Articles published in the semi-annual AGH Managerial Economics have been peer reviewed by reviewers appointed by the Editorial Board. The procedure for reviewing articles is described at the following web address: http://www.zarz.agh.edu.pl/polska/czasopisma_wydzialowe/czasopismawydzialowe.asp?ID=ekonomia_managerska

Reviewers: *Prof. dr hab. Eugeniusz Michalski*, *Prof. MWSE dr hab. inż. Michał Woźniak*, *Prof. Gerrit Brösel*, *Prof. Ingo Klein, Prof. Michael Olbrich, Prof. Heinz Eckart Klingelhöfer*

Linguistic Correction: *Norman L. Butler*

Statistical editor: *Anna Barańska*

Editorial support: *Magdalena Grzech*

Cover and title page design: *Zofia Łucka*

Nakład 80 egz.

Redakcja Wydawnictw AGH
al. Mickiewicza 30, 30-059 Kraków
tel. 12 617 32 28, tel./faks 12 636 40 38
e-mail: redakcja@wydawnictwoagh.pl; http://www.wydawnictwa.agh.edu.pl

SPIS TREŚCI

AGH Managerial Economics
2012, nr 12, s. 7–24
doi: 10.7494/manage/2012.12.7

Marianna Księżyk*, Marek Ł. Michalski**

Financialization as a Factor Constraining Economic Growth and Standard of Living Improvement in Poland

1. Introduction

Basing the economic systems of EU countries on the doctrine of market liberalism caused an idealized market to be perceived as the best way to maximize profits, not from the production of material goods and their distribution, but through the provision of broadly defined financial services. This was evidenced by the development of a range of financial products (quasi-money), removal of financial capital from the sphere of material goods production and investing it in risky financial transactions, giving impetus to the process of financialization, as it was described by P. H. Dembinski [5]. The development of information and communication technologies further accelerated this process. This free-market euphoria and building a future based on an investment utopia was also served by erroneous theories, supported by mathematical models and the Bank of Sweden Prize in Economic Sciences in memory of Alfred Nobel, supposedly indicating effective ways of investing (by businesses and residents) in capital markets.

Examples of such award-winning theories and models include work by co-creators of so-called financial engineering or financial mathematics – Myron Scholes and Robert Merton (they received the Nobel Prize in Economics in 1997). Their model for pricing derivatives, focusing on long term contracts, was to help investors minimize investment risk. It soon became apparent that these were false hopes, since an investment fund called *Long-Term Capital Management* that they founded on this supposedly profitable strategy quickly failed and investors lost

* Andrzej Frycz Modrzewski Cracow University
** AGH University of Science and Technology

USD 4.6 billion [24, p. 41]. E. Prescott's (Nobel laureate in economics in 2004 for his work on business cycles) theory also proved to be false. In 2000, he asserted with the help of economic theory and econometrics that financial markets are rational (they function rationally). A few months later, the "internet bubble" burst with share prices dropping 50%. This fact can be regarded as a disaster from which some financial markets, such as Nasdaq, have not recovered until this day [5, p. 17].

The financial crisis that started in 2008 shows that financialization, as the direct cause of this crisis, not only shook the belief in free markets, but also showed that neoliberal theories, as a basis for economic processes, despite the development of an extensive methodology (i.e. statistical and mathematical models) which is intended to aid making rational decisions, do not ensure sustainable economic growth and standard of living improvement for society as a whole. It also indicates that studies limited to direct causes of financialization and its impact on financial crises are inadequate. A thorough explanation of the sources of this process and its socio-economic impact under the current process of globalization, is required.

Recognizing that these problems are pertinent to the realization of objectives that were at the foundation of European integration (i.e. prosperity, peace, democracy and human rights), this article shows the effects of financialization on achieving sustainable economic growth and living standards improvement of residents of countries with market economies, including Poland as an EU member. It also indicates a way out of the existing negative approaches forming the basis of financialization.

2. Main sources of financialization

A characteristic feature of modern liberal market capitalism, which is called "casino capitalism" [21], "stock market capitalism" or the epoch of finance, in which "finance primarily finances finance" [12], are frequent financial crises turning into economic crises. Many authors (such as Stiglitz [20], Dembinski [5] and Otte [16]) seeing financialization as the direct cause of contemporary financial crises, analyze its symptoms, direct causes and effects of economic growth.

By contrast, Song Hongbing [9, 10] does not focus his research on causes, manifestations and direct consequences of financialization but on its sources. The primary source of financialization and financial crises, turning into global economic crises, is the issuance of money out of nothing by private central banks. Consequently, this led to the introduction of floating exchange rates and casino capitalism.

Studies of financialization show that the residents of many countries, and even economists, are not aware of the socio-economic effects of the existence of private central banks, even in countries such as the United States or Great Britain, and of giving them full control over the issuance of money.

The private UK central bank was founded in 1694. The primary reason for creating the Bank of England was the desire to convert the debt of the king (William III) and his court into eternal government debt set up as a mortgage based on tax revenue. Thus, the Bank of England gained the exclusive right to issue national currency (it was given this exclusive right). The uniqueness of this project consisted in the absolute binding of issuing national currency with public debt. Whenever the need arose to issue new money, the only solution was to increase public debt [9, pp. 16–19].

The need to repay the interest on this debt and the need for continued economic growth led to an increase in demand for money and loans. Hence, both public and private debt continues to grow. The interest charged on loans ends up in bankers' wallets and the burden of repayment is borne by ordinary people.

Similarly to the Bank of England, the U.S. Federal Reserve is a private bank, which means that the Fed is not only not a federal bank, but it is also not a reserve. Starting from December 23, 1913, the U.S. federal government does not have the right to issue money and does not issue the U.S. dollar. After the assassination of President Kennedy in 1963, the U.S. government lost the authority to issue the "silver dollar", the only means of payment that the government was still entitled to issue at that time. It is noteworthy that president Kennedy was determined to keep this right as stated by Song Hongbing based on reliable U.S. documents [9, p. 62].

The Federal Reserve was designed to have all the characteristics of a private central bank and did not differ in any way from the private Bank of England that acted as the central bank of Great Britain. It was stipulated that private shareholders will be the owners of the Federal Reserve, which gave them the opportunity to reap huge profits from the issuance of money. Regional banks that make up the Fed are also not part of government structures. The idea that the government was entitled to 20% of its shares was rejected. According to Song Hongbing, the name "Federal Reserve System" was used in the *Federal Reserve Act* that founded the Fed in order to hide the true nature of this private central bank, as well as to comply with the constitution, which states that "The Congress shall have power to coin money and regulate the value thereof" [23, Art. 1, Sec. 8].

The *Federal Reserve Act* was passed in great haste. Most of the congressmen and senators did not even have time to carefully read the contents of the Act and to make appropriate amendments since the final draft was printed on December 22 at 4:30 AM, the final reading took place at 7 AM and voting in Congress began at 11 PM all on the same day. The next day (December 23) the Act passed the Senate and on the same day, an hour after its adoption, it was signed into law by President W. Wilson. Its signing generated an explosion of joy on Wall Street and in the London City financial district.

The *Federal Reserve Act* was passed in such a haste that only a few congressmen, including Ch. A. Lindbergh, were able to publicly point out its flaws. A passage from Lindbergh's speech at the meeting of Congress should certainly be remembered: "The greatest crime of Congress is its currency system. The worst legislative crime of the ages is perpetrated by this banking bill. The caucus and the party bosses have again operated and prevented the people from getting the benefit of their own government" (Ch. Lindbergh, *Speech in Congress*, December 23, 1913, quoted by [9, pp. 82–83]).

Senator Aldrich also noted significant flaws in this act. In an interview for *The Independent* in 1914 he said: "Before the passage of this Act, New York bankers could only dominate the reserves of New York. Now we are able to dominate the bank reserves of the entire country" [9, p. 83].

The introduction of the *Federal Reserve Act* meant that after more than a century of the bankers' struggle with the U.S. government, international bankers finally achieved their goal – they gained total control over the right to issue currency in the U.S., thus control finance, trade and politics in America.

Following his presidency, the twenty-eighth president of the United States W. Wilson, who hurriedly signed the *Federal Reserve Act* into law, noticed his mistake and said: "A great industrial nation is controlled by its system of credit. Our system of credit is concentrated. The growth of the nation, therefore, and all our activities are in the hands of a few men." (as cited by Hongbing [9, p. 61]). He also admitted that he had been cheated and that he was allowed to nominate only one member of the supervisory board of the Federal Reserve, all others were elected by New York bankers, which means that the government is completely dependent on the bankers. Plagued by remorse he confessed (before his death): "I have unwittingly destroyed my country" [9, p. 89].

Control of issuing money by private banks has always been the goal of bankers. The effects of this were understood not only by bankers, but also by nineteenth century leaders of the United States and other countries.

Napoleon Bonaparte's statement on this point dating from 1815 is clear. He stated that "When a government is dependent upon bankers for money, they and not the leaders of the government control the situation, since the hand that gives is above the hand that takes… Money has no motherland; financiers are without patriotism and without decency; their sole object is gain" (R. McNair Wilson, *Monarchy or Money Power*, London 1933, p. 68 as cited by Hongbing in [9, p. 25]).

A similar view was held by the barely thirty-three year old author of the *Declaration of Independence* (the third president of the United States) Thomas Jefferson, undoubtedly representing the interests of most citizens. Worrying about their future he warned: “If the American people ever allow private banks to control the issue of currency, first by inflation, then by deflation, the banks and corporations that will grow around them will deprive the people of all property until their children wake up homeless on the continent their fathers conquered.” (T. Jefferson’s statement from 1787, quoted by Hongbing [9, p. 39]).

He also made a clear and decisive statement in 1802: “I believe that banking institutions are more dangerous to our liberties than standing armies. Already, they have raised up a moneyed aristocracy that has set the government at defiance. The issuing power should be taken from the banks and restored to the people, to whom it properly belongs.” (T. Jefferson’s statement from 1802, quoted by Hongbing [9, p. 39]).

The sixteenth U.S. President Abraham Lincoln also perfectly understood the threat to the country and welfare of residents resulting from the printing of money by private banks, that is why during the Civil War, he issued $450 million of a new currency called “Lincoln’s greenback”. The issuance aroused a negative reaction of British bankers, as stated in the *London Times* (a newspaper representing the interests of bankers): “If this mischievous financial policy, which has its origin in North America, shall become indurated down to a fixture, then that Government will furnish its own money without cost. It will pay off debts and be without debt. It will have all the money necessary to carry on its commerce. It will become prosperous without precedent in the history of the world. The brains, and wealth of all countries will go to North America. That country must be destroyed or it will destroy every monarchy on the globe.” (quoted by Hongbing in [9, p. 53]).

In view of the profits from the issue of money by private banks, the issuance of “Lincoln’s greenback” was opposed by the *American Bankers Association*. It expressed this in a letter to its members saying: “It is advisable to do all in your power to sustain such prominent daily and weekly newspapers, especially the agricultural and religious press, as will oppose the greenback issue of paper money and that you will also withhold patronage from all applicants who are not willing to oppose the government issue of money. To repeal the Act creating bank notes, or to restore to circulation the government issue of money will be to provide the people with money and will therefore seriously affect our individual profits as bankers and lenders. See your congressman at once and engage him to support our interest that we may control legislation.” (From a letter by the Bankers Association of New York, Philadelphia and Boston sent to bankers of all states in 1877, quoted by Hongbing [9, p. 59]).

It turns out that the issue of state debt-free money, the "Lincoln's greenback", brought a great benefit to the state. This solution has saved the government from taking out high-interest loans from private banks. Thanks to this, the industry, construction companies involved in the development of railways, agriculture and trade gained access to cheap credit. Based on information issued by the U.S. Treasury secretary in 1972, by issuing its own currency, without the need to pay interest to private bankers, the government saved four billion U.S. dollars in interest payments (M. Sikler, *Abraham Lincoln and J. F. Kennedy*, "Michael" 2003 no. 4 , quoted by Hongbing [9, p. 55]).

Although many U.S. presidents and congressmen warned against the danger of putting money supply in the hands of the financial elite, it was finally given to a private bank.

An analysis of the Federal Reserve System clearly shows that the democratic system that Americans are so proud of is not resistant to the threat of government by money, because international finance, using the right to issue money, is gaining control of the country too.

This general conclusion makes it reasonable to consider the situation in Poland resulting from the issuance of money in the former People's Republic of Poland and today.

3. Brief characteristics of money issuance in Poland during the former People's Republic of Poland (PRL) and after 1990

In Poland, during the period after World War II until the premarket transformation, the issue of money ("złoty") was not based on debt. Poland's central bank (NBP) and other banks (except a few cooperatives) located throughout the country were government owned. In its activities, none of these banks were motivated by profit. Quite the contrary. Prices of loans in the Polish banking system were set at a level that only covered the banks' own operating cost. They hovered around 2% until 1958, which provided cheap credit to rebuild the country after the devastation of war (as part of the three-year plan) and invest in capital-intensive production (as part of a six-year plan, which laid the foundations of the Polish economy). After 1958, interest on operating loans was increased to 4% whereas interest on investment loans was left unchanged. Until 1969, investors could benefit from low interest rates (2% per year) loans for central investments. The price of credit could be increased to 3% only as punishment in case the investor was not fulfilling the credit agreement (i.e. the investment was not carried out according to plan). Additionally, loans were easily accessible for all types of investments, i.e. central, cooperative and business investments (an analysis of loans well-documented with empirical data was presented by F. Skalniak [18]). In the mid-1970s a variation in the prices of loans by type of investment was introduced, with a preference for so-called quick-return investments. Discount rates were raised to 8% for evaluating the efficiency of investments to be financed using bank loans. Low credit prices favored investments. Along with the transformation of the Polish economy (after 1989), the price of bank loans in Poland rose to a very high level. In recent years, the real price of loans in private banks, of which over 80% are foreign-owned, has been hovering around 14% (in the first years of transformation, the nominal price of credit was higher and amounted up to 120%). Moreover, loans from Polish state-owned banks sold to foreign investors are very difficult to get. Banks owned by foreign capital often demand assets of the potential debtor company valued at two to three times the value of the loan, as collateral for the loan. This not conducive to investing, nor creating and maintaining jobs.

The example of PRL shows that a country in which the government issues its own money can not only quickly, without incurring foreign loans, rebuild itself after the devastation of a war, but also eliminate unemployment. Foreign debt was not introduced in PRL until the 1970s when Edward Gierek took foreign loans for investments to modernize the economy.

To summarize this discussion concerning the issuing of money by private central banks, it is worth noting that at present China is a country in which the government directly issues currency (there is a state-owned banking system). In this way both the government and the public can save huge amounts of money by not having to repay interest on debt. This is one of the main causes of China's rapid economic growth over the last 30 years and it reinforces the belief that China should never agree to their government giving up the right to issue money to a private bank, which would use state bonds as a basis for printing domestic currency. Whether China's example will become a model to imitate depends on the awareness, strength and unity of politicians and leaders of countries who will be able to break free from the dictates of bankers. It also hinges on economists from prestigious universities worldwide, who would want to honestly explain the issuance of currency in economics textbooks and classrooms, and not – as is the case now – remain silent on the subject.

Giving the right to issue money to private banks, deregulation and the formation of giant financial entities, which (given the scope of their activities) should not be called "banks", means that they are capable of controlling economic recessions and financial crises to reap huge profits.

4. Control of recessions by banks

An analysis of crises shows that banks' control of recessions always follows the same scenario. First, banks relax their lending policies. They offer various forms of cheap credit, even nag their customers to borrow money, which ultimately inflates a speculative bubble. Afterwards, these banks suddenly suspend lending and a recession begins. There is a sudden drop in prices of fixed and various other assets. Once the price of high-value assets drops to a very low level, such as 10% of their normal value, the same bankers make bulk purchases at these extremely low prices. In banker's jargon this is called "sheep shearing". Where there is a private central bank "sheep shearing" reaches enormous proportions. Asian countries in 1997, except China that had no foreign-owned private banks, provide an example of such "sheep shearing".

The elimination of the gold standard facilitates control of recessions and "sheep shearing" since in the absence of a gold standard, as rightly stated by A. Greenspan, there is no way of protecting savings from inflation: "The Gold Standard hard stops the momentum of inflation." (A. Greenspan, *Gold and Economic Freedom*, New York 1967, pp. 100–101, quoted by Hongbing [9, p. 117]). This is why bankers sought to completely remove gold from its position in the monetary system. This was done in three stages. First, gold was eliminated from U.S. circulation and monetary exchange. Second, gold was eliminated from foreign exchange transactions (as part of the Bretton Woods system introduced in 1944). The third phase ended with President Nixon moving away from the Bretton Woods arrangements in 1971. This decision made the U.S. dollar a debt certificate. Despite the elimination of the gold standard, bankers fear gold as a store of reserves, and therefore control its prices.

Most people believe that the transition of an economy through boom and bust cycles is a regularity that governs economies and that it must be so. Such reasoning is erroneous, because the fundamental cause of this problem is the control of the currency supply by world bankers. They decide when to loosen monetary policy, and when you tighten it. Undoubtedly, the stock market crash of 1929 and other crises were been planned by the Federal Reserve and European bankers.

By analyzing the current financial crisis, which came from the United States, it is difficult to believe that A. Greenspan, for many years governor of the Federal Reserve, who perfectly understood the rules governing the global economy, known for his reliable, even astonishing precision in forecasting trends in its transformations and development, could not foresee that the policy of the Reserve headed by him leads to a crisis.

As a result of giving the issuance of money to private banks, now in countries with market economies, such as the United States and EU countries, the principle applies that economic growth must be fueled by debt. It consists in the fact that debt creates money, money promotes greed, greed increases debt; there is a debt implosion, the implosion results in deflation, which in turn leads to a recession. Therefore, questions arise whether, in such a situation, the governments of individual countries, including EU countries, are able to pursue a policy of sustainable economic growth, if their economies can be knowledge-based and ensure a steady improvement of living standards of the general population, or if these concepts, in the present reality, are only an expression of dreams and unrealistic visions of theoretical economists.

