901/e110910q4t.pdf/f5c19bae-b42f-4001-a09c-6578c0720a29?version=1.0

The dynamics of foreign trade slowed considerably, mainly due to the persistent problems of the euro-zone. Together with the increase in exports by 10% and imports by 6.8% it was achieved a positive trade balance of almost 36 mill. CZK which represented an improvement of nearly 21 billion CZK. The most of export was traditionally directed to EU countries (82.5%), whereas the highest surplus of trade has been reached by Germany (57 bill. CZK) and Slovakia (25.5 bill. CZK). On the contrary, the deepest deficit was showed in trade with China (73 bill. CZK). In the commodity structure there were again machinery and transport equipment, which accounted for export 53.4% and imports 40.6%.[30]

2012

Czech economics longer the descending trend by the 1.2% decline from the middle of the last year. Gross domestic product decreased by 1.7%, which is the worst result from 2009. On the other hand there was a certain improvement in the last quarter, where there was a moderate decline that counted 0.2%. Nevertheless its progress from last year fulfilled the technical point of view of recession that lasted longer than in 2009. Economic environment burdened the unfavorable sentiment, evoked by the inner reasons such as: worsening of income situation to households, strengthening of tenseness in labor market together with negative unemployment evolution. All of these projected into the still bigger concerns of citizens about their future. Possible solution for this situation includes predominantly economical measurements of government in an effort to rehabilitate the public finances.

Despite the complicated economic situation in euro-zone the international trade reached good results. Trade balance counted the record surplus of 322 bill. CZK, which was more by 120 bill. CZK than in previous year. Export reinforced totally by 6.4% and import by 2.4%. Results confirmed the strong addiction of domestic economic on the EU states. More than 80% of Czech exports aimed into the EU 27.[31]

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[30] *Ministerstvo průmyslu a obchodu* [online]. [cit. 2015-10-25]. Retrieved from:http://www.mpo.cz/dokument100014.html

[31] *Ministerstvo průmyslu a obchodu* [online]. [cit. 2015-10-25]. Retrieved from: http://www.mpo.cz/dokument141978.html

6.8 Period 2013 - 2014

The year 2013 was in modern history of Czech economics the tricky period. Economic environment was suppressed thanks to the continuation of economic decline from the previous year, which resulted in lower real volume of formed product than in 2010. Eurozone sank into economic recession even more in the beginning of 2013. EU performed better as a whole, its economy stagnated (0.1% growth).

In domestic conditions there was still unfavorable sentiment which sourced from unsolved debt crises in euro-zone, complex economy situation, impacts of restrictive and fiscal politics and uncertainty of future development. As a result of suffering economic activity there was year-by-year decline of gross domestic product by 0.9%. By the end of the year it showed up that the recession became truly the history. In the last quarter the Czech economy accelerated the pace of growth up to 1.8% and there was 1.2% growth in year-by-year comparison.

Inflationary progress was very similar as in previous two years. Demand inflation still reflected suppressed demand of households and remained negative. Whereas the price level was raised by taxes, regulated prices and prices of food. Average inflation reached the value of 1.4% as the lowest result since last four years.

However there was a bad situation on the labour market, unemployment rate furthermore accelerated up to 0.9%. The share of unemployed people represented 8.2% by the end of the year. Payroll average was almost the same and real wages declined by 1.3%.

International trade reached the record surplus of trade balance 350.7 bill. CZK, which means annual increase by 45bill. CZK. This result was thanks to the faster growth of export (3%) than import (1.8%), and due to improvement in the second half of the year. Traditionally the highest turnover was noticed in the trade with Germany (271 bill. CZK) and Slovakia (118 bill. CZK). On the other hand the highest deficit was registered the trade balance with China (265 bill. CZK). [32]

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[32] *Ministerstvo průmyslu a obchodu* [online]. [cit. 2015-10-25]. Retrieved from:
http://www.mpo.cz/dokument149564.html

2014

Revival in the Czech Economics – which started according the year-on-year dynamics in last quarter of 2013 continued in 2014. GDP increased totally during this year by 2%, gross domestic value rose by 2.6%. The most important part of it represented the processing industry oriented strongly on the international demand. In comparison with the previous year, the growth of the gross added value resulted from agriculture, forestry and fishery.

Overall price level in economy increased in 2014 by 2.3% according the implicit GDP deflator, mainly due to favorable development of prices in international trade with goods. Prices in industry turned into deflation (-0.8%), index of consumer prices augmented by 0.4%.

Changes on the labour market had complex character. The rate of unemployment significantly decreased to 6.2%, the total unemployment however rose by 0.4% together with the increase of free working positions. The proportion of part-time jobs already descended. Average nominal wage rose by 2.4% from last year, real wage was higher by 2.0% after two years of decline.

In external relationships the Czech Republic notified several historical improvements – surplus on current account (for the second time since 1993), record trade balance with foreign countries. There was also historically the highest outflow of dividends from direct investment the high of re-invested profits was the second highest. This progress was enabled due to the strong dynamics of sales, primarily from export and from profits gained thanks to weakened crown.

Inflow of direct investments from foreign countries was below the average compared to previous years.[33]

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[33] *Český statistický úřad* [online]. [cit. 2015-10-25]. Retrieved from: https://www.czso.cz/csu/czso/vyvoj-ekonomiky-ceske-republiky-4-ctvrtleti-2014-ljz3yh9xlg

6.9 Year 2015

In the first quarter of 2015 the pace of growth of economic increased again contrary the previous period, domestic economics was comparable with the beginning of the year 2006. Year-on-year growth was the highest since the half of the year 2008. Prior quarter brought year-on-year increase in GDP by 1.4% and trimester increase by 0.4%. Further progress in almost every sector of processing industry, namely production of means of transport, machines and equipment, played the key role in the revival of Czech economics.

The Czech Republic has become the fastest growing economics in the EU in quarterly comparison and at the same time it is on the second place in year-on-year comparison right behind Romania. On the side of production, the growth of economic is caused mainly due to the industry, which means there became to restoration of our international trade partners in EU, alongside with domestic consumers. These both "customers" considerably contributed to boosting of pace and revival of economics in the Czech Republic.