Answering this question necessitates, among others, showing the impact of financialization on economic growth and living standards.

5. Financialization's impact on economic growth and standard of living improvement in Poland as an EU country

For countries to achieve economic growth and development, a constant supply of monetary capital into the sphere of production of goods to meet the needs of society is required. This type of investment eliminates "casino capitalism" [21] and requires proper regulations concerning the issuance of money and the functioning of financial markets, because high profits in the financial markets are becoming a high alternative cost for investments in the sphere of material production and investments in knowledge. The creation of quasi-money and the development of "casino capitalism" leads to ignoring the basic law of economics, which is: well-being of society comes from work and the production of goods. Respecting this law implies that the impetus for development should result from innovations in the technological field, and not from preparing financial banking products for the needs of "casino capitalism".

The process of financialization should not be continued because it results in high public debt and budget deficits, high unemployment, highly diverse incomes and increasing poverty. This assertion is based on empirical data from the years of the current financial crisis and years proceeding it (Table 1).

Table 1

Public debt (as a percentage of GDP) in selected EU countries in 2007–2012

Country	2007	2009	2010	2011	2012
The euro area	66.0	78.2	83.9	86.5	87.3
Germany	65.0	73.2	76.5	79.5	81.0
France	63.8	77.6	83.2	86.1	87.1

Table 1 cont.

Country	2007	2009	2010	2011	2012
Greece	95.7	115.1	120.4	120.6	117.7
Italy	103.5	115.8	116.9	116.5	114.6
Spain	36.2	53.2	65.9	71.9	74.3
Portugal	63.6	76.8	70.5	70.0	-
Ireland	25.0	64.0	77.9	82.9	83.9
Belgium	84.2	96.7	100.6	101.4	100.6
Luxembourg	6.7	14.5	18.3	23.9	23.9
Netherlands	45.5	60.9	67.2	69.6	72.5
Austria	59.5	66.5	70.2	72.6	73.8
Finland	35.2	44.0	48.3	52.2	54.4
Slovenia	23.4	35.9	39.6	42.0	42.7
Cyprus	58.3	56.2	45.4	44.2	44.2
Malta	61.9	69.1	68.6	68.0	67.3
Slovakia	29.3	35.7	40.8	42.5	42.2
Poland	48.4	51.5	53.9	59.5	-

Source: [6, p. 72; 7, pp. 555–556, 574; as well as data from EU's stabilization programs]

Data in the table above shows that EU countries, even those considered to be highly advanced (such as Germany, France and Belgium), have a high public debt. In addition, the public debt shows no downward trend. Poland is also one such country. In 2011, the Polish public debt went up to around 900 billion zł. This debt calculated on an accrual basis would represent 220% of GDP [19].

In Poland, the entire transformation period is characterized not only by high public debt but also high budget deficits and high unemployment at well above the EU average. The last budget surplus was recorded in 1989 (in PRL) before the start of the transition, when the issuance of money belonged to the state; the state issued money and banks were state-owned. During the transformation of the Polish economy, a negative trade balance with major foreign trade partners, as a result of the opening of borders to the avalanche of imports to Poland (in the period of the so-called Balcerowicz plan), also made an significant contribution to the formation of a permanent budget deficit. In 1990, the negative trade balance amounted to USD 4793 million USD, and in 2010 it was USD 13119 million. Such a high negative balance of trade can be associated not only with shortages of goods on the Polish market but also no access to credit for Polish companies, a sellout of the best and most modern Polish companies to foreign capital, which led to the liquidation of many of them. This problem was thoroughly shown by W. Kieżun, who gave a list of modern Polish companies which have experienced "hostile takeovers" by foreign capital during the period of rapid privatization and now no longer exist [11, pp. 136–138], and also by J. Tittenbrun in a publication rightly called the four-volume work [22].

Privatization of Polish companies took place without a strategy to ensure long-term economic growth and development of the country. The only criterion was that everything that is state-owned and Polish is bad, whereas under D. Tusk's government the criterion was saving the state budget. Hence, now only 17 of the largest 100 companies in Poland are in fact Polish [11, p. 152]. Despite revenues from privatization, Polish foreign debt has been increasing throughout the transition period (Table 2).

Table 2

Polish foreign debt

Parameter	**2006**	**2007**	**2008**	**2009**	**2010**	**2010 minus 2006**
Total external debt (in million Euro), including:	128 870	159 106	174 265	195 025	236 000	107 130
– public sector debt (%)	40.0	33.8	27.4	31.2	36.2	– 3.8
– banking sector debt (%)	13.8	17.2	24.5	22.0	20.6	6.8
– NGO sector and non-banking sector debt (%)	45.5	45.5	47.0	44.9	40.4	– 5.1
Share of external debt (% GDP)	47.3	51.0	57.8	62.8	53.8	6.5

Source: based on [4; 8]

Furthermore, the entire transition period was characterized by low growth rates (as measured by % increase in GDP), which were negative in 1990 and 1991, in 1992 it was only 2.6% (Table 3). Only in 1995, the growth amounted to 7%. At this rate of growth, one can hardly expect a reduction in unemployment, a policy of sustainable development, the creation of a knowledge-based economy or a significantly reduction in the budget deficit.

Table 3

GDP growth rate, public debt and unemployment rate in Poland in 1990–2011

Year	GDP growth rate [%]	Public debt [billion zł]	Unemployment rate [%]
1990	– 19.1	53.1	6.1
1991	– 7.1	65.8	11.5
1992	2.6	97.9	13.6
1993	3.6	133.9	15.7
1994	5.2	152.2	16.0
1995	7.0	167.2	14.9
1996	6.0	189.0	13.6
1997	6.8	221.6	10.5
1998	4.8	237.4	9.6
1999	4.1	278.2	13.0
2000	4.2	288.3	15.0
2001	1.1	314.6	17.4
2002	1.4	352.6	18.1
2003	3.8	408.6	20.0
2004	5.3	440.5	19.0
2005	3.5	477.0	17.6
2006	5.8	506.2	14.9
2007	6.7	527.4	11.2
2008	3.8	569.9	9.5
2009	1.7	687.6	12.1
2010	3.8	776.8	12.3
2011	4.3	880.7	13.2

Source: [14]

Empirical data shows that unemployment in Poland throughout the period of transition remains at two-digit levels. At the outset of the Balcerowicz plan (in January 1990) the unemployment rate was only 0.3%, and already in December 1990 it was 12.2%. In the next two years, it grew to 16% as a result further bankruptcies of state-owned enterprises and their being subject to "hostile takeovers" [11]. In 2003, the unemployment rate reached 20%. Unemployment levels fell only after the Polish accession to the EU, when a large group of young Poles left to seek work in EU countries. Therefore, the twenty-year transition period in employment and population policies deserves a definite negative assessment.

Table 4

Emigration from Poland in 2004–2009 in thousands of people

Country	2004	2005	2006	2007	2008	2009	2009 minus 2004
Great Britain	150	340	580	990	650	555	405
Germany	385	430	450	490	490	415	30
Ireland	15	76	120	200	180	140	125
Netherlands	15	43	55	98	108	84	69
Italy	59	70	85	87	88	85	26
Spain	26	27	44	80	83	84	58
Total	650	986	1334	1945	1599	1363	713

Source: [2]

Very high unemployment rates and low wages for workers that persist in Poland undoubtedly constitute a major reason for many people moving abroad (Table 4). Furthermore, low wages of workers in Poland compared to other countries are an expression of total departure from the goals of the "Solidarity" movement in PRL to fight for decent wages and human dignity. Table 5 shows a comparison of wages in Poland, selected EU countries and the U.S. in 2010.

Table 5

Average gross hourly wages in selected EU countries, the United States and Poland in 2010 in USD (based on an average annualized rate)

Country	Wages in USD	Country minus Poland	Wages in Poland as a percentage of wages in other countries
Norway	55.03	46.09	16.25
Denmark	53.73	44.79	16.64
Austria	43.17	34.23	20.71
Belgium	42.17	33.23	21.20
Netherlands	38.47	29.53	23.24
Sweden	38.80	29.86	23.04
France	38.80	29.86	23.04
Great Britain	36.55	27.61	24.46
Ireland	35.06	26.66	25.54
Italy	32.10	23.16	27.85

Table 5 cont.

Country	Wages in USD	Country minus Poland	Wages in Poland as a percentage of wages in other countries
Spain	24.55	15.61	36.41
USA	20.56	11.62	43.48
Greece	13.10	7.84	68.24
Portugal	10.29	1.35	86.88
Poland	**8.94**	**0**	**0**

Source: [1]

Empirical data shown in the table above shows that promises of carrying out a market-oriented transformation resulting in Poland's rapid development and a wonderful capitalist future for the society did not come true. The public was deceived by the Solidarity movement and structures of government derived from it, because we are not a country of high economic growth, and besides, it does not translate into an improvement in standard of living of the general population, as shown by employees' wages in Poland compared to other countries and the percentage of population living in relative poverty (Table 6). According to the Central Statistical Office (GUS) relative poverty rate is determined by a minimum (monthly) subsistence on 466 zł for a single-person household and 1257 zł for a four-person farming-based household.

Table 6

Polish people living in relative poverty in years 2000–2010

Year	Percentage of population	Difference (given year – 2000)
2000	17.1	0
2001	17.2	0.1
2002	18.4	1.3
2003	20.4	3.3
2004	20.3	3.2
2005	18.1	1.0
2006	17.7	0.6
2007	17.3	0.2
2008	17.6	0.5
2009	17.3	0.2
2010	17.1	0.0

Source: [3, p. 3]

This data shows that during the last 10 years, the percentage of Poland's population living in relative poverty has not only not decreased but it has in fact increased.

So-called working poor, who receive a minimum wage that is among the lowest in the EU, are also common in Poland. This corresponds to a net income of only 1111 zł per month. Such a low minimum wage does not meet the criterion for fair wages, which the Council of Europe Committee of Experts set at 68% of the average wage in a given country's economy. In Poland, the minimum wage during the entire transformation period did not exceed 40% of the average wage. Such low wages in Poland are justified neither by productivity nor working time [13, pp. 43–52].

A worrying phenomenon in countries with market economies, including Poland, is a steady increase in income disparity. The income gap is already very high, yet it continues to grow not only in the so-called rich countries but also in poor ones, including new EU members such as Poland, which until 1990 was an egalitarian country, with a relatively not wealthy and not diverse society in terms of income and now it stands out in terms of the highest income disparity (with the second highest income disparity in the EU). "Rich Poles match the wealth of financial elites in the West, whereas communities belonging to the middle class or the poor (the unemployed and the so-called working poor and their families) are in a vastly inferior position compared with their counterparts in most countries of the Community" [17, p. 9].

6. Summary

The sources and effects of financialization on economic growth and living standards of the population of Poland, as an EU country, lead to the following general conclusions:

1. A growth model based on money owed and a budget deficit, implemented in countries with market economies, including Poland, is not appropriate, since it does not ensure: sustainable economic growth, implementation of the principles of a knowledge-based economy, elimination of unemployment and poverty, and a steady improvement in the living standards of the general population.
2. Control over issuing currency by private banks is the highest form of monopoly. Only if a state issues and controls money, is it possible to provide a fair basis for the functioning of society.
3. Currently, banks provide a large number of complex financial products (innovations) and they are able to create debt using different tools. This financial money has the same purchasing power as real money.

4. Foreign banks, using financial money, often implicitly, involve themselves in the process of issuing money even in countries where it is issued by the state. They also fund research into the creation of new forms of currency and models of the allegedly high rates of return on investments in financial markets. In this way, they have control over inflation and deflation, and thus over financial and economic crises.
5. Countries' financial security should be an area of strict control and supervision by their governments. Economies should focus on the production of material wealth by fair work that is remunerated based on the effects of work that is done.
6. National governments and politicians who create laws in parliaments should find the strength to oppose the aims of international bankers to control issuance of money on a global scale.
7. If societies of the world are not to become the slaves of world bankers and the global financial elite, it is necessary to take effective action leading to solutions that eliminate sources of financialization. Scientists as well should learn to undertake accurate research of the objective functions of management processes and the role of money in these processes, rather than assert, the same way as the world's financiers and the Bilderberg Club, that since globalization progresses, its effect should be one world currency and a global institution having the right to issue it (among others, the Nobel laureate in economics R. A. Mundell believes a single world currency should be introduced [15]).
8. In researching the role of money in the economy, one should not forget that power over government is achieved by controlling the money supply. The future will show whether countries of the world will be able to free themselves from the power of bankers, or if it will remain as Rothschild stated: without a doubt, politics and finance have always walked arm in arm [10, p. 74].

References

[1] Bureau of Labor Statistics, USA, 2011.
[2] Central Statistical Office (GUS), *Statistical Yearbooks* for the Years 2007–2010, GUS, Warsaw.
[3] Central Statistical Office (GUS), *Poverty in Poland in 2010*, GUS, Warsaw 2011.
[4] Central Statistical Office (GUS), www.stat.gov.pl (30/05/2012).
[5] Dembinski P. H., *Finance Following a Heart Attack*, EMKA, Warsaw 2011.
[6] European Central Bank (ECB), *Annual Report 2009*, ECB, Frankfurt 2010.
[7] European Central Bank (ECB), *Monthly Bulletin – May 2010*, ECB, Frankfurt 2010.

[8] Eurostat, www.eurostat.eu (7/30/2011).
[9] Hongbing S., *Currency Wars*, Wektory, Wrocław 2010.
[10] Hongbing S., *Currency Wars 2*, Wektory, Wrocław 2011.
[11] Kieżun W., *Pathology of the Transformation*, Poltext, Warsaw 2012.
[12] Kowalik T., *Systemic Sources of this global crisis*, "Master of Business Administration", No. 5 (97) September – October 2009.
[13] Księżyk M., *Labor costs in Poland Relative to EU Countries*, "Managerial Economics" 2008 No. 4, pp. 43–52.
[14] Ministry of Finance, debt clock.
[15] Mundell R. A., *Let's Create a Single World Currency* (interview), "Polityka" March 21, 2009, No. 12 (2697).
[16] Otte M., *When the Crisis Comes*, Studio EMKA, Warsaw 2009.
[17] Polak E., *Globalization and Socio-economic Diversity*, Difin, Warsaw 2009.
[18] Skalniak F., *Basic Problems of the Structure and Operation of Bank Credit in the PRL* (habilitation), WSE, Kraków 1975.
[19] Sobieski Institute, *Report of the Sobieski Institute*, IS Nr.11.
[20] Stiglitz J.E., *Freefall*, PTE, Warsaw 2010.
[21] Strange S., *Casino Capitalism*, London 1986.
[22] Tittenbrun J., *From the Rain into the Gutter. Meanders of Polish Privatization*, Vol. 1–4, Poznań 2007.
[23] *United States Constitution*, USA.
[24] Walt T., *Strong Mugs*, "Polityka" No. 46 (2833), 8–15.11.2011.

AGH Managerial Economics
2012, nr 12, s. 25–40
doi: 10.7494/manage/2012.12.25

Joanna Duda*

Role and Importance of Technological Credits in Financing of Innovative Investments by Small and Medium-sized Enterprises in Poland and Lesser Poland

1. Introduction

Contemporary economy is based on innovation as it is reflected in various fields of operation of small and medium-sized enterprises, particularly as they constitute the core of not only Polish but also the European economy.

The concept of innovation in the economy was introduced by J. Schumpeter. The concept in his approach is very broad and includes all changes of a technical and organizational nature that may take place in business units. Innovation was also defined by P. Drucker. In his opinion, innovations permeate all areas of business. These may include product changes, changes in marketing, in organization and management methods [1].

Similarly, a broad approach of innovation was provided in the Oslo Manual. It is a document issued by the Organisation for Economic Co-operation and Development (OECD), which contains a discussion on the methods of collecting and interpreting innovation indicators. According to the Oslo Manual an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.

As the EU market expands, increasing attention is paid to innovation, thus to competitiveness of small and medium-sized enterprises (SMEs). Polish SMEs have faced problems obtaining third-party capital to finance their innovative activities that require high capital expenditure since the very beginning of the economic

* AGH University of Science and Technology, Faculty of Management

transformation in Poland. As a result, few businesses invest in new technologies, innovative products, marketing or organisational solutions. Entrepreneurs cite the following main reasons for scant investments: difficulties obtaining external capital and insufficient demand for innovative products in the Polish market. In effect, as globalisation has proceeded, entrepreneurs began to fear for their competitive status in the market. They became afraid they would be pushed out of the market by EU enterprises with stronger capital, better management and enhanced innovativeness. Due to such capital barriers that restrict more innovative investments by small and medium-sized enterprises in Poland, this paper attempts an assessment of the role of technological credit in financing of investments by SMEs in Poland and Lesser Poland. Besides the available literature, empirical results generated by research into a group of Polish SMEs by the Polish Confederation of Private Employers 'Lewiatan', the Polish Agency for Enterprise Development (PARP), the Department of Market Forecasting and Analyses with the Economy Ministry, as well as the author's own research into SMEs in Lesser Poland.

2. Financing of innovative activities by Polish SMEs in 1999–2011

23% of entrepreneurs surveyed by the Department of Market Forecasting and Analyses with the Economy Ministry stated that they engaged in innovative activities in the first half of 2011. Its report implies medium-sized enterprises run by university graduates tend to pursue such activities more often (Table 1).

Table 1

Percentage of small and medium-sized enterprises introducing innovations in 2011, broken down by company size

Enterprise size	Percentage of enterprises that introduced innovations
Micro	20
Small	28
Medium	43

Source: the author's own compilation based on: [9]

In 2003–2008, investment spending of the enterprises under analysis climbed steadily. In 2003, entrepreneurs invested PLN 37 bln while in 2008 it was PLN 71 bln. Investment expenditure dropped by more than PLN 2 bln in the following year (2009), possibly a symptom of a partial block on investment activities due to the 2008 crisis. The results are presented in Table 2.

Table 2

Capital expenditures of the Polish SME sector in total PLN bn in 2003–2009

Years	Capital expenditures in PLN bn
2003	37.0
2004	45.0
2005	44.2
2006	55.1
2007	68.9
2008	71.3
2009	69.1

Source: [6]

When investment spending as dependent on company size is analysed, one can note that most investment operations (more than 20%) were initiated by medium-sized enterprises, followed by micro businesses (15%) and small enterprises (Table 3).