Positive economic development has proved on the labour market. Employment has increased after the first quarter in annual comparison by 1.1% and quarterly by 0.7%, which is the highest growth since the beginning of 2008.

7. Empirical Research: How selected macroeconomics indicators affects GDP growth of the Czech Republic

7.1 Examined data

As a next issue of practical part of this thesis I have selected empirical research concerning the Gross Domestic Production in the Czech Republic in last 20 years. GDP represents Y-dependent, explained variable and as X-independent, explanatory variables I will state: inflation, unemployment rate, and external trade balance. To determine the cause-and-effect relationship between variables, it is used regression analysis as a statistical procedure. Variables represent time-series data in period 1995-2015.

The future of the Czech economy is uncertain, are we and our next generations sentenced to long time stagnation or even more decline? Or are we about to grow and finally we will reach the West? People are literally psychically dependent on the number of GDP growth, but if it is really the mirror of what it is happening in the field of economic, it is very difficult to claim.

This research gives only a very narrow view how and what role play selected macro-economic indicators.

The dependent variable is the annual **GDP growth** in the Czech Republic (in %/year) and independent variables are:

x_1 – **annual inflation rate** in the Czech Republic (in %/year)**,**

x_2 – **annual rate of unemployment** in the Czech republic (in %/year),

x_3 – **annual external trade balance** of the Czech Republic (in %/year).

This analysis is important to see what influences the GDP growth and how much the GDP changes. Be familiar with this kind of information can be helpful to people who would like to get a certain preview of Czech economics situation in last 20 years.

7.2 Aim

7.2.1 Intention of the project

The intention and aim of this research is to clarify and analyze influence of macroeconomics indicators (namely inflation, unemployment, external trade balance of goods) on growth of GDP in the Czech Republic during a period 1995 - 2015. The primary objective is to identify how selected macroeconomics indicators cause significant changes of GDP growth in individual years.

7.2.2 Dependent variable – GDP growth (%/year)

GDP (yₜ)

$y = 0{,}0016x^4 - 0{,}0693x^3 + 0{,}9347x^2 - 4{,}2577x + 6{,}9$
$R^2 = 0{,}4723$
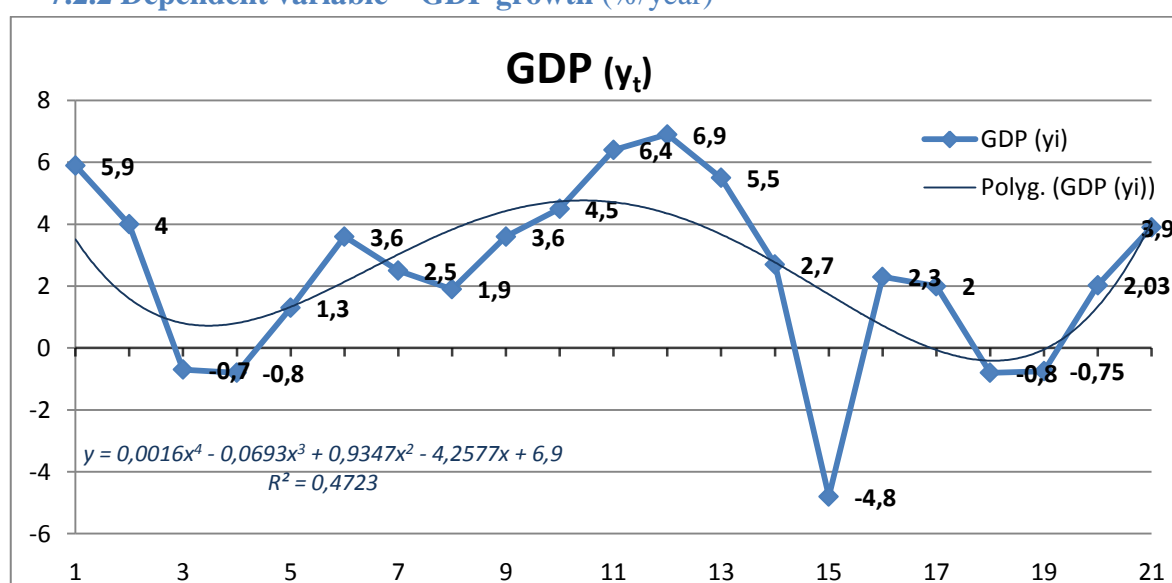
Graph no 1. GDP growth represented by dependent variable y_t.

Source: www.kurzy.cz/makroekonomika/hdp/

The graph shows the annual fluctuations, by how much the real GDP had changed between years 1995-2015. Axes *x* demonstrates the years, from the beginning of observation in 1995 (1) to the end 2015 (21). Axes *y* demonstrates measured percentage values of GDP (-6% - 8%).

Blue curve indicates the course of gross domestic product with the starting point in 1995 (5.9%), and ending point 2015 (3.9%). Each year is separately labeled on the curve with a blue dot with its corresponding value. There is graphically well shown a great range between maximum and minimum. The highest grow was noticed in 2006 (6.9%) and the lowest value occurred during the crises in 2009 (-4.8%). Since that the production is progressively increasing again.

Black curve indicates the polynomial trend line (of 4th degree) of GDP values. There is shown the dependency between fluctuating values. The graph also contains the polynomial equation ($y = 0.0016x^4 - 0.0693x^3 + 0.9347x^2 - 4.2577x + 6.9$) and the value of reliability R ($R^2 = 0.4723$), which signs the adaptation of the curve to data.

7.2.3 The prognosis

1. Hypothesis:

If inflation (in %/year) increases, the GDP (in %/year) will decrease.

2. Hypothesis

If unemployment (in %/year) increases, the GDP (in %/year) will decrease.

3. Hypothesis

If external trade balance (in %/year) increases, the GDP (in %/year) will increase.

7.2.4 Basic analysis of variables

Research contains 1 dependent variable and 3 independent variables which affect the dependent variable.

Dependent variable: Y_t = GDP (%/year)

Explanatory variables: X_{1t} = Inflation (%/year)

X_{2t} = Unemployment (%/year)

X_{3t} = External Trade balance (%/year)

7.2.5 Relationships among variables

Dependent variable is influenced by 3 independent variables. Namely gross domestic product in the Czech Republic is affected by inflation, unemployment rate and external trade balance.