Table 3

The structure of investment in the SME sector in 2009

Enterprise size	Investment in% of SMEs
Medium	21.4%
Small	11.4%
Micro	15.2%

Source: [6, 8]

CEBOS research for 'Lewiatan' indicates that medium-sized enterprises decided to invest more than small and micro enterprises in 2010. Where small and medium-sized enterprises make new investment decisions, they normally desire to boost their manufacturing capacity (23.5%). It was much rarer for an entrepreneur to invest into research and development (10.4%) or purchase of new technologies (11.7%).

In the years 2010 and 2011 almost 70% of micro firms performed investment activities, as well as over 80% of small and 90% medium-sized companies. In the analysed period entrepreneurs predicted to maintain investments in the stable level or a slight decrease in them. The results are presented in Table 4.

Table 4

Investments that increase production capacity in the Polish SMEs in 2010–2011

The level of investment	Percentage of enterprises					
	Micro		Small		Medium	
	2010	2011	2010	2011	2010	2011
Investing enterprises, total	69.4	69.9	82.5	83.9	90.2	91.0
Increase	20.4	18.0	32.7	23.7	43.5	35.4
Unchanged	42.2	48.0	42.3	55.9	44.1	51.4
Decrease	6.9	3.9	7.9	4.3	2.6	4.2
Not applicable	30.6	30.1	17.5	16.1	9.8	9.0

Source: the author's own compilation based on: [5, 6]

Regardless of whether entrepreneurs actually pursue investments or not, most of them (63%) consider investments important and useful to building of a company's competitive status (Table 5).

Table 5

Entrepreneurs' opinion about the usefulness of business innovation activities in increasing the competitive position of enterprises

The usefulness of innovation activities	Percentage of SMEs
Yes	63.5
No	15.5
Hard to say	21.0

Source: [6]

Tendency towards innovation is loosely dependent on the size of a business. Innovation is seen as important by more than 62% of micro entrepreneurs, 73% small and approx. 75% medium-sized enterprises [6].

The figures in Table 5 demonstrate entrepreneurs are aware of the need to invest into innovation but the limited access to external sources of financing is a barrier to investment operations.

In 1999–2011, own retained profits and capital contributed by owners are the principal sources of financing for SME investments. Bank crediting is the next source. More entrepreneurs took advantage of the latter source in 1999–2000 yet, in time, criteria for awarding credits were becoming increasingly stringent, mostly due to substantial rates of lost credit and the huge number of businesses active for less than a year. Entrepreneurs have been losing interest in leasing as well. The structure of investment financing by the Polish SME sector in 1999–2011 is shown in Table 6.

Table 6

Financing sources of the Polish SME sector in the years 1999–2011

Specification	The percentage of companies [in%]								
	2000	2004	2005	2006	2007	2008	2009	2010	2011
Shareholders' equity including retained earnings	76	86	69.1	73.1	72.6	74.1	64.8	64	65
Bank loan	38	14.2	16.6	12.7	17.4	12.8	17.7	10	12
Leasing	24	12.6	10.5	9.0	6.9	-	8.3	8	11
EU Funds	0	3.6	1.4	1.9	1.9	6.5	7.3	-	2
other	0	0	2.4	3.3	1.2	2.9	1.9	-	-

Source: the author's own compilation based on: [3, 6, 9]

The figures in Table 6 imply that sources of financing for SME investments did not change during the eleven years. It can only be observed that fewer entrepreneurs take advantage of bank credits or leasing.

A mere 6% of the companies that took bank credits in 2011 used investment credits; most obtained current account or working capital credits (Table 7).

Table 7

The share of enterprises using various forms of bank loans in 2011

Type of loan	The percentage enterprises that use bank loans			
	Micro	Small	Medium	Total
Overdraft	17	33	39	29.6
Working capital loan	6	16	17	13
Investment loan	3	13	20	12
Another type of loan	2	2	2	2

Source: the author's own compilation based on: [9]

Every second business credit applicant was awarded of the credit they had requested. A majority of successful applications (as many as 78%) were submitted by medium-sized enterprises, followed by small (62%) and micro businesses (35%) (Table 8).

Table 8

Assessment of conditions for obtaining bank loans and cooperation with banks on business development opportunities in the opinion of entrepreneurs in 2011

Assessment of conditions for obtaining bank loans and cooperation with banks	The percentage of enterprises	
	Conditions for obtaining bank loans	Cooperation with banks
Impediment	24.1	26.2
No effect	27.4	37.1
Facilitation	26.8	25.6
Not applicable	20.5	10.7
Hard to say	1.8	0.4

Source: [6]

Merely 27% of businesses took advantage of bank credit in 2011. Research published by 'Lewiatan' confirms the regularity that the larger an enterprise, the easier access to bank crediting it enjoys. Only 24% of micro entrepreneurs and more than 60% of medium-sized enterprises employed bank credits. The results are illustrated in Table 9.

Table 9

The percentage of SME entrepreneurs using / not using bank loans

Enterprise size	The percentage of SME entrepreneurs using / not using bank loans	
	Yes	No
Total SME	27.1	72.9
Medium	62.2	37.8
Small	43.5	56.5
Micro	24.3	75.7

Source: [6]

3. Technological credit as a specialist source of financing innovation in the Polish SME sector

The foregoing section of this paper has shown that Polish SMEs implement relatively few innovative investments, chiefly due to the limited access to external sources of financing, including investment bank crediting. Technological credit, available as part of the Innovative Economy Operational Programme, Action 4.3. with a budget of € 336 149 568, may be of assistance to solving this problem.

The credit is issued by Bank Gospodarstwa Krajowego pursuant to the Act on certain forms of support for innovative activities dated 29 July 2005 and is earmarked to finance technological investments, which the Act defines as:

- purchase of new technology, its implementation and the resultant manufacture of new or modernised products or provision of new or modernised services,
- implementation of an own new technology and the resultant manufacture of new or modernised products or provision of new or modernised services,
- intangible technological know-how, in particular, results of research and development which enables us to manufacture new or improved products or services and which has not been used worldwide for longer than 5 years [10].

The Act implies that credit financing may cover their own or third-party solutions characterised by high novelty value and below 5 years of global application.

SME entrepreneurs are clearly beneficiaries of such funds as the technological credit cannot finance:

- large investments with spending in excess of the Polish zloty equivalent of € 50m,
- investments in iron and steel metallurgy, synthetic fibres, coal mining and fisheries,
- investments related to the manufacture, processing and launching of products specified in Appendix 1 to the Treaty establishing the European Community (i.e. products of animal and plant origin including meat, fish, dairy, fruit, vegetables, fats, sugar, alcohol, tobacco, flax, hemp, etc.).

Credit may be provided for up to 72 months, though a 12-month grace in its repayment is possible. The amount of technological credit cannot exceed € 2MM.

Technological credit is essentially a form of investment credit provided at arm's length conditions, which means that enterprises must demonstrate their financial liquidity and provide credit collateral. The rate of interest may not be greater than the average rate on the remaining investment credits awarded by the lending bank.

Its terms, especially commissions and fees, cannot be worse that those the bank offers in connection with other investment credits [10]. It differs from a traditional investment credit, however, in the so-called technological premium, that is, redemption of its part. A maximum premium may reach PLN 4 MM. In most Polish regions, it amounts to 70% for micro and small businesses and 60% for medium-sized enterprises. In the case of 'richer' regions, e.g. Mazovian, the limits are reduced to: 50% for micro and small businesses and 40% for medium-sized enterprises.

In practice, a part of this redemption is repaid with public resources. Until November 2010, this redemption had been conditional on the borrower spending technological investments on:

– purchase of new or second-hand fixed assets at arm's length conditions,
– extension or modernisation of the existing fixed assets,
– preliminary work, studies, expert opinions, concepts, engineering designs,
– purchase of intangible assets: patents, licences, unpatented technical, technological or management organisation know-how [11].

To prevent credit cancellations to entrepreneurs who have failed to make appropriate use of the funding, levels of the technological premium are dependent on sales volumes of goods and services generated by the implementation of such innovations. Thus, benefits could only be derived from the technological credit if a project was started and began to generate revenue. This requirement proves a substantial barrier to entrepreneurs, however, who claimed to be discouraged from using this source.

176 applications for financing had been submitted to BGK until 15 February 2010. The value of technological premiums requested reached approx. 287.5 million PLN 56 projects were approved and technological premiums of 98.6 million PLN were formally promised. 44 financing agreements were signed at a sum of 80.9 million PLN. A total of more than 1.200 million PLN remained to be consumed as part of action 4.3 Technological credit PO IG as of 15 February 2010, which the Ministry believed to be proof of poor utilisation of the resources.

Entrepreneurs cited the following issues as some other of the greatest drawbacks of technological credit:

– the support is calculated according to only that eligible expenditure which will be financed with a technological credit, not to the overall eligible expenditure (which applies to other EU-funded SME instruments);
– an implemented new technology must materialise as industrial property rights or research and development services. The patenting process is time-

consuming and a new technology often loses its novelty value after its completion;
– an entrepreneur could request premium payment only after a specific sales level of goods or services produced by means of the new technology has been reached, not promptly at the end of a technological investment.

These opinions encouraged the Council of Ministers to amend the Act on 23 November 2010. Key changes allowed for support of unpatented know-how. As a result, an entrepreneur will find it far easier to comply with the formal requirements of an implemented technology and the ratio of approved applications should rise dramatically (44% had been accepted by 2010 while legislators estimate it should grow to 75% after the amendment). A variation to the method of computing the technological premium – not only on the basis of spending financed with technological credits but also of the entire eligible expenditure – is another major shift. Intensity of the support and average values of technological premium payments should climb as a result. The same concern is addressed by yet another change – cost of land purchase (to a maximum of 10%), construction of buildings and structures, and costs of consulting services will be treated as part of the eligible expenditure. Consequently, the support can now be earmarked for projects where new technologies must be incorporated in new facilities. Investment processes can be commenced earlier as technological investments can now begin after a financing application is filed with BGK, not after a promissory note is executed, which was the case before. A Premium can also be paid promptly after the correct completion of a technological investment without the need to document sales of goods and services produced by means of new technologies.

Numbers of applications rocketed after the amendment of 23 November 2010. The technological credit budget for the years 2007– 2013 is € 336.1m, with PLN 278.2m distributed in June 2011. In 2011 alone, BGK received 146 applications for a total sum of PLN 420.7MM, with 103 applications approved for funding of nearly PLN 186MM (a mere 13.8% of planned allocation). Agreements were concluded with 74 beneficiaries (that is, by nearly 100% more than before the amendment of 2010) providing for PLN 131.6MM (9.75%) and PLN 14.3MM (merely 1.06% of the anticipated allocation) remitted to bank accounts of the beneficiaries.

Technological credits can finance investment undertakings pursued by enterprises in a variety of sectors and for diverse purposes, which is demonstrated by the examples in Table 10. It is difficult to determine which business types or sectors were most eager to take advantage of technological crediting as similar numbers of applications were presented by the individual sectors. No economic sector prevails over others and objects vary widely – from construction to IT and telecommunications, and food industry [12].

Table 10

Examples of projects where investments have been funded with technological crediting

Name of company	Aim of project	Amount of financing
Poland Solution Center, Lodz branch of Transition Technologies S.A. of Warsaw, supplier of IT solutions to energy and gas markets	ITIL Link – improvement of service and IT process management services using ITIL v3 standard.	PLN 105 K
Poland Solution Center Lodz branch of Transition Technologies S.A. of Warsaw, supplier of IT solutions to energy and gas markets	Implementation of an immunological industrial process optimiser SILO II	PLN 166.4 K
MGGP Aero, provider of air surveying services	Air Teledetection Platform, an appropriately converted plane including sensors. An air laser scanner (LiDAR), or a high--efficiency ranger that emits pulses and accurately measures land, was purchased, among other items	PLN 1.8 m
Ekotech Sp. z o.o.	Purchase and start-up of a mobile installation producing mineral hydraulic binders based on energy sector waste	PLN 594 K
Przedsiębiorstwo Wielobranżowe Marek Mackiewicz	Implementation of a processing innovation in manufacture of industrial concrete	PLN 2462 K
Internet Media Services SA	Implementation of a state-of-the--art Videomarketing System Digital Signage Premium in leading shopping arcades	PLN 1379 K

Source: the author's own compilation based on figures published at [12]

It can be said, therefore, that the 2010 amendment to the 2005 Act on certain forms of support for innovative activities made the credit a more accessible source of financing for innovative activities in the Polish SME sector. It is a unique combination of a standard investment credit (from commercial banks) and EU subsidies of up to PLN 4MM (as a technological premium), thus can facilitate innovation financing in the Polish SMEs.

4. Financing for innovative activities of Lesser Poland microbusinesses in 2009–2011

The preceding sections of this paper have demonstrated that Polish SMEs have limited access to external sources of financing. This part of the article will present the author's own research among Lesser Poland entrepreneurs who applied for EU funding as part of action 6.2. 'Become a Lesser Poland entrepreneur' in 2009–2010 when Poland joined the EU and funding applications became possible.*

Among Lesser Poland microbusinesses, like all Polish SMEs, retained profit and owners' capital were the principal sources of financing both in 2009 and 2010. Additionally, 6% of the respondents obtained venture capital in 2009, which was not the case in 2010 (Table 11)

Table 11

Financing sources of investments in Lesser Poland micro enterprises in 2009–2010

Financing sources	The percentage of micro enterprises using equity [%]	
	2009	2010
Profit	52	71
Owner's capital	42	75
Venture capital	6	0
Loan	32	14
Leasing	29	14
Factoring	0	0
Franchising	0	0
EU Funds	84	96
Surety	3	0
Loan funds	3	0
Business incubator	3	0
other	0	0

Source: [3]

* The sample is further described in [2]

The figures in Table 11 show that entrepreneurs took advantage not only of their own capital but also of EU resources, though it is due to the unique nature of this particular population. Few of them received bank credits, like all Polish SMEs not covered in the EU project. Scarce entrepreneurs received credit guarantees from credit guarantee funds or used the assistance of business incubators in both 2009 and 2010. Only three sources of third-party investment financing were utilised: bank credits, leasing, and EU resources.

Considerably (18 percentage points) fewer companies employed bank credits, 15 percentage points fewer funded their investments with leasing in 2010 as compared to 2009. None took advantage of venture capital, credit guarantee funds funding or aid of business incubators.

Due to the problems of obtaining bank credits, some entrepreneurs financed their planned investments with private bank crediting which was then allocated to investments. The research results are illustrated in Table 12.

Table 12

The percentage of entrepreneurs making investments from bank loans to individuals in 2009–2010

The use of bank loans to individuals	The percentage of enterprises using loans to individuals in	
	2009	2010
Use	6	4
Do not use	69	86
Intention to use	25	11

Source: Duda J. [4]

Table 12 figures indicate 2% fewer companies used this form of crediting and 14% fewer declared their intention to obtain such funding in 2010.

In January 2012, the author began a new survey research project concerning sources of financing for innovative activities of Lesser Poland enterprises. The target group comprised of 65 enterprises. Results of a pilot study into 15 Lesser Poland SMEs will be discussed in the following sections, though. The research population is so limited because the work is in progress and the presentation of partial results is not intended to lead to conclusions regarding the entire population but only to indicate new trends apparent in 2011.

Like in the case of the entire Polish small and medium-sized enterprise sector and the Lesser Poland microbusiness population analysed before, most of these enterprises financed investments with their own capitals, including retained profits. The research results are presented in Table 13.

Table 13

Financing sources of investment in Lesser Poland SMEs in 2011

Financing sources	The percentage of micro enterprises using equity [%]
Owner's capital	53
Retained earnings	73
Venture capital	0
Loan	33
Leasing	20
Factoring	0
Franchising	0
EU Funds	33
Surety	0
Loan funds	0
Business incubator	0
other	0

Source: the author's own compilation

Table 13 demonstrates that own capital, namely, retained profits and owners' capital surcharges, remain the chief source of funding in 2011 (73%). (Above 50%) more entrepreneurs used bank credits (33%) to fund their investments than the entire Polish SME sector. The same can be observed about leasing, employed by 20% of the Lesser Poland respondents, compared to 11% of all Polish SMEs in the same year. EU funds accounted for a significant share (33%) of financing for investment activities.

Those entrepreneurs facing difficulties when trying to obtain bank credits for their investments have borrowed arranged for bank credits (13%), with 27% declaring this intention in future. A majority (60%) do not plan to resort to this form of investment financing, however (Fig. 1).

It appears that both groups of Lesser Poland enterprises faced difficulties obtaining bank credits and, consequently, some entrepreneurs have taken advantage of private bank crediting for investment purposes, or intend to do so.

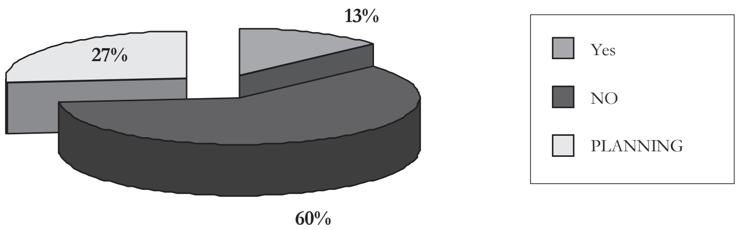


Figure 1. The percentage of SMEs in Lesser Poland using loans to individuals in 2012 to finance their investment activities.

Source: the author's own compilation.

The foregoing analysis also suggests that both Polish and Lesser Poland enterprises encounter problems when seeking external capital, including bank credits, therefore can resort to financing innovative activities by means of the technological credit described above.

5. Conclusion

Investing in innovative solutions is a challenge to all enterprises, in particular the SME sector, especially as it exhibits enhanced risk and financing requirements.

Results of the research discussed in this paper demonstrate that the Polish SMEs have for years faced difficulties obtaining third-party capital to finance their investment activities. Own capital, most frequently retained profits, have constituted the principal source of financing for eleven years now. The figures published by the Department of Market Forecasting and Analyses with the Economy Ministry indicate that 23% of the SMEs surveyed declared they engaged in innovative activities in 2011. Research clearly implies that the smaller an enterprise, the less willing it is to innovate. Nonetheless, investment expenditure gradually increased in 2003–2010 (Table 2). The limited extent of innovative investment projects is not a result of low entrepreneur awareness, as more than 63% consider such activities important and useful to enterprise development and building of its competitive position in the market (Table 5).

Entrepreneurs cited low demand for investments in the Polish market as the main reason for the absence of investment in innovations, chiefly because the purchasing decisions of customers in Poland are driven by prices, which does not encourage the launching of expensive innovative products. Barriers to access to funding are another difficulty. This is confirmed by research conducted by both 'Lewiatan' and PARP for the entire population of Polish SMEs and the author's own research in Lesser Poland.

Survey results presented in Table 6 show Polish SMEs employed only three sources of financing in the period from 1999 to 2011: own capitals, bank credits, and leasing. The share of businesses resorting to bank credit fell markedly in the period under analysis. In 2011, as many as 72% of Polish SMEs did not take advantage of bank credits (Table 9) since most bank require three years of crediting history and high collateral. To limit their risk, banks normally issue current account and working credits (Table 7), which prevents entrepreneurs from pursuing long-term investments. Lesser Poland's SMEs operate in similar circumstances. They also drew funding for their investments from three sources, namely: own capitals, bank credits, and leasing. Due to the unique nature of this population, most businesses obtained financing from EU funds. An analysis of the results indicates that, compared to the entire SME sector, more Lesser Poland entrepreneurs received bank credits though some used private bank crediting for investment purposes as they found it difficult to obtain long-term investment credits. It is for that reason that technological credit – combining the characteristics of a bank credit and EU funding as the technological premium can reach 60–70% of an investment's value – may prove of assistance to financing of innovative investments. Until 2010, entrepreneurs had complained against barriers to access to this source because, for instance, payment of a technological premium, that is, redemption of a part of the credit, could be requested only after an appropriate sales volume had been attained, new technologies had to be constituted as industrial property rights or research and development services, and support was computed on the basis of eligible costs. The Act on certain forms of support for innovative activities was amended on 23 November 2010 to abolish the barriers described above and make the credit a more enticing source of financing for innovative investments. This is proven by a dramatic rise in the share of approved applications for technological credits in 2011.

References

[1] Drucker P.F., *On the Profession of Management*, Harvard Business Scholl Press, Boston, 1998.

[2] Duda J., *Decyzje inwestycyjne przedsiębiorstw polskich z sektora MSP*, in: Prace Naukowe Uniwersytetu Ekonomicznego, Wydawnictwo Uniwersytetu Ekonomicznego, Wrocław, 2009.

[3] Duda J., *Strategie finansowania działalności inwestycyjnej polskich MSP na rynku Unii Europejskiej*, w: *Strategie i determinanty wzrostu wartości*

przedsiębiorstwa, Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 685, Finanse, Rynki Finansowe, Ubezpieczenia nr 46, Szczecin 2011.

[4] Duda J., *Wpływ globalizacji na działalność finansową i inwestycyjną polskich MSP*, w: *Zarządzanie finansami. Współczesne wyzwania teorii i praktyki*, Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 640, Finanse, Rynki Finansowe, Ubezpieczenia nr 38, Szczecin 2011, s. 231–242.

[5] Europejski Program Modernizacji Polskich Firm, *MSP pod lupą raport*, PARP, Warszawa, 2011.

[6] *Monitoring kondycji sektora MSP*, PKPP Lewiatan, Warszawa 2004, 2005, 2006, 2007, 2009, 2010, 2011, 2012.

[7] Pietras P., Głodek P., *Finansowanie przedsięwzięć innowacyjnych w MSP*, PARP, Warszawa, 2011.

[8] Pietras P., Głodek P., *Finansowanie komercjalizacji technologii i przedsięwzięć innowacyjnych opartych na wiedzy*, PARP, Warszawa 2011.

[9] *Trendy rozwojowe sektora MSP w ocenie przedsiębiorców w pierwszej połowie 2011 roku*, MG DPiA, nr 2/2012, Warszawa 2011.

[10] *Ustawa o wspieraniu niektórych form działalności inwestycyjnej* [Dz.U. Nr 179, poz 1484, art. 3.1].

[11] Witryna internetowa: www.bgk.com.pl.

[12] Witryna internetowa: www.pi.gov.pl.

AGH Managerial Economics
2012, nr 12, s. 41–60
doi: 10.7494/manage/2012.12.41

Henryk Gurgul*, Milena Suliga*, Tomasz Wójtowicz*

Responses of the Warsaw Stock Exchange to the U.S. Macroeconomic Data Announcements

1. Introduction

Many empirical contributions reflect a significant stock price and volume reaction to different public and firm specific announcements which are called events. These announcements may contain information with respect to just decided or planned new activities of a company. These activities may be started by a company itself, rival company, other market participants or government. The released important information affecting prices and trading volume may concern the firm itself, the respective sector or the whole economy. Another classification of information refers to historical prices of securities, public information about issuer or confidential company information. Empirical results support the view that individual asset prices and trading volume are influenced by unanticipated events (releases of information). However, some events have a more persistent effect on security prices and trading volume than do others.

The idea that stock markets are sensitive to macroeconomic news is well known in the economic and financial literature. The majority of economists believe that market participants follow government releases of economic data and news in monetary policy and hence macroeconomic news can have a serious impact on the stock exchange. Moreover, although the press suggests that there is a strong link between macroeconomic data announcements and movements in stock prices, there exist few empirical attempts to identify which macroeconomic variables announcements determine asset pricing on the equity market what could reflect that rather common belief.

* AGH University of Science and Technology, Faculty of Management, Department of Application of Mathematics in Economics

One of the first papers concerning the relationship between macroeconomic indicators and stock prices was an article by Chen et al. [7] who investigated e.g. the influence of expected and unexpected inflation or industrial production on stock prices. Since then a variety of macroeconomic variables have been studied. However, the literature concerning the impact of macroeconomic announcements is rather limited and in some cases empirical results are ambiguous.

The importance of the American economy suggests that investors in their forecasts and expectations should take into account U.S. macroeconomic indicators, thus the U.S. announcement released should play an important role in determining stock prices. In our study we examine the impact of announcements on inflation, industrial production and unemployment on most liquid stock listed on the SE. In order to examine the strength, direction and duration of the impact of these announcements releases we use the event study approach.

The information content of different announcements has been a topic of scientific discussion and public debate since Miller and Modigliani [34, 35]. Event studies became a key empirical tool in studies devoted to these issues. There is widely accepted fact that event studies have been introduced to capital market research in papers by Ball and Brown [2] and Fama *et al.* [17]. Despite many modifications in the event study methodology over the years, the main elements of a typical event study refer to these early papers. However, the mentioned papers were not the first event studies. According to MacKinlay [28] the earliest event study is that by Dolley [14]. He examined stock price reaction to stock splits. In the following years some other authors (like Myers and Bakay [37], Barker [3, 4, 5], Ashley [1]) published their event study contributions. In spite of these facts modern event study literature refers to Ball and Brown and Fama-Fisher-Jensen-Roll contributions because of two reasons. In these papers for the first time the market model by Sharpe [42] was applied and both papers used data from the newly established Center for Research in Security Prices (CRSP) at the University of Chicago. This data source became the standard in capital markets research. Moreover, by the end of the 1960s economists have got access to computer systems equipped with advanced statistical software. The examples of event study contributions concerned mainly with methodological issues are those by Corrado [10] and Corrado and Zivney [12].

The common interpretation of event study results in the literature is that the ability of announcements to move stock prices and change trading volume can serve as evidence of their significant information content. From a theoretical point of view, it is however often no obvious *a priori* whether or not an announcement can change stock prices or trading volume and if yes in which direction it influences these stock characteristics.

Up to now numerous event study contributions have been published in major economic journals. According to Kothari and Warner [24] five major finance journals have published over the period 1974–2000 more than 560 articles containing event study results. The last number is clearly conservative since it does not include event study contributions in accounting journals and other finance journals, especially outside of the U.S. The most important and recent reviews of event study papers include contributions by MacKinlay [28], McWilliams and Siegel [33], McWilliams and McWilliams [32], Lamdin [25], Serra [41], Cichello and Lamdin [8], Johnston [23] and Corrado [11].

The structure of this paper is as follows: section 2 presents the overview of literature concerning event study and impact of macroeconomic announcements on security prices. Section 3 presents conjectures and their scientific justification. Section 4 presents the data, whereas empirical results and the discussion of them is presented in section 5. The last section concludes the paper.

2. Literature review

The role of information is one of the main topics in modern economic literature concerning financial markets. The contributors try to evaluate the impact of different kinds of information on the value of companies acting on the stock exchange. The released information about macroeconomic variables may affect security returns as well as trading volume. Market participants observe releases of macroeconomic data and analyst often suggest a strong link between macroeconomic data announcements and changes in stock prices. Following [31] researchers take into account the state of the economy when estimating the effect of macroeconomic announcements on stock returns. The macroeconomic variables used in most of the contributions are the Consumer Price Index (CPI), Index of Industrial Production *(IIP)* and the Unemployment Rate (UR).

Chen et al. [7] stress that modern financial theory has concentrated on systematic effects as the likely source of investment risk. However, in the event study literature the authors pay attention to the firm specific events but mostly ignore events that are likely to influence all assets, like macroeconomic announcements.

The reason may be that many economists think that financial markets influence the macroeconomics but not vice versa what would mean that opposite relationships exists. On the other hand, in finance it is usually assumed that stock prices adjust to external forces. However, due to [7] all economic variables are endogenous. The only exogenous factors on the world economy are natural forces.

The contributors stress in their paper that stock returns react to systematic economic news and stocks are priced in accordance with the content of these news. Therefore, it seems to be justified identification of macroeconomic variables that influence equity returns. The reason is twofold: first of all one may find hedging opportunities for investors. Second, if market participants (potential investors) are averse to fluctuations in macroeconomic variables, then these variables may be counted to priced factors.

Cutler et al. [13] have proven whether unexpected macroeconomic announcements have explanatory power i.e. whether they can explain a significant part of security price movements. The contributors analyzing relations of stock returns to news about macroeconomic performance, could explain no more than one third of return variance by means of this kind of news. The news announcements effects on returns are mostly identified in the empirical literature. But the impact of the news on the absolute level of securities prices is rather unclear. According to common among economists opinion the fluctuations in asset prices are caused by changes in the fundamental value of companies. The stock prices react to announcements the respect to corporate policy, governmental regulatory policy, and macroeconomic conditions affecting fundamentals. It means that the same information can cause different results according to the economic situation of the country. The strength and direction of the impact of economic announcements on the market depends on the state of the economy.

One of the most important macroeconomic variables is the inflation rate. The relation between inflation and stock returns is reflected in numerous hypotheses concerning the effects of unanticipated inflation on stock returns. The economists observed that the relationship between unexpected inflation and stock returns confirms the conjecture that in unexpected inflation is incorporated new information about future levels of expected rate of inflation. This effect is found e.g. by Fama and Schwert [18]. Schwert [40] tried to find evidence on the interdependence between the daily returns of the Standard and Poor's composite portfolio around the CPI announcement. He found that the stock market reacts to unexpected inflation in the event window i.e. primarily on the day of the CPI announcements, but this reaction is rather weak. According to Li and Hu [26] announcements about the inflation rate could also affect the financial market not only by means of inflationary expectations. They argued that unanticipated high inflation may be a reason for the expectation of a more restrictive monetary policy. This kind of policy can lead to the reduction of cash flows and lower stock prices. In addition, a high unexpected inflation rate could force agents to increase their savings. The consequences of such agents' reaction would be higher interest rates and lower stock prices. According to [26] these possible interrelations suggest that the unexpected new information contained in CPI and

PPI announcements are likely to be positively related to interest rates, therefore negatively related to stock prices. A similar point of view based on the “Taylor rule” (interest rates are a linear function of inflation and gross national product) is presented in [9]. Authors justify their conviction that bad news about inflation can be good news for the exchange rate if the central bank follows the mentioned rule. This occurs because the bad news about inflation forces government to start a policy that causes anticipated currency appreciation. This can influence stock price formation. On the other hand, rising inflation forces investors to look for savings and hence to sell bonds, especially long-term with fixed interest rates. It can cause a fall in bond prices and encourage investment in another financial instrument i.e. stocks, that give opportunity for higher profits. Consequently, it could increase stocks prices.

Boyd et al. [6] explained the impact of unemployment news on security prices. Unemployment news joint two types of information relevant for valuing stocks: information about future interest rates and future corporate earnings and dividends. An increase in unemployment typically signals a decline in interest rates. This is good news for stocks. However unemployment causes also decline in future corporate earnings and dividends, which is bad news for investors. The feature of this bundle i.e. the relative importance of the two effects changes over time and is related to the state of the economy. Hence, the unambiguous relationship between unemployment rate and the level of stock prices cannot be simply determined. The link needs to be verified empirically.

It is widely accepted in the literature that industrial production is a proxy for the level of real economic activity. An increase in industrial production reflects economic growth. Fama [15] found that the growth rate of industrial production has a strong contemporaneous link with stock returns. Geske and Roll [20], Fama [16] and Tainer [43] assumed a similar positive relationship taking into account the impact of industrial production on future cash flows. Chen et al. [7] indicated that future growth in industrial production was a significant factor which affected stock returns. They argued that the productive capacity of an economy is determined by the accumulation of real assets. Technical equipment enhances the ability of companies to generate cash flow.

According [31] the endogeneity of macroeconomic policy explains the low explanatory power of economic variables for security returns. However, there have been a growing number of contributions demonstrating a strong influence of macroeconomic variables on stock markets, mostly for industrialized countries (compare, for example, [21], [36], [19], [27], [38]. Contributors have started to turn their attention to examining similar relationships in developing countries, in particular in the rapidly growing economies of Asia (compare [29], [30].

3. Hypotheses

On the basis of the literature we hypothesize some relationships between industrial production, consumer price index and unemployment rate with the security returns of the Warsaw Stock Exchange.

Inflation

The results of studies by Nelson [39] and Jaffe and Mandelker [22], Fama and Schwert [18], Chen et al. [7] are in favor of a negative relationship between inflation and stock prices. We conjecture analogously that an increase in the rate of inflation is likely to imply fiscal tightening policies. This increases the nominal risk-free rate and the discount rate. However, as we pointed out in section 2, it is not clear for us that concern about more restrictive monetary policy leads to lower stock prices. Therefore , we verify it empirically.

Industrial production

The procyclical nature of industrial production and the theoretical reasoning reviewed in the last section imply that a positive relationship between industrial production and stock prices can be expected also for the Polish economy.

Unemployment

Taking into account [6] we assume that on average an announcement of rising unemployment is 'good news' for stocks during economic expansions and 'bad news' during economic contractions. Thus, stock prices usually increase on news of rising unemployment, since the economy is usually in an expansion phase.

4. Data

In this study the impact on stock prices and trading volume of announcements of three U.S. macroeconomic indicators are examined: Consumer Price Index (CPI), Unemployment Rate and Index of Industrial Production (IIP). The announcements of these indicators are released on a monthly basis. Hence, in the whole period under study i.e. between February 2004 and December 2011, there have been 95 releases of each announcement. CPI and IIP are released usually about the 16th of each month whereas the Unemployment Rate is usually announced at the beginning of the month. For each release, the real value of the announced indicator is compared with its consensus forecasts, thus the events are divided into three clusters: 'above consensus', 'below consensus' and 'in line with consensus'. Our analysis will focused mainly on two first clusters because they include unexpected news. The type of an announcement and the number of events in each cluster in the period under study are presented in Table 1.

Table 1

Type of events

	Below consensus	In line with consensus	Above consensus
Consumer Price Index	31	28	36
Index of Industrial Production	47	8	40
Unemployment Rate	39	29	27

The reaction of investors on the WSE to U.S. macroeconomic data announcements is examined on the basis of quotations of the largest companies listed in WIG20 between January 2004 and December 2011. Our sample consists of 45 companies although not all of them have been listed in WIG20 for the whole period. Daily percentage log-returns are computed on the basis of the closing prices. Logarithms of daily trading volume are applied as a measure of investor trading activity.

The importance of macroeconomic announcements is examined by means of event study analysis. For each release, pre-event and event windows are defined. The data in the pre-event window are used to estimate the relevant model, while the fitted data in the event-window are used to test the statistical inference. Announcements are released monthly, thus the distance between two consecutive events is about 20 trading days. It determines the length of the pre-event and event windows. The event window is as short as possible and comprises three days: the announcement day ($t = 0$) plus one day before ($t = -1$) and one day after the event day ($t = +1$). Similarly, to minimize the possibility that the data will be influenced by the previous announcements the pre-event window of length 15 trading days was chosen. For each event the reaction of returns and trading volume of stocks listed at that moment in WIG20 is examined*. On the basis of stock returns in the pre-event window their average is estimated and abnormal returns (*AR*) are defined as the difference between actual return and the average from the pre-event window. The market model which is widely used in the event study analysis is inappropriate in this study because we do not analyze the reaction of single stock but by analysis of individual securities' reaction we examine

* We include in the sample only stocks that have been listed in WIG20 form 20 days before event to 5 days after it.

the reaction of the whole market on the appearing information. On the other hand, no time series model could be properly estimated due to the small number of data in the pre-event window.

5. Empirical results and their analysis

In this section we present the results of our conducted event study analysis. First, the announcements of each macroeconomic indicator will be studied separately. Later, interrelationships between them will be examined.

Unemployment

The results of estimating the reaction of trading volume and stock returns of stocks from WIG20 to Unemployment Rate announcement are presented in Table 2. Average abnormal trading volume ($\overline{AV}$) and average abnormal returns ($\overline{AR}$) in the event window are reported jointly with corresponding *t*-statistics. Because the most meaningful is investor reaction on unexpected news we do not report the results of the analysis when the announced rate of unemployment was in line with previous expectations which all are however not significant.