7.3 Methodology

Year	GDP (y/y %)	Inflation (y/y %)	Unemployment (y/y %)	External Trade Balance (y/y %)
1995	5.90	9.1	4	-6.3
1996	4.00	8.8	3.9	-8.44
1997	-0.70	8.5	4.8	-7.7
1998	-0.80	10.7	6.5	-3.74
1999	1.30	2.1	8.7	-2.95
2000	3.60	3.9	8.8	-4.69
2001	2.50	4.7	8.1	-4.41
2002	1.90	1.8	7.3	-2.65
2003	3.60	0.1	7.8	-3.05
2004	4.50	2.8	8.3	-0.825
2005	6.40	1.9	7.9	1.18
2006	6.90	2.5	7.1	1.12
2007	5.50	2.8	5.3	2.29
2008	2.70	6.3	4.4	2.02
2009	-4.80	1	6.7	3.84
2010	2.30	1.5	7.3	3.06
2011	2.00	1.9	6.7	4.76
2012	-0.80	3.3	7	7.56
2013	-0.75	1.4	7	8.63
2014	2.03	0.4	6.1	8.75
2015	3.90	0.4	6.7	8.91

7.3.1 Sources of the data:

- https://www.bluenomics.com/data#!data/country_overview/key_indicators_1/external_trade_balance_of_goods_total/2789457426|chart/line&countries=czech_republic
- https://www.czso.cz/csu/czso/gdp_national_accounts_ekon
- https://www.czso.cz/csu/czso/analyses_commentaries
- http://www.kurzy.cz/makroekonomika/hdp
- https://www.cnb.cz/cs/statistika/inflace/

7.3.2 Used methods

1. Time series data and the frequency of the data is annual
2. Multiple linear regression model – estimation according to OLS method (Gretl)

3. T-test for evaluation of statistical significance of parameters
4. Goodness of fit according to R-square
5. Trend analysis for prognosis

7.3.3 Used software

Gretl program: Gretl version 1.9.13-64

Microsoft Word, Excel 2010

7.4 Elementary analysis

7.4.1 Graph no. 2 - Research variables
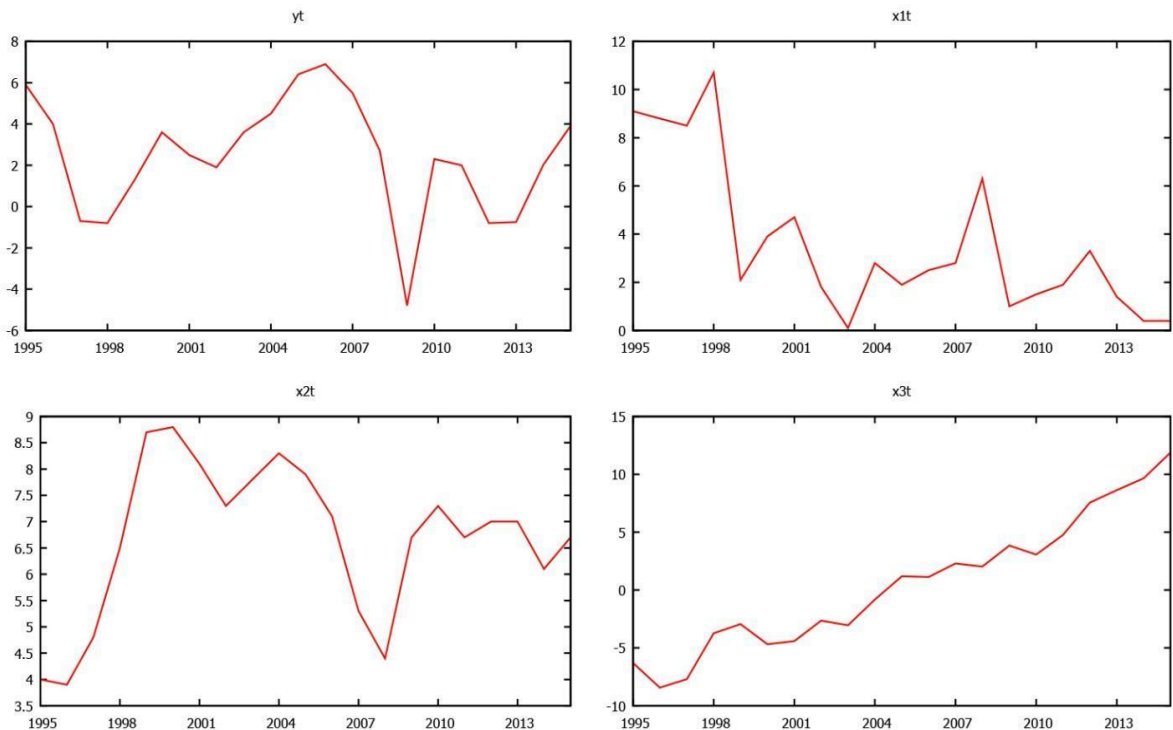
Source: Gretl program, version 1.9.13-64 (sources of data from chapter 7.3.1.)

Graph y_t: there is shown how the GDP went up and down. On the top it was between the years 2005 – 2006, there was annual increase nearly by + 7%. After 2007 the GDP started rapidly to decrease, in 2009 it reached its bottom with the annual decrease of – 4.8%. Since 2010 the production has been gradually increasing again with smaller declines in years 2012 and 2013.

Graph x_{1t}: the graph tells us levels of inflation in given years. In 1998 there was the highest inflation rate, which represented 10.7% and in contrast in 2003 there was the lowest one 0.1%. In last two years inflation rate has stabilized and its values is around 0.4%.

Graph x_{2t}: this graph shows the unemployment rate, very low it was in the second half of the 90's, in 2000 it reached its peak with more than 8% of unemployed, before the crisis year 2009 there were pretty good numbers around 4% like in 90's. In recent years the unemployment rate has anchored on the value of 7%.

Graph x_{3t}: the graph shows the external trade balance which has been more or less still increasing since the end of 90's from negative numbers to positive ones.