Table 2

Reaction of trading volume and stock returns to unemployment rate announcement

	Below consensus (39 events)		**Above consensus (27 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.076	0.86	0.039	0.39	0.068	0.73
0	0.004	0.05	0.045	0.45	0.019	0.20
1	–0.095	–1.07	–0.214	–2.17**	–0.114	–1.22
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	0.207	0.79	0.430	1.23	0.182	0.90
0	0.227	0.87	0.115	0.33	0.010	0.05
1	0.416	1.59	0.299	0.85	0.163	0.80

*, **, *** – significant at 1%, 5% and 10% level respectvely

The mean abnormal trading volume in the announcement day is insignificantly different from zero in the whole sample as well as in each cluster. This means that announcements about the unemployment rate in the U.S. do not influence investor trading activity regardless of the meaning of the announcement. However, the day after the announcement a decrease in the trading volume can be observed. This drop is significant when the announced value of the unemployment rate is greater than expected, i.e. when 'bad news' for the U.S. economy is announced.

Announcements of unemployment rate have no significant effect on stock prices. Average abnormal returns, although positive, are insignificantly different from zero on any day in the event window regardless of the information content of the announcements. However, it should be noted that in the case of unemployment rate below consensus, where the average abnormal return is 0.4%, *t*-statistic is close to the critical value for 10% significance level.

The abovementioned results indicate that the U.S. unemployment rate announcements either do not convey any important information to investors on the WSE or their information content is ambiguous and causes divergent interpretations and reactions. The latter interpretation is in line with a theory presented by Boyd et al. [6] that an announcement about rising unemployment contains simultaneously some positive and negative information. The lack of significant reaction in the event day and generally insignificant price and trading volume changes the day after can also suggest uncertainty of investors on the WSE who wait for more information or reaction of investors in the U.S. and Asia.

Industrial Production

Results of analysis of impact of U.S. industrial production level announcements on the WSE are reported in Table 3. U.S. industrial production announcements are accompanied by a significant increase in trading activity on the WSE, especially when production is smaller than market expectations. In this case an increase in trading volume occurs on the announcement day and persists during the next trading day after the announcement. Both average abnormal volumes are significant at the 1% level. The rise in trading activity on the day of the announcement is also visible when the whole sample of 95 events is taken into account. It is mainly due to an increase in volume when production is below consensus (47 of 95 events). In the case of an announcement above forecasts trading volume also increases but not significantly. However, from these results it can be concluded that the information about the level of industrial production in the U.S. is important news for investors on the WSE.

Announcements have significant effects on trading volume especially when actual production is lower than market expectations. The accompanied negative mean abnormal returns in the event window convinces the reader that the announcements are evaluated as bad news by market participants.

All calculated average abnormal returns in the event window are negative and only in a few cases these changes are significant. Significant price declines associated with the announcements of industrial production in the U.S. are independent of changes in investor activity – they appear when change in trading volume is insignificant. In the cluster of announced production below market expectations (47 events) we find a statistically significant average abnormal daily return of about –0.51 % on the day before the announcement. Similar result can be noticed in the sample of all industrial production announcements. This suggests that in the period under study the announcement about the level of industrial production in the U.S. was mainly associated with a negative reaction of investors on the WSE. It is possible that in this case, especially during the financial crisis, news about production in the U.S., regardless of consistency with forecasts, carried information about the slowdown in the U.S. economy. It is worth noting that 49 out of 95 events under study are connected with a drop in production when compared with the previous month, and 41 are associated with increased production.

Table 3

Reaction of trading volume and stock returns to industrial production announcements

	Below consensus (47 events)		**Above consensus (40 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.056	1.13	0.051	0.67	0.031	0.58
0	0.157*	3.18	0.062	0.81	0.103***	1.92
1	0.140*	2.84	0.006	0.08	0.068	1.27
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.509**	–2.09	–0.041	–0.15	–0.305***	–1.69
0	–0.156	–0.64	–0.032	–0.11	–0.207	–1.15
1	–0.175	–0.72	–0.024	–0.09	–0.110	–0.61

*, **, *** – significant at 1%, 5% and 10% level respectively

The significant drop in prices one day before the announcement can be caused by two factors. First, investors update their prior forecasts based on incoming information and opinions. Second, the drop is caused by CPI announcements which are released a few days before or after IP announcements. In order to verify this second hypothesis the entire test is repeated, however, limiting it only to those events which were not preceded by an earlier CPI announcement. There is 43 such events in the period under study (22 below forecasts, 5 in line with forecasts and 16 above forecasts).

When the analysis is reduced to industrial production announcements which are released before the CPI announcements one can observe insignificant changes in trading volume on the event day in the whole sample as well as in the cluster of industrial production below consensus. However, in this cluster, a significant decrease of stock prices the day before the event is still observed. On the other hand, a decline in prices the day before the event reported in table 3 in the sample of all 45 events under study lost its significance but instead the significant average abnormal return in the day $t = 0$ is present*. Results in Table 4 means that industrial production announcements considered separately attract less attention to investors than when they are considered together with CPI announcements. However, significant values of mean abnormal returns indicate a strong influence on stock prices. This analysis also indicates that a significant decline in abnormal returns the day before the announcement below forecast is not caused by earlier news about CPI but results rather from updating investor expectations and forecasts.

Table 4

Reaction of trading volume and stock returns to industrial production announcement (earlier CPI announcements are excluded)

	Below consensus (22 events)		**Above consensus (16 events)**		**The whole sample (45 events)**	
	Trading volume					
	$\overline{AV}$	t-statistic	$\overline{AV}$	t-statistic	$\overline{AV}$	t-statistic
–1	–0.007	–0.08	0.066	0.46	–0.006	–0.07
0	0.095	1.13	–0.041	–0.28	0.005	0.06
1	0.225*	2.67	0.029	0.20	0.116	1.45
	Stock returns					
	$\overline{AR}$ (%)	t-statistic	$\overline{AR}$ (%)	t-statistic	$\overline{AR}$ (%)	t-statistic
–1	–0.480***	–1.65	0.162	0.44	–0.226	–1.16
0	–0.399	–1.38	–0.245	–0.66	–0.420**	–2.15
1	–0.184	–0.63	–0.039	–0.10	–0.114	–0.58

*, **, *** – significant at 1%, 5% and 10% level respectively

* Its significance is mainly due to results (not mentioned) for announcements in line with forecasts when mean abnormal return is equal to –1.065%.

The Consumer Price Index

As it can be seen from table 5, mean abnormal trading volume is significantly greater than zero almost on every day in the event window. It is insignificant only at the day after the announcement above forecasts. A significant increase of investors' activity is observed on the announcement day as well one day before regardless of the correspondence of the announcement with market expectations. Additional tests conducted for event windows comprising five days (two days before and two days after the event) confirm a significant increase in trading volume in days $t = -0$ and $t = 0$ and show that two days before the CPI announcement increase in trading volume is insignificant. These results mean that investors start to react on the CPI announcement one day before the news is released but their reaction is the most intense on the day of the announcement because then the greatest value of abnormal trading volume is observed. Direction of reaction is indicated by movement of returns.

Table 5

Reaction of trading volume and stock returns to Consumer Price Index announcement

	Below consensus (29 events)		**Above consensus (34 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.115^{**}	1.96	0.096^{**}	2.07	0.073^{**}	2.00
0	0.221^{*}	3.77	0.195^{*}	4.22	0.175^{*}	4.76
1	0.186^{*}	3.17	0.037	0.81	0.103^{*}	2.80
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	-0.869^{**}	–2.09	–0.220	–0.15	-0.331^{***}	–1.69
0	–0.453	–0.64	–0.109	–0.11	–0.223	–1.15
1	–0.766	–0.72	0.050	–0.09	–0.222	–0.61

*, **, *** – significant at 1%, 5% and 10% level respectively

From Table 5 it follows that significant change in trading volume is accompanied by decrease in stock returns. This drop is significant only on the day before the announcements below consensus and in the whole sample regardless of the value of the announced CPI. This change in prices is probably caused by updating investor earlier expectations about the value of inflation in the U.S. This updating is made on the basis of other macroeconomic indicators. However, it is impossible to verify if the observed change in prices is due to an earlier industrial production announcement or is caused by other factors because there are only 15 CPI announcements which are not preceded by IP announcements (5 below consensus and 6 above consensus). As we mentioned in section 2, according to Li and Hu (1998) and Clarida and Waldman (2007) information in CPI announcements are likely to be negatively related to stock prices. However we also presented opinion that this relationship could be positive. Insignificant changes in stock prices observed in a majority of cases together with growth of trading volume suggest ambiguous interpretation of announcements and heterogeneous investor reaction to released value of CPI.

This is in agreement with previously mentioned two possible and opposite views.

Industrial Production and CPI announcements

In the whole period from February 2004 to December 2011 there were 35 cases when Industrial Production and CPI were announced the same day. Thus, based on this sample we can analyze the impact of these macroeconomic announcements on each other. To check which indicator conveys more important information to investors we performed two tests. One, when the sample is divided according to the value of industrial production announcements and the second when the same sample is divided according to the value of CPI announcements. Results of both tests are reported in Tables 6 and 7, respectively.

Table 6

Reaction of trading volume and stock returns to Industrial Production announcement when IP and CPI are announced on the same day

	Below consensus (14 events)		**Above consensus (18 events)**		**The whole sample (35 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.064	0.75	0.137	1.55	0.080	1.26
0	0.189**	2.22	0.188**	2.13	0.207*	3.23
1	0.092	1.07	0.049	0.56	0.065	1.01
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.991**	–2.49	–0.228	–0.52	–0.561***	–1.67
0	0.251	0.63	0.296	0.68	0.087	0.26
1	–0.794***	–1.99	0.216	0.50	–0.237	–0.71

*, **, *** – significant at 1%, 5% and 10% level respectively

Table 7

Reaction of trading volume and stock returns to CPI announcement when IP and CPI are announced the same day

	Below consensus (14 events)		**Above consensus (18 events)**		**The whole sample (35 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.143***	1.77	0.095	1.20	0.080	1.26
0	0.293*	3.65	0.286*	3.61	0.207*	3.23
1	0.172**	2.14	0.052	0.66	0.065	1.01
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–1.179***	–1.76	–0.541	–1.50	–0.561***	–1.67
0	–0.275	–0.41	0.346	0.96	0.087	0.26
1	–0.676	–1.01	0.062	0.17	–0.237	–0.71

*, **, *** – significant at 1%, 5% and 10% level respectively

In both cases there is significant growth of investor activity in the event day. Moreover, trading volume increases significantly in the whole event window when CPI is announced below forecasts. From table 6 it follows that when IP and CPI announcements are released together only information that IP is below consensus impacts stock prices. Significant drop in stock prices on the day before the event reported in tables 3 and 4 remains still significant when CPI announcement is released together with information about the Industrial Production. Moreover, in this situation prices decrease about 0.79% even on the day after both announcements. These results indicate that in general the reaction of investors on the WSE to IP announcements does not alter when information about CPI appears earlier. Similarly, when the information content of CPI announcement is taken into account, a comparison of results in tables 5 and 7 indicates that stock prices reaction remain unchanged regardless of information about Industrial Production. CPI announcement mainly negatively affects stock prices with a significant drop the day before CPI announcement below expectations.

Table 8

Reaction of trading volume and stock returns to IIP announcement when IP and CPI are announced the same day but their comparison with forecasts is different

	Below consensus (9 events)		**Above consensus (10 events)**	
	Trading volume			
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.091	1.36	0.200**	2.11
0	0.211*	3.14	0.119	1.25
1	0.060	0.90	–0.029	–0.31
	Stock returns			
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.480	–0.85	–0.136	–0.22
0	0.339	0.60	0.249	0.40
1	–0.359	–0.64	–0.112	–0.18

*, **, *** – significant at 1%, 5% and 10% level respectively

Above results indicate that investor reaction to CPI announcements is not affected by information about IIP and vice versa information about CPI does not influence the reaction to IIP announcements. However, the above tests do not indicate which macroeconomic indicator is more important and which of them has greater impact on stock prices. To determine this the above tests are repeated only for events when accordance of both indices with the expectations was different i.e. for example when CPI was below forecasts and IIP was above or in line with forecasts. In the whole period under study there are 21 such events. In such cases we divide events according to the agreement of CPI announcements with consensus or according to agreement of IIP announcements with consensus. Results of performed test in each cluster are presented in Tables 8 and 9 ,respectively. It shows that when values of macroeconomic indicators are divergent with prior forecasts they do not affect security prices – all average abnormal returns in the event window are insignificant. However, their impact on trading activity remains significant. It also means that CPI and IP announcements are essential for stock prices only when they deviate from consensus in the same direction.

Table 9

Reaction of trading volume and stock returns to CPI announcement when IP and CPI are announced the same day but their comparison with forecasts is different.

	Below consensus (6 events)		Above consensus (7 events)	
	Trading volume			
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.251*	3.27	0.136	1.48
0	0.416*	5.41	0.302*	3.29
1	0.194**	2.52	–0.053	–0.58
	Stock returns			
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.551	–0.86	–0.770	–1.19
0	–0.592	–0.93	0.337	0.52
1	0.097	0.15	–0.575	–0.89

*, **, *** – significant at 1%, 5% and 10% level respectively

6. Conclusions

It is widely accepted that stock prices are sensitive to different external information. Our study of the impact of U.S. macroeconomic variables announcements on WSE securities shows that information about Consumer Price Index and Index of Industrial Production significantly affects investor reaction. In the period under study, i.e. from February 2004 to December 2011 CPI and IIP announcements implied a significant rise in trading volume around the day of announcement. However, their interpretation by investors was divergent, hence stock returns remain insignificantly different from zero on the event day. Prices move significantly mainly the day before the announcement, and this is probably due to updating investor expectations or their uncertainty connected with market reaction on announcements. Performed tests indicate that investor reaction on CPI announcements is mainly unaffected by IIP announcements and vice versa. However, when announced values of these macroeconomic indicators deviate from previous forecasts in different directions their impact diminishes. The conducted analysis indicates also that U.S. Unemployment Rate announcements had no essential impact on the WSE in the period under study what is in line with results in the literature about an unambiguous relationship between unemployment rate and stock prices.

References

[1] Ashley J., *Stock prices and changes in earnings and dividends: some empirical results*, *"Journal of Political Economy"* 1962, vol. 70(1), pp. 82–85.
[2] Ball R., Brown P., *An empirical evaluation of accounting income numbers*, *"Journal of Accounting Research"*, 1968, vol. 6, pp. 159–178.
[3] Barker C.A., *Effective stock splits*, "Harvard Business Review" 1956, vol. 34(1), pp. 101–106.
[4] Barker C.A., *Stock splits in a bull market*, "Harvard Business Review" 1957, vol. 35(3), pp. 72–79.
[5] Barker C.A., *Evaluation of stock dividends*, "Harvard Business Review" 1958, vol. 36(4), pp. 99–114.
[6] Boyd J.H., Hu J., Jagannathan R., *The Stock Market's Reaction to Unemployment News: Why Bad News Is Usually Good for Stocks*, "Journal of Finance", 2005, vol. 60(2), pp 649–672.
[7] Chen N.F., Roll R., Ross S., *Economic forces and the stock market*, "Journal of Business" 1986, vol. 59(3), pp. 83–403.
[8] Cichello M., Lamdin D.J., *Event studies and the analysis of antitrust*, "International Journal of the Economics of Business" 2006, vol. 13(2), pp. 229–245.
[9] Clarida R., Waldman D., *Is bad news about inflation good news for the exchange rate?*, Working Paper, 2007, Columbia University.
[10] Corrado C.J., 1989. *A nonparametric test for abnormal security-price performance in event studies*, "Journal of Financial Economics" 1989, vol. 23, pp. 385–395.
[11] Corrado C.J., *Event studies: A methodology review*, "Accounting and Finance" 2011, vol. 51, pp. 207–234.
[12] Corrado C.J., Zivney T.L. *The specification and power of the sign test in event study hypothesis tests using daily stock returns,* "Journal of Financial and Quantitative Analysis" 1992, vol. 27(3), pp. 465–478.
[13] Cutler D.M., Poterba J.M., Summers L.H., *What Moves Stock Prices?,* "Journal of Portfolio Management" 1989, vol. 15, pp. 4–12.
[14] Dolley J.C., *Characteristics and procedure of common stock split-ups*, "Harvard Business Review" 1933, vol. 11, pp. 316–326.
[15] Fama E.F., *Stock returns, real Activity, inflation and money*, "The American Economic Review" 1981, vol. 71(4), pp. 45–565.
[16] Fama E.F., *Stock returns, expected returns and real activity,* "Journal of Finance" 1990, vol. 45(4), pp. 1089–1108.