7.4.2 Formulation of the model

The GDP of the Czech republic (y/y %) is influenced by the inflation (y/y %), unemployment (y/y %) and by external trade balance of goods (y/y %). Therefore if the inflation increases, the GDP will decrease, if the unemployment increases, the GDP will decrease, if the external trade balance increases, the GDP will increase. The research is based on 21 annual observations.

$$y_t = \gamma\,0 + \gamma\,1x_{1t} + \gamma\,2x_{2t} + \gamma\,3x_{3t} + \varepsilon t$$

7.4.3 Summary statistics

Using the observations 1995-2015, variables: GDP, inflation, unemployment, trade balance

- number of observations: n = 21

- mean: $\bar{x} = \dfrac{x_1 + x_2 + x_3 + ... + x_n}{n} = \dfrac{\sum\limits_{i=1}^{n} x_i}{n}$

- median: $\tilde{x}$

- mode: $\hat{x}$

- variance:

$$s = \sqrt{s^2} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n\text{-}1}}$$

- standard deviation:

$$s^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n\text{-}1}$$

- coefficient of variability:

$$v = \frac{s}{\bar{x}}$$

- maximum: highest value of the observations - **max,** minimum: lowest value of the observations - **min,** range: $R = x_{max} - x_{min}$

	y_t	x_{1t}	x_{2t}	x_{3t}
Mean	2.437142857	3.614285714	6.685714286	0.350238095
Median	2.5	2.5	7	1.12
Mode	-0.8	2.8	6.7	-
Variance	7.804782313	9.66122449	2.048843537	28.32945828
Standart dev.	2.793704049	3.108251034	1.431378195	5.322542464
Coeff. of var.	1.146302951	0.859990405	0.214095029	15.19692614
Min	-4.8	0.1	3.9	-8.44
Max	6.9	10.7	8.8	8.9

7.4.4 General statistics

Summary Statistics, using the observations 1995 – 2015

Variable	Mean	Median	Minimum	Maximum
v1	2.43714	2.50000	-4.80000	6.90000
v2	3.61429	2.50000	0.100000	10.7000
v3	6.68571	7.00000	3.90000	8.80000
v4	0.350238	1.12000	-8.44000	8.90000
Variable	**Std. Dev.**	**C.V.**	**Skewness**	**Ex. kurtosis**
v1	2.86269	1.17461	-0.593287	0.183363
v2	3.18501	0.881228	0.995176	-0.313802
v3	1.46673	0.219382	-0.553290	-0.648623
v4	5.45398	15.5722	0.131974	-1.08787
Variable	**5% Perc.**	**95% Perc.**	**IQ range**	**Missing obs.**
v1	-4.40000	6.85000	3.95000	0
v2	0.130000	10.5400	4.05000	0
v3	3.91000	8.79000	2.15000	0
v4	-8.36600	8.88500	8.37500	0

7.4.5 Boxplot
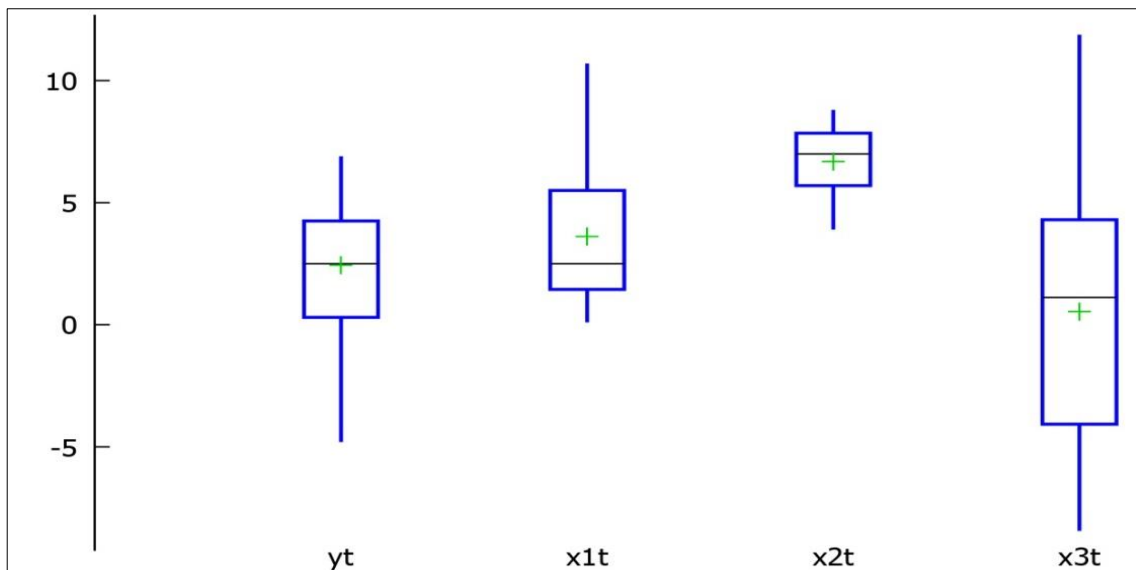
Graph no. 3 - Multiple variable boxplot

Source: Gretl program, version 1.9.13-64 (sources of data from chapter 7.3.1.)

This graph displays the distribution of data, gives the full range of variations including the five number summary.

Minimum – whisker below the box, first quartile – area below the media, median – typical value, signed by horizontal line, third quartile – are above the median, and maximum – whisker above the box. Green sign marks the mean.

Boxplot variables: yt - GDP in % per year, x1t - Inflation in % per year, x2t- Unemployment in % per year, x3t - Trade balance in % per year.

7.5 Regression model

7.5.1 Regression model

Mathematic description of regression model:

$\hat{y}_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \square_t$

7.5.2 Declaration of variables

y_t	GDP (in %)
x_{0t}	unit vector
x_{1t}	inflation (in %)

	unemployment (in %)
x_{2t}	unemployment (in %)
x_{3t}	external trade balance (in %)

7.5.3 Formulation of economic model

GDP in the Czech Republic is affected by inflation, unemployment and by external trade balace of the Czech Republic.

7.5.4 Estimated mathematical equation

$y_t = 7.10875x_{0t} - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t} + e_t$

7.5.5 Estimation of the regression model

Model 1: OLS, using observations 1995-2015 (T = 21)

Dependent variable: y_t

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
Const	7.10875	5.08934	1.3968	0.1804
X_{1t}	-0.416423	0.367692	-1.1325	0.2731
x_{2t}	-0.460793	0.60388	-0.7631	0.4559
X_{3t}	-0.244987	0.17574	-1.3940	0.1813

Mean dependent var	2.437143	S.D. dependent var	2.862695
Sum squared resid	146.6713	S.E. of regression	2.937299
R-squared	0.105119	Adjusted R-squared	-0.052801
F (3, 17)	0.665649	P-value(F)	0.584573
Log-likelihood	-50.20626	Akaike criterion	108.4125
Schwarz criterion	112.5906	Hannan-Quinn	109.3193
Rho	0.301944	Durbin-Watson	1.326167

7.5.6 Estimated function

$y_t = 7.10875 - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t} + e_t$

7.5.7 Interpretation of results

Estimate parameter, dependent variable $\beta_0 = 7.10875$

If all explanatory variables are zero, then annual growth of GDP is 7.10875 %.

Estimated parameter $\beta_1 = -0.416423$

If the annual inflation rate increases by 1%, the annual GDP growth will decrease by -0.416423.

Estimated parameter $\beta_2 = -0.460793$

If the annual rate of unemployment increase by 1%, the annual GDP growth will decrease by -0.460793.

Estimated parameter $\beta_3 = -0.244987$

If the annual rate of external trade balance increases by 1%, the annual GDP growth will decrease by -0.244987.

7.6 Statistical verification of the model

7.6.1 Goodness of fit

The model captured 10.5% of variance of dependent variable.

$R^2 = 0.105119$

The model explained 10.51% of variability of dependent variable with selected explanatory variables.

7.6.2 Statistical significance of parameters

The significance of variable (parameter) is declared by p-value from OLS regression model.

T-test

H_0 : $\gamma i = 0$ Parameter is statistically not significant, because H_0 is **rejected**.

H_1: $\gamma i \neq 0$ Parameter is statistically significant, because H_0 is **accepted.**

$$H_0 : \beta_0 = 0$$
$$H_0 : \beta_1 = 0$$
$$H_1 : \beta_2 = 0$$
$$H_0 : \beta_3 = 0$$

Level of significance is 10% ($\alpha = 0,1$)

	p-value		α		
β_0	0.1804	>	0.1	Not rejects H_0	Parameter β_0 isn't statistically significant at 10% level of significance.
β_1	0.2731	>	0.1	Not rejects H_0	Parameter β_1 isn't statistically significant at 10% level of significance.
β_2	0.4559	>	0.1	Not rejects H_0	Parameter β_2 isn't statistically significant at 10% level of significance.
β_3	0.1813	>	0.1	Not rejects H_0	Parameter β_3 isn't statistically significant at 10% level of significance.

7.7 Discussion of results

$$y_t = 7.10875x_{0t} - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t}$$

From the results we can claim that parameters β_0, β_1, β_2 and β_3 are not statistically significant so explanatory variables x_{1t}, x_{2t} and x_{3t} have no effect on dependent variable y_t.

Estimate parameter, dependent variable $\beta_0 = 7.10875$, if explanatory variables are zero. Constant is positive, which means that GDP in this research starts at this level from 7.10875%.

7.7.1 Variables hypothesis confirmation - rejection:

If the inflation in the Czech Republic increases by 1%/year, the GDP will decrease by -0.416423% => Hypothesis num.1: H_0 is accepted, there is no statistical significance. *The first hypothesis was confirmed.*

If the unemployment increases by 1%/year, then the GDP will decrease by -0.460793% => Hypothesis num.2: H_0 is accepted, there is no statistical difference. *The second hypothesis was confirmed.*

If external trade balance increases by 1 %/year, then the GDP will decrease by -0.244987% => Hypothesis num.3: H_0 is accepted, there is no statistical significance. *The third hypothesis was confirmed.*

Estimated parameter γ_1 : *negative*

Assumption about negative relationship between inflation rate and growth of GDP was fulfilled. Model confirmed that increase in inflation will cause decrease in GDP growth.

Estimated parameter γ_2 : *negative*

Assumption about negative relationship between unemployment rate and growth of GDP was fulfilled. Unemployment influences the GDP growth from all explanatory variables the most.

Estimated parameter γ_3 : *negative*

The last estimated parameter has also negative sign. Assumption about positive relationship between external trade balance and growth of GDP was not verified. Therefore there is a negative relationship between these variables. External trade balance has no significant impact on GDP growth.

7.8 Utilization of model

7.8.1 Simulation of scenario

$(y_t = 7.10875x_{0t} - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t} + e_t)$

$\hat{Y}_t = 7.10875x_{0t} - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t}$

1. To increase GDP by 1% it is needed to decrease the unemployment by **-1.8649 %.**

$$\hat{Y}_t + 1\% = 7.10875 - 0.416423x_{1t} - 0.460793x_{2t} - 0.244987x_{3t}$$

$$x_{2t} = \frac{7.10875 - 0.416423*0.4 - 0.244987*8.91 - 3.9}{-0.460793} = -1.864929$$

2. Increased annual inflation rate by 2% would lead to GDP change by **0.7291 %.**

$$\hat{Y}_t = 7.10875 - 0.416423*(0.4+2) - 0.460793*6.7 - 0.244987*8.91 = 0.7291$$

3. By increasing the external trade balance of 10% the GDP will grow by **1.4049%.**

$$\hat{Y}_t = 7.10875 - 0.416423*0.4 - 0.460793*6.7 - 0.244987*(10) = 1.4049$$

8. GDP Growth rate and Prognosis

Following table shows statistical data in selected years. The table is possible to split into two parts.

The first part contains columns: **GDP (%)** – annual value of real GDP in %, t_i – chronological order of years, **Δ Y (%)** - annual changes of economic growth in %.