[17] Fama E.F., Fisher L., Jensen M.C., Roll R., *The adjustments of stock prices to new information*, "International Economic Review" 1969, vol. 10(1), pp. 1–21.
[18] Fama E.F., Schwert W.G., *Asset returns and inflation*, "Journal of Financial Economics" 1977, vol. 5, pp. 115–146.
[19] Fifield S., Power D., Sinclair C., *A study of whether macroeconomic factors influence emerging market share returns*, "Global Economy Quarterly" 2000, vol. 1(1), pp. 315–335.
[20] Geske R., Roll R., *The fiscal and monetary linkage between stock returns and inflation*, "Journal of Finance" 1983, vol. 38(1), pp. 1–33.
[21] Hondroyiannis G., Papapetrou E., 2001. *Macroeconomic influences on the stock market,* "Journal of Economics and Finance" 2001, vol. 25(1), pp. 33–49.
[22] Jaffe J., Mandelkar G., *The Fisher effect for risky assets: An empirical investigation,* "Journal of Finance" 1976, vol. 31, pp. 447–456.
[23] Johnston M.A., *A review of the application of event studies in marketing*, "Academy of Marketing Science Review" 2007, vol. 11(4), pp. 1–31.
[24] Kothari S.P., Warner J.B., *Econometrics of event studies*, in: *Handbook of Corporate Finance: Empirical Corporate Finance*, ed. B. Eckbo Espen, (Handbooks in Finance Series, Elsevier, North-Holland), 2005, pp. 3–36.
[25] Lamdin D.J., *Implementing and interpreting event studies of regulatory changes*, "Journal of Economics and Business" 2001, vol. 53, pp. 171–183.
[26] Li L., Hu Z.F., *Responses of stock markets to macroeconomic announcements across economic states*. IMF Working Paper 1998, No. 79.
[27] Lovatt D., Parikh A., *Stock returns and economic activity: The UK case*. "European Journal of Finance" 2000, vol. 6(3), pp. 280–297.
[28] MacKinlay A.C., *Event studies in economics and finance*, "Journal of Economic Literature" 1997, vol. 35(1), pp. 13–39.
[29] Maysami R.C., Koh T.S., *A vector error correction model of the Singapore stock market*, "International Review of Economics and Finance" 2000, vol. 9, pp. 79–96.
[30] Maysami R.C., Sim H.H., *Macroeconomics variables and their relationship with stock returns: error correction evidence from Hong Kong and Singapore*, "The Asian Economic Review" 2002, vol. 44(1), pp. 69–85.
[31] McQueen G., Roley V.V., *Stock prices, news and business conditions*. "Review of Financial Studies" 1993, vol. 6, pp. 683–707.
[32] McWilliams T.P., McWilliams V.B., *Another look at theoretical and empirical issues in event study methodology*, "Journal of Applied Business Research" 2000, vol. 16(3), pp. 1–12.
[33] McWilliams A., Siegel D., *Event studies in management research: theoretical and empirical issues*, "Academy of Management Journal" 1997, vol. 40, pp. 626–657.

[34] Miller M.H., Modigliani F., *Dividend policy, growth and the valuation of shares*, "Journal of Business" 1961, vol. 34, pp. 411–433.
[35] Miller M.H., Modigliani F., *Corporate income taxes and the cost of capital: a correction*, "American Economic Review" 1963, vol. 53(3), pp. 433–443.
[36] Muradoglu G., Metin K., Argae R., *Is there a long-run relationship between stock returns and monetary variables: evidence from an emerging market*. "Applied Financial Economics" 2001, vol. 11(6), pp. 641–649.
[37] Myers J.A., Bakay A., *Influence of stock split-ups on market price*, "Harvard Business Review" 1948, vol. 26, pp. 251–255.
[38] Nasseh A., Strauss J., *Stock prices and domestic and international macroeconomic activity: A cointegration approach*, "Quarterly Review of Economics and Finance" 2000, vol. 40(2), pp. 229–245.
[39] Nelson C.R., *Inflation and rates of return on common stocks*, "Journal of Finance" 1976, vol. 31(2), pp. 471–483.
[40] Schwert G.W., *Measuring the effects of regulation: evidence from the capital markets*, "Journal of Law and Economics" 1981, vol. 24, pp. 121–145.
[41] Serra A.P., *Event study tests: a brief survey*, *Working Papers da FEP* 117, 2002 (Universidade do Porto, Portugal).
[42] Sharpe W.F., *Capital asset prices: a theory of equilibrium under conditions of risk*, "Journal of Finance" 1964, vol. 19, pp. 425–442.
[43] Tainer E.M., *Using economic indicators to improve investment analysis*, John Wiley & Sons, Inc., New York, USA, 1993.

AGH Managerial Economics
2012, nr 12, s. 61–78
doi: 10.7494/manage/2012.12.61

Agnieszka Barcik*, Piotr Dziwiński**

Leniency Program as an Innovative Legal Tool for Fighting Cartels within the European Union

1. Introduction

The prohibition of anti-competitive agreements is one of the key competition-oriented regulations in the European Union and attaching importance to its effective enforcement is related to the awareness of the need to protect the economy from the harmful cartel-like agreements. Cartel monopoly appropriating the market is a hidden phenomenon which means it is difficult to detected so its prevention appears to be a much more complicated task than fighting any other anticompetitive practices, including the abuse of a dominant position. It has been attempted in this paper to explain the reasons for establishing the illegal collusions and to answer the question what makes them constitute such a great threat for other participants of economic relations that they are pursued and punished with the whole severity of the law.

The traditional measures aimed at protecting the market and taken by the European Commission and by regional antimonopoly bodies, including the detailed studies of its segments and independent creation of evidentiary materials, are expensive and long-lasting and which is most important they do not give a full guarantee for the cartel to be detected and punished before it stops its activities. Implementation of leniency regulations has made the European Commission possess an innovative legal tool enabling a more effective enforcement of art. 101 of the Treaty on the Functioning of the European Union (TFEU). This program was based on the experience of the states outside Europe (mainly the USA) and assumed the elimination of cartel agreements exploiting the market to be the paramount value. In the consequence the regulations have been introduced

* University of Bielsko-Biala, Faculty of Management and Computer Science
** Andrzej Frycz Modrzewski Krakow University, Faculty of Law and Administration

which foresee the sanctions to be mitigated for the penitent businessmen who have participated in the illegal collusions, but they voluntarily give up the illegal activity and get involved in an effective co-operation with the Commission's services. In the course of time the leniency has become the main weapon at the Commission's disposal for fighting the anticompetitive practices which has made other member states, including Poland, introduce it.

The paper focuses mainly on the analysis of the influence of practical application of leniency institution on the effects of proceedings carried out by the European Commission and by the Polish Office of Competition and Consumer Protection.

Research thesis: the leniency program is a significant legal tool aimed at fighting cartel-type agreements and besides, it plays a role of a preventive measure which effectively discourages the entrepreneurs from illegal collective activities aimed at maximizing profits in a dishonest way. The method which allows to prove the above thesis was the inquiry into the European and Polish literature regarding competition protection law, documents of the European Commission and the Polish Office of Competition and Consumer Protection as well as the European and Polish regulations including the jurisdiction of the Court of Justice of the European Union.

2. Competition rules on the market of the European Union

The single market covering member states constitutes the essential element of the European integration. It enables the integration to be tighter and much faster. It is all the more significant because of its being a regulator of economic processes occurring in the European Union which results from the functioning of a market-oriented economy model. Then, such a type of economy is based on competition in the framework of which all economic subjects situated on the market [1] can compete with one another. It occurs when different entrepreneurs offer similar or identical products to the consumer at the same time and within the same territory. Because of the limited quantity of available resources for each market participant, the consumer can make his own choice among the offers presented to him. These differ from one another in respect of price, quality and other parameters. The measurable effect of the competition between enterprises is price reduction, improvement of product quality and, finally, the optimal allocation of resources [21].

In order to enable the correct functioning of competition, it is necessary to introduce some legal mechanisms aimed at protecting it from violations [4]. When creating the foundation for the European integration it was the priority to avoid substituting the removed trade barriers, including customs duties and quantitative restrictions introduced by the state, with new ones. They would result from the excessive autonomy of enterprises or from the measures taken by the state. Therefore, it was assumed that the integration would be based on “the system ensuring undisturbed competition on the internal market”, which was mentioned under former art. 3 section 1 letter g of TWE [26]. In view of the jurisdiction of the European Court of Justice stating this regulation to be the directly binding legal norm, there emerged the need to create the basic competition rules [20]. Two main categories of these rules can be distinguished on the internal market, i.e.:

1. The rules aimed at enterprises and preventing them from collective or individual activities which could lead to competition disturbance. They cover preventing excessive concentration, prohibition of dominant position abuse and the prohibition of entering into anticompetitive agreements;
2. The rules aimed directly at member states whose goal is to eliminate the behavior which could lead to the violation of the rule of trading equality on the internal market, which also means a competition disturbance. This group covers the following: prohibition of the aid granted by member states out of their own means (the so called public aid) which is harmful for the market, and the requirement of matching the state of their own commercial monopolies to the market conditions in order to ensure equal chances in the access to supplies and market [1].

2.1. Cartel agreements within the European Union

In 2008 the Commissions services decided to make the valuation of losses suffered by the economy in the consequence of cartel activities. 18 cartels were surveyed which were the object of proceedings in the period 2005–2007, taking the size of objective markets and the time of the existence of cartels into consideration. Prudent assumptions were also made regarding the estimated prices inflated by them ranging from 5 to 15 per cent, which means that the loss caused by the above mentioned cartels ranged from 4 to 11 billion EUR. It has been decided to assume the average value, i.e. 10 per cent which determines the amount of losses borne by consumers to be as much as 7,6 billion EUR. When analyzing the economic literature according to which the prices were inflated by cartels by 20–25 per cent, it can be found that the amount calculated by the Commission’s services is seriously lowered [22]. Consumer losses resulting from cartel activities reach a shocking size like those borne by other enterprises, which can be shown by analyzing particular examples of illegal market agreements cartels broken by the European Commission or competition protection bodies of member states.

LCD cartel participated by six companies acting on the European market, inter alia Samsung and LG Display, was a clear example of cartel collusion which caused losses to consumers and to the companies acting honestly. The companies were regulating the prices of displays mounted in TV sets and telephones in the period from October 2001 up to February 2006 and faced the allegation of the European Commission of acting to the disadvantage of consumers and the fine in total amount of 649 million EUR. The cartel arranged price ranges, minimum prices, and exchanged information on production plans and future prices which was to the disadvantage of the enterprises not participating in the agreement [12].

A specific example of a cartel-type agreement is the resolution taken by the Polish National Notarial Council (a self-governmental body of notaries) in 2002 which introduced the provision into the moral code stating that attracting customers by proposing a lower price constitutes a glaring violation of vocational moral rules. It meant that a notary could not propose a lower price to the customer than the maximum price given in the ministerial decree, and without any disciplinary consequences. It caused the maximum rates to be the only compulsory ones which has totally eliminated the price competition, i.e. the most important one on the market of notary services. The lawmaker has purposely established the upper limit of the price for notary services taking into account the significance of social accessibility to their services. The resolution of the Notarial Council obliging all its members to use the maximum remuneration secured the interest of this group. Because of identical rate it was not important for the customer whose services to use and that situation implies deterioration of service quality comprising competent service, working time of notary public or the location of the notary's office. The resolution has been found to be contrary to competition law [31].

The agreement between the operator of a section of A4 toll road Katowice –Kraków with some selected enterprises was aimed at ensuring them exclusivity for providing road assistance services in particular sections of the highway. The authorized entrepreneurs were appointed by way of an offer of competition based on unclear rules. Arrangements with the traffic police were made whereby it was declared that the operator had concluded agreements with four road assistance companies which would be the only ones to be called to any events occurring on the highway. The consequence of the above agreement is very harmful for drivers (consumers) as the exclusivity- based authorized enterprises establish higher prices for their road assistance services than under normal market conditions. It forces the holders of uninsured cars or those who have a policy but do not want to make use of it, to use the services offered for an inflated price. The second consequence of the similar nature is the increase of insurance policy price which is determined taking into account many factors including road assistance costs [11].

Fighting cartels is in the interest of all market participants and the whole economy, as they lead, in a longer period of time, to a drop of competitiveness and employment reduction [7]. Elimination of illegal collusions belongs to the priorities of the Directorate General for Competition of the European Commission and of national competition protection bodies. However, it is a very difficult task. Detection of a cartel and proving infringement to the entrepreneurs participating in it, is not an easy task, as for obvious reasons the parties to the forbidden agreement try to hide its existence [10].

3. Leniency – origins, scope and assumptions of the program

The first leniency program was introduced by the US Justice Department in 1978. However, it was not very effective and only a small number of reports were received which made it impossible to fight cartels. The old version of the program was modified as late as 1993 by introducing a very important amendment admitting an automatic remission of a penalty for the entrepreneur who is the first to disclose cartel existence and provides information about it. This amendment brought the desired effect whereby a large increase of the received applications was reported (in the period 1993–1999 the number of applications increased by twentyfold as compared to the period of 1978–1993). The attractiveness of the American leniency program was also raised by the fact that the local entrepreneurs knew what penalty reduction they could count on before launching co-operation with the antimonopoly body.

Success of the American antimonopoly body in fighting cartels brought an effect in the form of a great interest of other countries in leniency. Australia, South Korea and Canada decided to copy the American concept as early as in the nineties. In Europe it was the European Commission which initiated it as first in 1996. The first EU leniency program was based on the Commission's Notice on immunity from fines and reduction of fines in cartel cases. These cases were related to the activities which were in conflict with the EU law and covered illegal agreements and practices aimed at reducing the competition within the internal market [7]. The above act ceased to be binding six years later when it was substituted with the new Notice in 2002 [14]. The presently functioning leniency program for penitent participants of cartel collusion is based on the Notice of 2006 [13]. Program efficiency expressed by the data received from the European Commission and the USA and other countries made Germany and the United Kingdom decide to implement leniency oriented regulations into their legal systems in 2000. Later the group the countries using the program was joined by France, Ireland, Sweden, the Netherlands, Czech Republic, Slovakia, Hungary, Lithuania, Cyprus and Poland. Legal regulations on which the functioning of leniency is based in particular countries are contained in the detailed notices or directives issued by competent bodies which have been based on the laws on competition protection or fall within the scope thereof [7]. However, they are systematically matched to the model leniency program approved by the Commission and by national antimonopoly bodies of member states.

Even though the program was successful in the United States the European Commission developed a different policy. The most important differences between the US and the European Union program are as follows (Table 1):

Table 1

Key differences between US and EU Leniency program

United States	European Union
the first company which reports gets 100% amnesty	The first company gets only a partial amnesty
fine reduction does not depend on the evidence provided	fine reduction strictly depends on the evidence provided.
the second company which reports gets no reduction at all	fine reduction is also intended for other self reporting companies.
individual leniency is possible	no individual leniency for managers or other employees is possible
leniency applications to the Antitrust Division are privileged under the US law	the European Commission may disclose the evidence to national court of any member state
full immunity can also be granted if the case is already under investigation	maximum fine reduction of 50% is granted if the case is already under investigation
granting immunity from fines is automatic	granting immunity from fines is dependent on the value of submitted information

Source: [3, 27]

The objective scope of the European Commission's leniency program covers the agreements determined under art. 101 TFEU [25]; in Poland it is regulated by art. 6 section 1 of the Law on the Protection of Competition and Consumers. The subjects authorized to enjoy the benefits offered within leniency are the participants of a cartel agreement, however, the fine reduction depends on meeting numerous conditions which will be described below in this section.

The anti-cartel program assumes an increase of entrepreneurs' awareness of the risk related to participation in a cartel. Due to its introduction there is no collusion, even the best organized and carefully concealed one, to give a full guarantee of impunity. The essence of the whole undertaking is to encourage informing against other partners in order to avoid fines, so it can be said that the assumptions of leniency are similar to those of another institution functioning within the law, i.e. the institution of crown witness which used to face distrust but today it has become an important tool for fighting the organized crimes. Another similarity between the above mentioned legal measures is constituted by the fact that both cartel collusion and an organized criminal group are difficult to be broken up in another way than by hitting its unity and solidarity. Moreover, the leniency program was intended to trigger rivalry among collusion participants in submitting applications. It is fastness and efficiency that matters as only the first entrepreneur may count on full fine remission. Practice shows the matters to happen where each day and hour of delay in submitting application with antimonopoly body, is decisive. The entrepreneur who joins the program later may only count on a partial reduction of the fine, although it also seems attractive in the light of loss of 10 per cent of the annual revenues [9].

4. Leniency program in the light of European Commission Notice of 2006

The Notice of the European Commission which has been in force since 2006 determines the framework of rewarding the co-operation of cartel participants (entrepreneurs participating in the agreement prohibited by virtue of art. 101 TFEU), who, due to their activity, exerted an influence on the functioning of the internal market. According to its provision it is in the interest of all the citizens of the European Union to reward any initiative aimed at a voluntary withdrawal from a cartel. Moreover, the Commission finds the co-operation of an enterprise in respect of detecting the existence of a collusion to be very valuable. Its contribution to the initiation of legal proceedings or to the establishing of a violation may be a factor which justifies the immunity from any fines, provided that certain complementary requirements are met. It should be stressed that immunity from fines may cover only one subject. Co-operation of one or several enterprises can be regarded as the justification for the reduction of a fine. Any fine reduction is directly proportional to the real contribution of a subject covering the time of co-operation and its quality for the Commission in respect of establishing the existence of a cartel. Reduction of a fine may be offered to those enterprises which provided the evidence complementary to the materials already possessed and, at the same time, increasing their value as a whole. However, it should be noticed that both immunity from and reduction of the fine resulting from the participation in leniency program do not protect the enterprise from civil sanctions related to the violation of the competition law.

According to the Notice an enterprise can provide the Commission with the already existing documents and a free description of its knowledge of the cartel and its participation therein. Such a description is prepared and submitted in the framework of the leniency program. According to the Commission such solutions have proved useful from the point of view of proceedings efficiency and elimination of cartels. The possibility of submitting voluntary explanations should not be substituted with order of disclosing the information which is issued in civil legal actions. Such a status could effectively discourage enterprises from co-operating with the Commission within the framework of the Notice, as the potential program participants would regard their situation in the civil legal proceedings to be worse than that of other enterprises which were not prone for co-operation. The eventual consequence of introducing the order would affect the widely understood public interest which assumes the efficient enforcement of art. 101 TFEU by public authorities in the matters concerning cartel-type agreements which in turn is connected with the inefficient enforcement of these regulations in the framework of private actions. Testimonies given before the Commission are subject to strict protection but it does not mean that the prohibition of disclosing them to the addressees of reported charges in order to ensure their right of defense. The entrepreneurs may view the files of a given case in the Commission's headquarters upon submitting their objections. Moreover, the declaration given by enterprises are transmitted to the public bodies for competition protection in the framework of co-operation within the European Competition Network which tackles the matters of cartels acting in the area of their domestic markets. The Commission tackles those collusions which are functioning in at least three member states [6].