The second part includes columns: **GDP in bill. CZK** – annual monetary value of GDP, **Incremental GDP growth rate (%)** – annual increments of GDP in % based on monetary value of GDP, **GDP growth rate (%)** – evolution of economic growth in % since 1995, which is considered as a baseline.

Values of annual change - **Δ Y (%)** of GDP fluctuates, half of figures are negative (recession), half positive (expansion). Values close to the zero are taken into consideration as zero growth (stagnation).

According the calculations based on collected data, we can claim that average value of annual change of economic growth counts: -0.1% (period 1996 -2014). The highest annual decline -7.5% was in 2009 during the peak of economic crises. And the highest growth was during the revival of Czech economics in 2010 with the value 7.1%.

Aggregate economic growth rate based on the monetary values has positive progress. There is an increase by 175.78% since the base year 1995 up to 2014. Annual increments based on monetary values of GDP fluctuate, but they do not include negative figures besides the crises year 2009, the most distinct positive accrual was in 1995.

Year	GDP (%)	t_i	Δ Y (%)	GDP in bill.CZK	Incremental GDP growth rate (%)	Aggregate GDP growth rate (%)
1995	5.9	1	-	1466.5	-	-
1996	4	2	-1.9	1683.3	14.78	114.78
1997	-0.7	3	-4.7	1811.1	7.59	123.50
1998	-0.8	4	-0.1	1996.5	10.24	136.14
1999	1.3	5	2.1	2080.8	4.22	141.89
2000	3.6	6	2.3	2189.2	5.21	149.28
2001	2.5	7	-1.1	2352.2	7.45	160.40
2002	1.9	8	-0.6	2464.4	4.77	168.05
2003	3.6	9	1.7	2577.1	4.57	175.73
2004	4.5	10	0.9	2814.8	9.22	191.94
2005	6.4	11	1.9	2983.9	6.01	203.47
2006	6.9	12	0.5	3222.4	7.99	219.73
2007	5.5	13	-1.4	3535.5	9.72	241.08
2008	2.7	14	-2.8	3689	4.34	251.55
2009	-4.8	15	-7.5	3628.1	-1.65	247.40
2010	2.3	16	7.1	3667.6	1.09	250.09
2011	2	17	-0.3	3807.2	3.81	259.61
2012	-0.8	18	-2.8	4041.9	6.16	275.62
2013	-0.75	19	0.05	4077.3	0.88	278.03
2014	2.03	20	2.78	4261.1	4.51	290.56
2015	*3.9*	*21*	*1.87*			
2016	*-2.05*	*22*	*-5.95*			
2017	*-2.46*	*23*	*-0.41*			
2018	*-2.88*	*24*	*-0.42*			
2019	*-3.3*	*25*	*-0.42*			
2020	*-3.71*	*26*	*-0.41*			

[34]

Red highlight marks the data which are forecasted (period 2015 - 2020). [35]

[34] Sources of collected data from the table: *Kurzy.cz* [online]. [cit. 2015-10-25]. Retrieved from: www.kurzy.cz/makroekonomika/hdp/*www.kurzy.cz/makroekonomika/hdp/*

[35] Appendix – *Graph no.4* showing the prognosis of GDP in forecasted years 2015-2020

Used formulas in the table:

$Annual\ change\ of\ economic\ growth\ (\%) = Y_t - Y_{t-1}$

$Aggregate\ GDP\ growth\ rate\ (\%) = \dfrac{Y_t}{Y_{t(base\ year)}}$

$Incremental\ GDP\ growth\ rate\ (\%) = \dfrac{Y_t - Y_{t-1}}{Y_{t-1}}$

$Prognosis\ y'_t = T_t + \varepsilon_t$

9. Conclusion

The model confirmed that increase in inflation leads to decrease in GDP. High inflation affects the economy very negatively. However there is positive information, that inflation rate in the Czech Republic has declined nearly by 2% in recent years (since 2012) and has been stabilized since the last year on the level of 0.4%.

Increase in unemployment naturally leads to lower GDP. Due to that it is essential to ensure minimal rate of unemployment in the country through measurements, regulations and steps realized by government. These measurements could include for instance: unrestricted and free labor market, lower taxation and levy's rates, higher minimum wages, structure and amount of social welfare benefits.

External trade balance has been reaching positive numbers since 2005. Until this year the trade balance was negative and considerably fluctuated. In last 20 years there has been a significant increase in trade economics of the Czech Republic, which is notably opened to the world and shares of external trade turnover are more and more in positive progress year by year. Distinct increase in turnover in the Czech Republic was noticed in the beginning of new millennium and then especially after the entrance to the EU. Annual turnover between the years 2003 and 2004, when there was entry of the Czech Republic to the EU, more than doubled from 231mill.CZK to 660 mill. CZK.[36]

The main destination of the Czech export represents unambiguously the EU. The top 10 destinations for Czech export are: Germany, Slovakia, Poland, The UK, France, Austria, Italy, Hungary, Netherland and Spain. The highest export to the states out of the EU was to the US, Russia, Turkey and China. According the commodities structure, the largest profit was recorded in traditional industry: automotive industry, engineering, electronics, iron and steel manufacturing together with plastics, where first three sectors have apparent distance from others.

As a new and great opportunity for the state, I would see in further diversification of export places. New export territories represent a challenge for government, and by all

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[36] *Český statistický úřad: Česká republika od roku 1989 v číslech* [online]. [cit. 2015-10-25]. Retrieved from: https://www.czso.cz/csu/czso/ceska-republika-od-roku-1989-v-cislech#05

means it should not harm the national economy. *„It is legitimate to think of export's alternative scenario. The Czech Republic can apply then its competitive advantages. One of the options is formed when looking at the map. We can benefit from the geographical position. After the building of appropriate infrastructure the Czech Republic could become a logistics center of Europe".[37]*

How does the prognosis of the Czech future look like?