The issued notice determining the rules of the leniency program application and participation describes precisely the requirements qualifying for two categories of sanction mitigation which are functioning within the program. The first of the categories which foresees the possibility of making maximum use of the benefits offered within the leniency program resulting in the immunity from the fine, has been regulated under section II A of the Notice. As already mentioned, the basic condition for the fine to be remitted is the informant's priority in transmitting the evidence of the existence of a cartel influencing the EU internal market; additionally, this evidence must be important enough to enable specific inspection to be carried out at the enterprises in connection with the alleged cartel activity, or to enable the violation of treaty regulations to be detected. In order to carry out an inspection by virtue of the law, the co-operating entrepreneur must provide the Commission with the information and evidence materials which cover the following:

– The entrepreneur's statement containing the following information, if known to the entrepreneur when submitting the application:

1. A precise description of a cartel's alleged practices covering its goals, activities and way of functioning, the products or services covered by the cartel, its geographical scope, duration of the cartel and the estimated size of the market influenced by the alleged agreement, the detailed information on the dates and participants of contacts regarding the cartel and, additionally, any explanations in the framework of evidence of any items of importance attached to the application;
2. Name and address of the legal entity applying for the immunity from the fine and the names and addresses of all the entrepreneurs who belong or have belonged to the alleged collusion;
3. Personal data, functions, business or home addresses of natural persons (if necessary) who, according to the applicant's knowledge participated in the alleged cartel, including the persons on the side of the applicant;
4. Information related to the alleged cartel on the basis of which the entrepreneur has addressed or intends to address other antimonopoly bodies in or outside the European Union;

– Other evidence materials related to the alleged collusion which are in direct possession of the applying entrepreneur or are available to him at the moment of submitting the application; they cover especially the evidence from the period when particular events occurred.

Providing the materials enabling a control of participants of the alleged cartel or detection of the violation of the Treaty of the Functioning of the European Union does not give a full guarantee of avoidance of the fine. According to the Commission's decision immunity from the fine shall not be applied towards the applicant who disclosed the evidence authorizing for an inspection, if on the date of his application for lenience program participation the Commission was entitled to carry out such an inspection in the light of the evidence which had already been in its possession or such an inspection had already been carried out. Moreover, the immunity from the fine shall be applied when three following conditions are jointly met:

– On the date of application the Commission did not have sufficient evidence materials to establish the violation of art. 101 TFEU;
– No other entrepreneur has been offered the conditional immunity from the fines, i.e. no other subject has been covered by the leniency program on the grounds of the evidence transmitted to the Commission before the proceedings in the same case is launched [7].
– The entrepreneur has provided the charging materials and was the first to submit the declaration to the Commission.

Apart from meeting all the above conditions, according to the Commission's requirements, the enterprise should definitely obey the additional directives regarding the co-operation in explaining the cartel affair. In order to be qualified for immunity from the fine it must co-operate in a truthful, complete and continuous way beginning from the moment of submitting the application and within the framework of the procedure carried out by the Commission. The enterprise is obliged to give precise not misleading and incomplete information. According to the jurisdiction of the Court of Justice the reduction of fine on the basis of a communication regarding the co-operation is justified only if the behavior of the enterprise could be the evidence of its real will of co-operation [30]. According to the above said it should include the following:

– Transmitting any important information and evidence available for the enterprise related to the alleged cartel to the Commission,
– Remaining at the Commission's disposal in order to give answer to any questions asked by the Commission,
– Enabling the Commission to question its current of former employees of any rank,
– Disclosing the full content of any available evidence items,
– Concealing the fact of submitting the application and its content up to the moment of issue of the Commissions allegations in writing; additionally event the intention of submitting the application must be kept secret.

What is more, the entrepreneur is obliged to withdraw from the cartel on the date of launching the co-operation at the latest, unless the Commission's decision states otherwise, finding it undesirable in the light of an efficient inspection at the alleged cartel participants. The last condition of the remission of the fine is the lack of the status of a cartel initiator. It means that the entrepreneur who submits the application could not be a subject inclining other to enter into the cartel collusion [7]. Otherwise, he is only entitled to apply for a reduction of the fine.

5. Leniency program in the practice of the Office for the Protection of Competition and Consumers

The leniency program functions within the Polish legal system on the basis of the following acts:

– Law of 16 February 2007 on the protection of competition and consumers [28];
– Decree of the Council of Ministers [19];

and other related documents:

– Explanatory Notes concerning the determination of fines for competition reducing practices [29];

– Guidelines of the President of the Office for the Protection of Competition and Consumers regarding the leniency program [6].

The program is regulated by art. 109 section 1 and 2 of the Law on the Protection of Competition and Consumers. The Polish version of the leniency program was modeled after penalty mitigation programs which are functioning within the European legal systems, especially the regulations applied by the European Commission. The regulations related to the application of the leniency procedure by the Office for the Protection of Competition and Consumers cover numerous analogies as compared to the regulations contained in the above analyzed Commission's Notice.

On the basis of art. 109 of the Law, the Council of Ministers has issued a decree which is an executive act to the provisions of the Law. It defines the procedure in case an entrepreneur applies for participation in the program. Its provisions also specify the procedural requirements concerning the submission and consideration of applications and the methods of notifying the entrepreneurs of the standpoint of the President of the Office for the Protection of Competition and Consumers (UOKiK). The detailed determination of the conditions of leniency program is to guarantee the possibility of carrying out the detailed analysis and a fair assessment of meeting the requirements by the subjects involved to be covered by penalty mitigation program [7]. What is more, the regulations added to the above mentioned decree by way of the amendment thereto of 2009 enable the entrepreneurs to submit shortened applications [16]. In order to increase transparency of the regulations contained in the Law and the Decree, the President of the Office for the Protection of Competition and Consumers issued guidelines regarding leniency which constitute a practical manual for the entrepreneurs who want to participate in the program; however, they do not have legal status.

According to art. 109 of the Law [28], two forms are admitted for the lenient treatment of entrepreneurs by the President of the Office for the Protection of Competition and Consumers, i.e.:

– immunity from the fine;
– reduction of the fine.

Remission or reduction of the fine can be applied for by the entrepreneur who participated in an agreement covered by the catalogue of prohibited agreements according to art.6 of the Law on the protection of competition and consumers. As in the Commission's program total remission of the fine can be enjoyed by one single subject which is the first to submit the application and to meet additional conditions, while the reduction may be granted in the case of a larger number of entrepreneurs. Reduction of the fine shall be granted in the following amounts:

- the second applicant to submit the application – reduction of the fine up to 5 per cent of the annual revenues;
- the third applicant to submit the application – reduction of the fine up to 7 per cent of the annual revenues;
- the remaining applicants – reduction of the fine up to 8 per cent of the annual revenues;

6. Results of the leniency program

According to more than ten years experience of the Commission in applying the penalty mitigation program has shown it to be an efficient tool for fighting cartels. In the course of time the number of entrepreneurs applying for leniency has successively been increasing which was undoubtedly the effect of subsequent amendments introduced into the regulations, aimed at increasing the efficiency of this institution.

In the period 1998–2001 above 80 entrepreneurs accessed the program by virtue of the notice of 1996. In the same period the Commission made reference to the above mentioned notice in 16 out of 18 decisions in carte-related cases. In 2003 the Commission issued 4 decision based on the information provided within the leniency program, imposing fines for participants of the detected cartels exceeding 100 million EUR. The activities of these cartels covered the whole EU market for a significant period of time; it was even 28 years in one case. The entrepreneurs who informed about their existence have really deserved the remission or reduction of their fines.

The amendment to the notice of 2002 aimed at modernizing the program was very successful. Due to its introduction the Commission managed to raise the trust of entrepreneurs towards the leniency institution. Above 20 company representatives were registered by the Commission's contact points during the very first year of the new regulation being in force. Conditional waiver of imposing a fine was applied in more than ten cases, whole in the period 1996–2002 it was the case three times only [32]. In the course of time the leniency procedure was becoming more and more efficient which allowed the co-operating entrepreneurs to avoid fines amounting to millions or, sometimes, even hundreds of millions euro [3]. This tendency has been kept up-to-date enabling market collusions to be eliminated and the budget of the European Union to be fed with billions of euro from the fines imposed on their participants.

The potential of leniency can be best illustrated by analyzing the statistics of the European Commission regarding cartels [5]. The total amounts of fines imposed on entrepreneurs and the number of decisions in cartel cases in particular periods of time, have been presented below (Tables 2 and 3):

Table 2

Fines imposed by European Commission

Period	Amount in Euro
1995–1999	270 963 500.00
2000–2004	3 157 348 710.00
2005–2009	8 456 838 162.50
2010–2012	3 883 258 432.00
Total	16 112 691 354.50

Source: [3]

Table 3

Number of decisions

Period	Undertakings
1995–1999	45
2000–2004	157
2005 -2009	203
2010–2012	112
Total	702

Source: [3]

It should be stressed that not all the cartels covered by the above statistics were detected and fined due to leniency applications. The Commission managed to eliminate some of them due to precise market studies and the effective work of its services which were collecting the evidence materials by themselves. However, it can be easily seen that the rising tendency has been kept in respect of the amounts of fines and number of decisions since the program was launched. The amendments to the leniency regulations of 2002 and 2006 and the aggravation of the antimonopoly policy have implied a further increase of revenues for the EU budget from the fines whose total amount increased by eleven fold in the period 2000–2004 (as compared to the period 1995–1999), and then it tripled within the period of 2005–2009. The fines imposed in 2010 only, reach the level of nearly 30 per cent of the fines imposed within the preceding five years. The rising trend can be expected to be kept during next few years.

The list of ten cartels which have been fined most severely by the Commission in the history can be regarded as the interpretation of the program efficiency (Table 4):

Table 4

Cartels fined most severely by European Commission, http://ec.europa.eu/competition

Year	Case	Amount in Euro
2008	CAR GLASS – cartel of car glass manufacturers	1.383.896.000
2007	ELEVATORS AND ESCALATORS – cartel elevator & escalator manufacturers	832.422.250
2010	AIRFREIGHT – cartel created by air lines	799.445.000
2001	VITAMINS – cartel of vitamin manufacturers	790.515.000
2008	CANDLE WAXES – cartel paraffin manufacturers	676.011.400
2010	LCD – cartel LCD panel manufacturers	648.925.000
2009	GAS – German-French gas cartel	640.000.000
2010	BATHROOM FITTINGS – cartel of bathroom fittings manufacturers	622.250.782
2007	GAS INSULATED SWITCHGEAR – cartel of gas insulated switchgear manufacturers	539.185.000
2006	SYNTHETIC RUBBER – cartel of synthetic rubber manufacturers	520.000.000

Source: [3]

It results from the open-access information disclosed by the Commission that the „active regret" institution has contributed to breaking up 9 of 10 above agreements (gas cartel was the only exception). Leniency applications brought to contact points revealed the activity of a cartel which had been unknown before, or they shortened proceedings duration when the Commission collected sufficient evidence for launching an inspection or explanatory proceedings, by itself. An analysis of the proceedings carried out and the decisions issued by the Commission with regard to several of the above mentioned cartels prove the efficiency of this institution and fully reflect its significance for the proper functioning of the EU internal market.

The origin of the Polish leniency program was not promising for that institution. New regulations of 2004 were supposed to bring revolutionary changes as far as cartel fighting is concerned; unfortunately it did not happen immediately after their introduction. In the period 2004–2006 the President of the Office for the Protection of Competition and Consumers issued 53 decisions regarding the anticompetitive agreements none of which however was supported by evidence materials collected within the leniency program. The Polish program did not live up to expectations, contrary to the system of sanction mitigation of the European Commission whose success was spectacular. It is a meaningful fact that during the first two years the Office received applications for the remission or reduction of fines from four entrepreneurs. Moreover, the materials they provided did not contribute to any fine to be imposed on any enterprise. According to former President of Antimonopoly Office, prof. Anna Fornalczyk, such a state of things was caused by several factors such as reluctance towards any payable denunciations, low fines for cartel activities and inefficiency of the Office for the Protection of Competition and Consumers. In general opinion of the specialists the main reason of the failure were the gaps in the law. Any benefits offered to an entrepreneur depended on the good will of the officials which made him uncertain of the benefits to be enjoyed after acceding to leniency program. According to many experts, another reason of a low number of program participants was a poor general knowledge of Polish entrepreneurs and a short time of binding force of the law [5]. However, in the course of time these circumstances have changed.

Next years brought a greater interest in the institution of penalty mitigation. In 2007 the Office received 7 applications and 5 applications in 2008. Another step ahead were the leniency regulations which came in force at the beginning of 2009 in the form of a governmental decree, and the guidelines issued by the President of the Office constituting a kind of manual for entrepreneurs, which were worked out for one year (2008) [23]. They have introduced some significant simplifications and caused an increase of the number of the received applications [17, 8]. A promotion campaign was also carried out. According to the data as for 11 January 2011 the contact points received in total 43 entrepreneurs 15 of whom submitted the shortened applications as they had already notified the European Commission before (they acted in a cartel covering at least three member states) [18].

The “Cement cartel” was the best known example of collusion the Office managed to break up using the institution of leniency [2]. Simultaneously, it was the largest anticompetitive agreement detected in the twenty year history of the Polish antimonopoly body. It was formed by the following enterprises: Lafarge Cement, Górażdże Cement, Grupa Ożarów, Cemex Polska, Dyckerhoff Polska, Cementownia Warta and Cementownia Odra, whose total market shares amounted to nearly 100 per cent. Seven of the above mentioned companies divided the market among themselves for a period of 11 years, establishing the among of shares for each of the cartel participants. Minimum prices, amounts of price surges as well as the dates and order of their introduction. In order to coordinate their activities confidential trade information was exchanged concerning inter alia the volume of production and sales [24]. As a result of the cartel activities the prices were kept at an inflated level ranging from 4 to 13 per cent per annum at Polskie Składy Budowlane company [32].

A further development of the leniency program aimed at improving its results belongs to the most important priorities of the Office planned for the period 2011–2013. It is the explicit evidence that the correct functioning of this institution is in the interest of the Office and of the Polish market. In order to ensure it, it is necessary to match a number of elements to one another which constitute the basis of the program and influence its results. These elements are especially the conditions and amount of reduction of the fine in view of the entrepreneur's co-operation with the Office. In light of the above-said the Office has found it desirable to analyze the experience gained up to the present concerning the application of leniency institution in the context of its legal construction, and, if necessary, to prepare its appropriate modification [15].

7. Summary

Fighting cartels is one of the most difficult tasks for antimonopoly bodies. Fifteen years of applying leniency program within the European Union has made this process easier, cheaper and faster. Statistics univocally show the number of the detected and broken anticompetitive agreements to grow. Thus, the "active regret" institution is the undertaking which has brought and will bring great successes. However, keeping a high level of its results will depend on matching the regulations comprised by it to the changing market conditions which may make it necessary to introduce a modification of its legal construction.

Leniency is a tool which enables both detection of a violation which has been unknown so far and fast completion of proceedings with a high probability of giving the correct jurisdiction. It is possible due to the domino effect frequently occurring in the program where one entrepreneur's anonymous denunciation makes the remaining partners submit applications hastily which contributes to the collection of a rich evidence material concerning the matter and to imposing the fines which are adequate to the grade of violation. Implementation of leniency regulations on the grounds of Polish competition related policy will only bring the desirable effect when the entrepreneurs are guaranteed the legal certainty which is expressed by the transparency of the regulations, procedures and a strictly determined percentage of reduction of the imposed fine.

References

[1] Barcz J., Kawecka-Wyrzykowska E., Michałowska-Gorywoda K., *Integracja europejska,* Wydawnictwo Wolters Kluwer, Warszawa 2007.

[2] *Decyzja z dnia 8 grudnia 2009 w sprawie uznania za praktykę ograniczającą konkurencję niedozwolonego porozumienia zawartego pomiędzy Lafarge Cement S.A. w Małogoszczy i innych przedsiębiorców (nr DOK-7/2009)*, Dz. Urz. UOKiK z dnia 31.03.2010 r., nr 1.

[3] European Comission – Competition, *Cartels statistics*, http://ec.europa.eu/competition/cartels/statistics/statistics.pdf (28.03.2012).

[4] Justyński J., *Podstawy prawne polityk gospodarczych Unii Europejskiej*, Wydawnictwo TNOiK, Toruń 2001.

[5] Kruczek M., *Świadek koronny zawodzi w polskim biznesie,* "Rzeczpospolita" nr 3920 z dnia 21 sierpnia 2006 r.

[6] *Leniency – program łagodzenia kar*, Urząd Ochrony Konkurencji i Konsumentów, Warszawa 2009.

[7] *Leniency*, Urząd Ochrony Konkurencji i Konsumenów, Warszawa 2004.

[8] LEX a Wolters Kluwer business, Polski Serwer Prawa, *Leniency – sposób na uniknięcia kary za zakazane porozumienie*, http://lex.pl/?cmd=artykul,2281 (20.04.2012).

[9] LEX a Wolters Kluwer business, Polski Serwer Prawa, *Firmy opowiedzą o zmowie by uniknąć milionowych kar za naruszenie konkurencji*, http://lex.pl/?cmd=artykul,7339 (05.03.2012).

[10] Modzelewska De Raad M., *Bardzo srogie kary*, "Rzeczpospolita" nr 3354 z dnia 12 października 2004 r.

[11] *Niedozwolone porozumienia zawierane przez przedsiębiorców – skutki dla konsumentów*, Urząd Ochrony Konkurencji i Konsumentów, Warszawa 2007.

[12] NVISION.pl, *Komisja Europejska wyznacza 649 milionów kary dla kartelu producentów LCD*, http://nvision.pl/Komisja-Europejska-wyznacza-649-milionow-kary-dla-kartelu-producentow-LCD--News-18537-ndetails.html, (20.04.2012).

[13] *Obwieszczenie Komisji w sprawie darowania i obniżania kar pieniężnych w sprawach kartelowych*, Dz. Urz. WE z 13 lutego 2002r., C 45.

[14] *Obwieszczenie Komisji w sprawie zwalniania z grzywien i zmniejszania grzywien w sprawach kartelowych*, Dz. Urz. UE z 8 grudnia 2006 r., C 298.

[15] *Polityka konkurencji na lata 2011–2013*, Urząd Ochrony Konkurencji i Konsumentów, Warszawa 2011 r.

[16] *Program leniency – zmiany przepisów*, eGospodarka.pl, Poradnik Internetu dla Twojej Firmy, , http://www.egospodarka.pl/37813,Program-leniency-zmiany-przepisow,1,11,1.html,(20.04.2012).