Substantial part of the Czech industry create operations, where people use their hands and muscles on machines invented and produced outside of our borders, which serve to production of product invented outside as well. And in the same time they serve just as a middle-delivery for the final production. Because of this fact, the Czech Republic cannot be richer. Our economy is moreover constricted by enormous bureaucratic barriers. *„Rigmarole of the Czech economy and suppressing of the market, too huge public sector and the range of state relocation, high social spending, excessive regulation of entrepreneurship, overly high tax burden, instability of jurisdiction and other system problems are in several common for the whole EU, however in the Czech there becomes to extraordinary accumulation of such problems".[38]*

In my opinion, if I should answer the question: Where is prosperity? My answer would be very trivial, it founds in the countries with high income. And that prompt us to the next question: Where is high income? Exactly there, where there are collected dividends. And where there are collected dividends? In the places where there is capital, where there are ideal conditions for its accumulation. To reach this state, it is needed not to carry out stupid experiments with taxes, nationalization, etc. Capital can be in form of natural resources, soil, financial reserves or intellectual property. If we talk about the Czech Republic, we can almost omit the natural resources and soil. From this we will never be rich. Regarding the financial capital, Czechs are poor in comparison with the West, and how is it look like with financial capital? The number of international patent

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[37]IVANA PEČINKOVÁ a KOL.AUTORŮ, *Budoucnost české ekonomiky*, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9, Vladimir Dlouhy (1953), former Minister of economy, trade and industry, current president of Economic Chamber of the Czech Republic , p.13

[38] IVANA PEČINKOVÁ a KOL.AUTORŮ, *Budoucnost české ekonomiky*, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9, Martin Riman (1961), government politician, former minister of transport, industry and trade, supervisor of a.s. CEZ, now private entrepreneur, p.69

application forms per million of citizens shows the maturity of given country. It points out where there is the real wealth. Capital in 21st century has predominantly the ideological character.

It is possible to split EU countries into the basic three leagues according the graph no.5 - Number of application forms of patents per 1 million resident, average of 2009-2010 [39] in Appendix. The first one: Sweden, Switzerland, Finland, Germany, Denmark, Netherland, Austria and Norway. The second one: Belgium, France, Luxembourg, Island, The UK, Ireland, Slovenia and Italy. And finally the third one: Spain, Estonia, Hungary, Croatia, Greece, Slovakia, Poland and the Czech Republic as well. After this last selection, it is felt that we ended up either on exotic holiday or in an "assembly".

Our economy belongs to the economies where there is qualified and cheap labour, geographical closeness to main economical centers of EU, reasonable fiscal and monetary politics and political stability. As a good example of this, I would mention the brand IKEA. Often we can see on packets of IKEA products signs: Made in Czech Republic, Poland, Latvia, Lithuania, however trade margin goes to Netherland where IKEA has its tax domicile and from there it goes to shareholders.

And that is a bitter reality, the western point of view on the Czech. Results of gifted Czech engineers belong to foreign companies, which belongs to shareholders, who reside in various parts of the world. The wealth arise where there are collected dividends and fees not where people impatiently wait for their salary.

As a satisfactory compensation of this reality it would seem to be sufficient, cheap and qualified labour. However, the Czech Republic is rushing into the dead end under current conditions. Qualified labour is now being devastated by educational system, which frankly has stopped to produce graduates of craft and technical high schools. Still more and more qualified labourers go to retire and this fact sooner or later will become a serious problem. Some politicians take a negative stand on competition between Czech and Chinese workers. That is it impossible for Czech workers to compete with Chinese. As an inevitable consequence, it will cause: at the expense of Czech workers new buildings,

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[38] Appendix - detailed division of countries into leagues according the intelectual ownership explains *graph no. 5 - Number of application form of patents per 1 million resident, average of 2009-2010.*

highways, power plants, etc. will be built by Chinese, price increase in qualified labour, increase in unemployment, developmental limit of domestic purchasing power and of course all of these has a certain influence on the economic growth. It is very sad to state, but the Czech Republic is very close to be technically more stupid nation.

Economy in the Czech Republic is not an autonomous economy, but derived, dependent namely on Germany and the EU as a whole. We cannot talk into issues. We have to do, what the owner wants us to do. We can only arrange what we can get for our middle-delivery. Proprietary and managerial skills and knowledge slowly disappear then it is difficult to find people who understand customers, strategy and the market.

Ownership is the basic function for business in modern world. The owner decides, what will be produced, where it will be exported, how much it will cost and so on. Such decisions are impossible for hireling. Let's explain it on following example. The concept of Skoda sounds to most of the Czech population as a Czech company, as we own it. However we do not own it, we just do contractual job, for which the owner pays us wages.

As a matter of fact our future and prosperity depends on the future of German or Korean or Chinese enterprises located on our area. If they get on well, so we do. And if they decide to move for ex. to Africa, where there will be cheaper labour, then we will get on worse. Czechs simply do not have it under control.

And why is it so?

Economic system has its own roots in decisions from history. In 1990 there came a very fundamental change, which is grounded on the reality, that many Czech enterprises in holding of state became the ownerships of foreign buyers. At that time the Finance Minister Vaclav Klaus defended the opinion, that it is not relevant to whom it belongs to, but the important thing is that the firm is situated on our area. As time passed the Czech economy has transformed into quite different content than it had been before. For instance if wind the clock back and go to the times of the first republic, when Skoda was the Czech company with the Czech owners, Kolben and Danek were the Czech firm with Czech proprietors, Bata was moreover private, so it was not subjected to stock exchange markets. All of them were registered in the Czech, therefore there was such attainment. Now we

found ourselves in the situation where there has left nothing to sell off and on the Czech territory administer predominantly foreign companies.

Maybe the prognosis of the Czech future seems to be too pessimistic and influenced by gloomy atmosphere in which we have been living in recent years. I would conclude it with apposite statement from the most popular Czech prognosticator, president Milos Zeman. *„Prognosis is processed, in order not to be fulfilled, because responsible persons act steps that would stop or turn away the negative development. Nevertheless about responsible individuals yet there are neither in the Czech nor the EU no signs".*[40]

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[40] IVANA PEČINKOVÁ a KOL.AUTORŮ*, Budoucnost české ekonomiky*, první vydání 2014, Pravý břeh.cz, ISBN 978-80-905908-0-9, Milos Zeman (1944), current president of the Czech Republic, former Prime Minister from 1998 to 2002, p.106

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11. Appendix

GDP (y_i)

$$y = 0{,}0005x^4 - 0{,}0251x^3 + 0{,}4319x^2 - 2{,}6222x + 6{,}9$$
$$R^2 = 0{,}4145$$
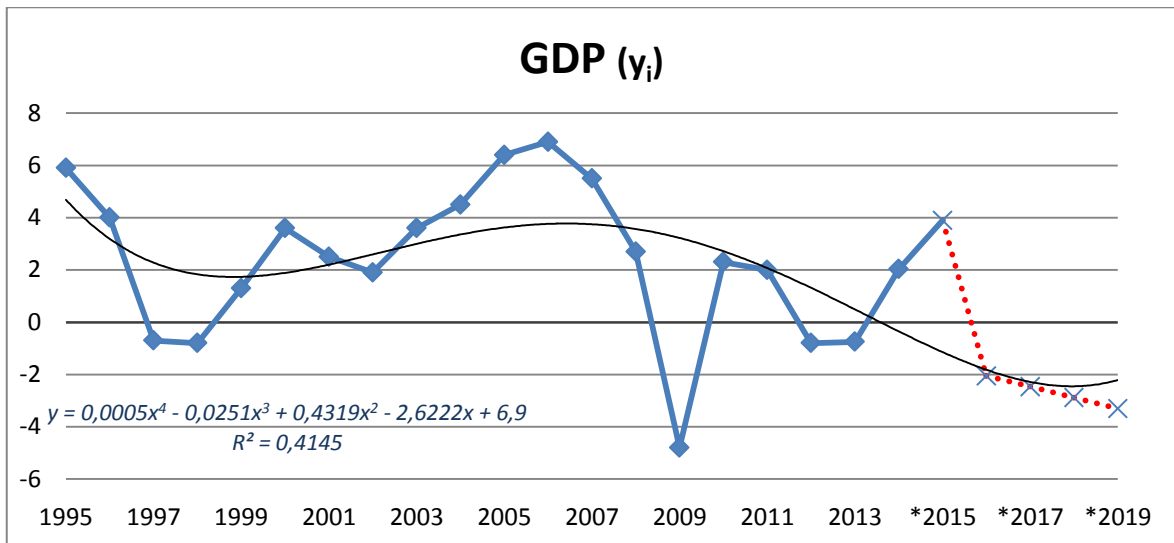
[35]*Graph no. 4 - The prognosis trend line of GDP in forecasted period 2015 – 2020.*

Source: www.kurzy.cz/makroekonomika/hdp/

 Axes *x* demonstrates the measured period (years 1995-2020), axis *y* demonstrates percentage values of collected data from each year. Estimated development of the GDP is depicted by interrupted red line. Regression model supposes on the basis of collected data the decline in GDP in next future years.

The black curve symbolizes the polynomial trend line, including the polynomial equation of 4th degree ($y = 0.0005x^4 – 0.0251x^3 + 0.4319x^2 – 2.6222x + 6.9$) and the value of reliability R ($R^2 = 0.4145$).

1. Sweden....................................	302,7
2. Switzerland............................	290,1
3. Finland....................................	283,8
4. Japan......................................	258,4
5. Israel......................................	218,8
6. Germany...............................	214,8
7. Denmark................................	203,3
8. Netherland............................	184,7
9. Korea.....................................	183,4
10. Austria.................................	157,7
11. Norway.................................	149,7
12. USA......................................	141,7
13. Singapore............................	124,4
14. Belgium................................	109,6
15. France..................................	101,4
16. Luxembourg.........................	95,9
17. Iceland.................................	90,6
18. Great Britain........................	81,7
19. Australia...............................	79,4
20. Canada.................................	74,2
21. The Czech Republic............	15,3
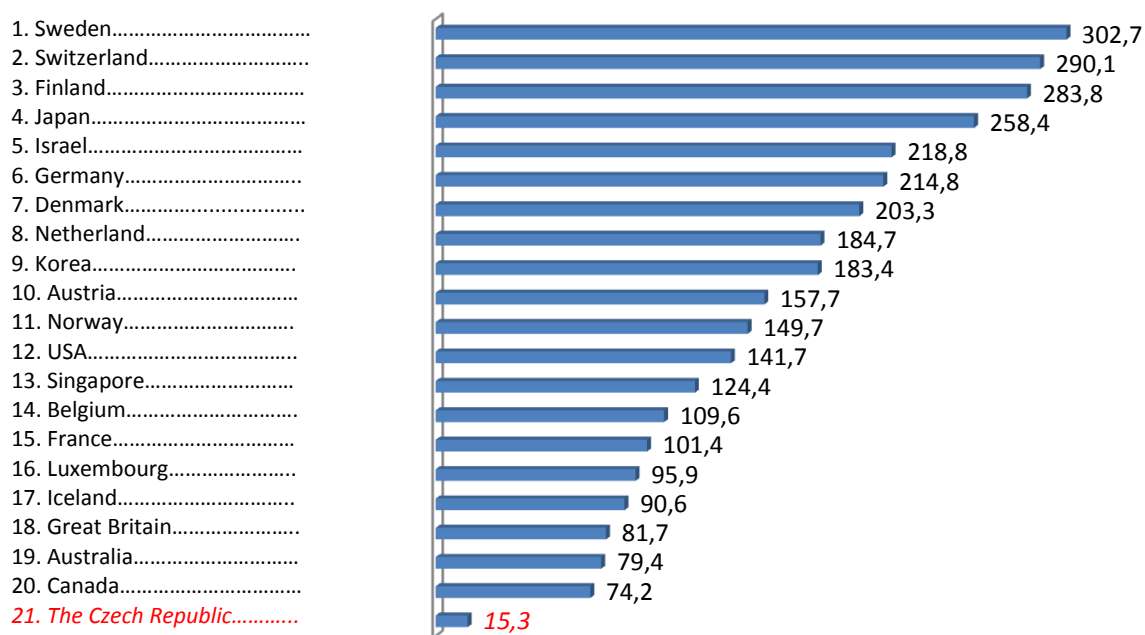
[38]*Graph no. 5 - Number of application forms of patents per 1 million residents, average of 2009-2010.*

Source: www.weforum.org