[17] Roszak M., *Niższe kary dla karteli*, “Dziennik – Gazeta Prawna” nr 48 z dnia 10 marca 2009 r.
[18] Roszak M., *Przedsiębiorca, który zawiadomi UOKiK o zmowie cenowej, może uniknąć kary*, “Dziennik – Gazeta Prawna” nr 6 z dnia 11 stycznia 2011 r.
[19] *Rozporządzenie z dnia 26 stycznia 2009r. w sprawie trybu postępowania w przypadku wystąpienia przedsiębiorców do Urzędu Ochrony Konkurencji i Konsumentów o odstąpienie od wymierzania kary pieniężnej lub jej obniżenie*, Dz. U. Z 2009 r. Nr 20, Poz. 109.
[20] Skoczny T., *Podstawy i zakres wspólnotowego prawa konkurencji*, in: *Prawo Unii Europejskiej, prawo materialne i polityki*, praca zbiorowa pod red. J. Barcza, Wydawnictwo Prawo i Praktyka Gospodarcza, Warszawa 2003.
[21] Skubisz R., Skrzydło-Tefelska E., *Prawo europejskie – zarys wykładu,* Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej, Lublin 2003.
[22] *Sprawozdanie Komisji dotyczące polityki konkurencji za rok 2008 z dnia 23 lipca 2009 r.* (COM (2009) 374 wersja ostateczna).
[23] *Sprawozdanie z działalności 2008*, Urząd Ochrony Konkurencji i Konsumentów, Warszawa 2009.
[24] *Sprawozdanie z działalności 2009*, Urząd Ochrony Konkurencji i Konsumentów, Warszawa 2010.
[25] Traktat o funkcjonowaniu Unii Europejskiej, Dz. Urz. C 115 z 9 maja 2008.
[26] *Traktat ustanawiający Wspólnotę Europejską (wersja skonsolidowana)*, Dz. Urz. C 340 z 10 listopada 1997 r.
[27] US Department of Justice, www.justice.gov.
[28] Ustawa z dnia 16 lutego 2007 r. o ochronie konkurencji i konsumentów, Dz. U. z 2007 r. Nr 50, poz. 331, ze zm.
[29] *Wyjaśnienia w sprawie ustalania wysokości kar pieniężnych za stosowanie praktyk ograniczających konkurencję*, Dz. Urz. UOKiK nr 4 z dnia 29 grudnia 2008 r.
[30] *Wyrok Sądu Ochrony Konkurencji i Konsumentów z 22 grudnia 2004 r.*, XVII Ama 50/04, Dz. Urz. Urzędu Ochrony Konkurencji i Konsumentów nr 1/2005.
[31] *Wyrok Europejskiego Trybunału Sprawiedliwości z dnia 29 czerwca 2006 w sprawie C-301/04 Komisja przeciwko SGL Carbon AG, pkt 68*, Dz.U. C 224 z dnia 16.09.2006.
[32] *Zmowa cementowa*, portal internetowy tygodnika Polityka, http://www.polityka.pl/rynek/gospodarka/1504828,1,zmowa-cenowa-polskich-cementowni.read, (28.03.2012).

AGH Managerial Economics
2012, nr 12, s. 79–108
doi: 10.7494/manage/2012.12.79

Henryk Gurgul*, Łukasz Lach*

Two Deficits and Economic Growth: Case of CEE Countries in Transition

1. Introduction

Budget deficit (government deficit) refers to the difference between government receipts and spending in a single year, that is, an increase of debt over a particular year. Budget deficit arises in most cases in the time of stagnation or a decrease of national income. In such a period government receipts become lower, usually because of falling tax revenue. However, key budgetary expenditures like outlays on national defense, police, education and health are mostly stable over time, which causes budget deficit. Business cycles may also play an important role, as in the time of recession budget deficit and an increase of public expenditures are usually inevitable.

In the past most of the countries were able to preserve a balanced budget in relatively long periods. However, since the so-called *Great Depression* in the thirties and the *New Deal* policy (increase of demand by means of public works and investment) deficit became one of the instruments of economic policy. Government deficit enables relative easy rise in GDP in the short term. The accumulated costs of this increase, i.e. public debt, are paid with some time delay. In recent decades government deficit has actually been a common feature of all market economies. One can also notice that economies with a large government sector and high social expenditures (e.g. Greece) usually exhibit higher budget deficits. Government deficit can be financed by government bonds and treasury bonds, credits and loans from abroad and money issue. The first two ways of deficit treatment increases government domestic and foreign debt. The last way causes a rise in the inflation rate.

In general, the motivation to analyze links between economic growth and budget and trade deficits in the case of CEE transition economies is twofold.

* AGH University of Science and Technology, Department of Applications of Mathematics in Economics, e–mail: henryk.gurgul@gmail.com, llach@zarz.agh.edu.pl.

First, this particular group of countries has not gained satisfactory attention from researchers so far. Second, previous papers on deficits-growth links have not reached a consensus on directions and signs of causal dependencies between examined variables.

In CEE countries in transition high budget deficits and rapidly growing public debts have become serious economic and political problems. There are many consequences of this phenomenon. First of all, the payment of interest on public debt involves a considerable part of government revenues. This is one of the main reasons for the imbalance in the budget. Moreover, a high deficit can cause rise in the interest rate in the banking system. In order to finance a rising deficit the government is forced to borrow money or to issue it. The sources of money are the same as in the case of private firms: households, foreign banks and so on. The cost of credit and loans is determined by the law of demand and supply. Therefore, excess demand due to government credit demand implies increased interest rates. In addition, in the case when government borrows indeed a lot of money, the availability of credit for private companies becomes significantly lower because of rising interest rates (the so-called *crowding-out effect*). This implies a fall in the investment rate and in the long-run GDP growth rate.

Budget deficit can also lead to higher taxes. Government may be forced to raise taxes in order to cope with the growing costs of public debt. Higher taxes hamper private consumption, enhance growth of the grey economy and discourage individuals to work and do business. Therefore, higher taxes reduce the rate of economic growth. The costs of servicing public debt are paid by a society (taxes). If a country has a foreign debt then the abroad receives the part of the domestic income. If debt is financed by citizens then natives receive the part of the national income. Usually, treasury bonds are held by wealthy people. However, also the poor pay taxes. In this way public debt (due to budget deficit and taxes) is a cause of income redistribution from poor to rich. In other words, budget deficits and public debt are the reasons for income redistribution between generations. Budget deficit used to finance future economic development is usually advantageous for future generations. However, if the budget deficit finances mostly current consumption, then one can say that the current generation lives on the cost of future generations. Most CEE countries had and still have problems with budget deficits. These troubles have been observed from the very beginning of the transition process and caused mostly by constantly lowering the taxes and growing the social expenditures.

Many economists claim that the reduction of the budget deficit does not lead to a slowdown in economic growth but it rather implies a rise in the rate of growth. The speeding up of economic growth takes place not only in the long-run but even immediately. The speed of the reaction of growth rate to reduction of budget expenditures depends on various factors. First of all, more money remains at households. This, in turn, can increase their expenditures. Moreover, one can observe that the crowding-out effect disappears, interest rates becomes lower and tax increases in the near future also become less likely. These factors enhance the propensity to consume and investment expenditure. The outbreak of the financial crisis (caused by problems with debt service) becomes lower too. In addition, enterprises may cut some of their costs, which, in turn, leads to an increase of profits, therefore a rise in the propensity for investment. There are some empirical results that support these links between budget deficit and economic growth. When sources of deficit are investment expenditures, increasing the budget deficit may not be so harmful, especially when there is a reason why private investment cannot replace public investment.

Jacques J. Polak [33] from IMF developed the idea of the monetary approach to the balance of payments. This idea, often referred to as the so-called *twin deficit hypothesis*, reflects the conviction that there are links between the current account deficit and the fiscal situation of an economy. Moreover, the internal (fiscal) and the external (current account) deficits occurring at the same time may be especially harmful for the economy. According to Polak, a rise in domestic credits (which consist of credit to the government and credit to the private sector) could have a negative effect on the current account. However, an increase in exports and output has a transitory positive impact. Thus, low domestic debt is of great importance for external balance. Government should minimize the risk of crowding-out the private sector. Therefore, it is important to avoid fiscal deficits. In general, a lack of fiscal deficits guaranties external stability and stable economic growth.

The twin deficit hypothesis is frequently linked with neo-Keynesian attempts to define an economic policy, which would allow for simultaneous external and internal equilibrium. In the traditional neo-Keynesian approach the exchange rate should be applied in order to achieve external equilibrium. In turn, suitable fiscal policy should be used to ensure internal equilibrium. These general opinions were formulated by the New Cambridge School (NCS). However, NCS justified that in many situations it would be more appropriate to use fiscal policy to support the external equilibrium, and exchange rate policy to manage the internal balance. The NCS stressed the role of the private sector's marginal propensity to spend. The economists from the NCS derived their theses on the basis of a particular version of the main macroeconomic identity:

$$M - X = (A_p - Y_d) + (G - T), \tag{1}$$

where M stands for imports, X for exports, A_p is the absorption (i.e. the sum of investment and consumption of the private sector), Y_d is disposable income of the private sector, G represents government expenses and T stands for taxes. New Cambridge School formulated conditions, under which the fiscal deficit equals the current account deficit, i.e. when:

$$M - X = G - T\ . \tag{2}$$

It is worth to underline, that the last equation, in contrast to the previous one, is not an identity – it is an equation that holds true only under certain assumptions. The contributors often emphasize that all versions of the neo-Keynesian theory assume a close relationship between fiscal and current account deficits [1].

Further content of this article is organized as follows. In the next section, the existing literature is reviewed. In the third section the data and its description are shown. In the fourth section the main research hypotheses are formulated. Section 5 is concerned with methodology applied. Moreover, the empirical specification of the econometric model is explained. Section 6 presents the empirical results. The last section concludes the paper.

2. Literature overview

Policy makers and advisers focus on the main goals of economic policy. Many of them, as pointed in the previous section, advise deficit reductions instead of higher economic growth at all costs (e.g. accompanied with higher inflation). However, according to some economists (comp. [10]) deficits can be reduced, even fully eliminated, nevertheless the rate of growth of an economy. On the other hand, many contributors think that the most important issue is not the reduction of budget deficit but establishing a desired level of growth and the means to keep it. The main policy goal should be shifting resources to investment in order to expand capacity of an economy and promote export, *without* reducing the level of economic activity.

It is much easier to reduce the domestic budget deficit if economic growth is relatively high. The same is true for the trade deficit, especially in the long-run. In general, however, cutting the deficit is not an easy goal. It will probably entail imposition of restrictions on important programs, a rise in taxes and an increase in pessimism. On the other hand, budget deficit supports future growth and enables economic expansion and the realisation of important public investment and social programs. Moreover, taxes may remain low, which creates a positive image of an economy in the eyes of investors, especially the foreign ones. In addition, higher growth needs not to be accompanied by high inflation. In the time of Kennedy, i.e. 1961–1963, the US economy grew at 5.3 percent a year, with inflation below 1.3 percent.

According to the existing literature budget deficit (BDEF) and current account deficit (CADEF) are important indicators of economic performance and macroeconomic stability. The dynamics of time series of BDEF and CADEF may have implications for complaisance with intertemporal budget constraint and sustainability. These properties have an impact on answering the question how the two deficits are linked. The Mundell-Fleming approach (see [9]) suggests that a deficit-financed expansionary fiscal policy can cause an increase of trade deficit through either stimulated income growth (under a fixed exchange rate) or exchange rate appreciation. This gives a basis to consider the twin deficit hypothesis based on a positive co-movement of BDEF and CADEF with the possibility of using BDEF as a causal factor influencing CADEF. In contrast, under the Ricardian equivalence scenario (comp. [9]), domestic residents anticipate that the government will raise taxes in the future to close the fiscal gap and pay back the accumulated debt. As a consequence savings are increased to allow for the accumulation of wealth, which in turn leads to a reduction in consumer expenditures.

The main existing literature on twin deficits concentrates on their short-run interaction (see, for example, [8] and [25] and references therein) and suggests a strong positive, weak or even negative relationship between the deficits. The negative short-term link takes place when, for example, an unexpected change in output gives a rise to endogenous movements of the BDEF and causes a divergence of the deficits. In contrast, a much smaller group of contributions (like [27] and those cited by them) confirmed the long-run relationship between the two deficits. Leachman and Francis [27] used a variety of cointegration techniques and found that fiscal deficits contribute towards current account deficits in the case of the US economy. However, this relationship was found to be time-dependent and rather weak. The further discussion suggested (see e.g. [21]) that the investigation of the possible nonlinearities in the twin deficit relationship may indeed be necessary. The paper by Holmes [21] also considers the US economy, but in sharp contrast to the previous studies, an alternative assessment of the twin deficits relationship is based on a testing procedure advocated by Bierens ([5], [6], [7]). That procedure examines whether nonlinear trend-stationarity is present in the series and if so, whether the series are co-trended sharing the same nonlinear deterministic trend.

Using cointegration analysis along with regime shifts Daly and Siddiki [9] found a long-run relationship between budget deficits, real interest rates and current account deficits in 13 out of 23 OECD countries examined. The number of countries with apparent long-run relationships was significantly reduced when regime shifts were not permitted. The mentioned authors demonstrated that, when structural breaks are taken into account, it seems that twin deficits are less likely to be conjoined in the case of countries with a more extensive financial infrastructure.

Not only the New Cambridge School gave a theoretical interpretation of the interactions between the fiscal and current account deficits. Other well-known theories include the monetary approach to the balance of payments (Ricardian equivalence) and the structural gap approach.

The consequences of the monetary approach to the balance of payments formulated by Johnson [23] are related to the neo-Keynesian theory. However, they refer to the conviction that fiscal deficits may increase money supply. According to Harberger [19], when money holdings exceed the necessary long-term real monetary balances then the spending of foreign assets rises. This can cause worsening of the current account balance.

As already mentioned, there are two main streams of argument in the critique of the New Cambridge School ideas. First, the equation (2) can hold true when the private sector does not react to fiscal policy impulses. Second, the critique from proponents of the theory of rational expectations and Ricardian equivalence suggests that if the government intends to generate fiscal surpluses in order to reduce the current account deficit, the private sector may react by cutting savings in such a way that the effect of fiscal tightening will be cancelled out.

Barro [14] in his well-known paper demonstrated that economic agents rationally expect that a higher fiscal deficit will cause higher taxes in the future. The expected measure is increasing by the current savings. Therefore, the interest rate, the investment and the current account balance may stay constant. In other words, no connection between the fiscal and current account deficits is expected.

The second stream in the critique of the New Cambridge School concentrates on foreign investor behavior. Equation (2) assumes not only that the internal propensity to save is low and remains constant, but also that the external sector has a low and constant propensity to invest in a country.

The latter assumption is rejected by a so-called *structural gap hypothesis* [12], which argues, that foreign savings can be an active factor in financing of the current account deficit by filling the gap between the investment and saving of the domestic private sector. The main insight of the structural gap hypothesis is that the world financial system is closed. This fact has another interesting consequence: if also the twin deficit hypothesis is true in its strong form, then the sum of current account deficits of all countries in the world should equal the sum of all fiscal deficits, and the sum of current account surpluses should equal the sum of all fiscal surpluses. In this sense the twin deficit hypothesis implies that all countries cannot have simultaneously fiscal deficits. In other words, the increase in saving above the level of investment in one country leads to an increase in investment and current account deficit in another country or countries [11]. The size of these external imbalances is determined by the relative competitiveness of individual economies.

It must be emphasized that from a statistical point of view a causal relationship between the fiscal and current account deficits may be just the opposite of the current assignment of instruments to targets in the economic policy of a country. For example, if the government considers that running a fiscal surplus/deficit is a way to reduce the current account deficit (the so-called *current account targeting*), then a statistical test may establish a causal relationship from the current account to the fiscal surplus/deficit and not vice versa [35]. If the government is targeting the current account, it should generate fiscal surpluses in the case when domestic investment exceeds domestic saving, and deficits in the opposite case. Current account targeting also implies a negative link in the private and public saving/investment gaps [26].

Neo-Keynesian theory, especially the New Cambridge School, suggests the existence of a causal relationship from fiscal to current account deficits. The neoclassical theory and the school of rational expectations predict the existence of an opposite link. After increasing budget deficit, the private sector saves more. This implies a reduction in the current account deficit. In addition, the structural gap approach suggests that in small open economies current account deficit causes fiscal surpluses in the long-run. Thus, several well-known theories do not provide a common opinion on the links between the two types of deficits under study.

These contradictory points of view imply that the relationship between the fiscal and current account deficits should be established empirically. In general, this relationship should be examined in the long- and short-run. In the long-run, the link between the fiscal and current account deficits in an open economy should rather be positive. This is a consequence of the fact that foreign capital inflows help to finance fiscal deficits, while the outflows of this capital make the financing of fiscal deficits more difficult. In other words, in the long-run a rise in current account deficit encourages government to increase fiscal deficit. Moreover, the outflows force governments to cut spending or increase taxes. On the other hand, in the short-term, the rise in the current account deficit can imply a reduction of the fiscal deficit. The capital inflows speed up economic growth and fiscal revenue. In turn, short-run capital flight is linked with economic fall and worsening of the fiscal position.

In general, the twin deficit hypothesis in the case of transition and developing economies has not received considerable attention from researchers so far. The paper by Aristovnik and Zajc [3] did not supply clear conclusions on the links between budget and trade deficits. On the other hand, Vyshnyak [36] found strong evidence supporting the twin deficit hypothesis for Ukraine. Katircioglu et al. [24] investigated the direction of causality between current account balance and the overall budget balance of 24 small island state economies using panel econometric techniques. The results of both bivariate and pairwise Granger causality tests suggest that there is a unidirectional causality, which runs from current account balance to the overall budget balance. On the other hand, the authors found no evidence on the causality running in the opposite direction in case of small island states analyzed.

Herrmann and Jochem [20] also found some support for the twin deficit hypothesis in CEE countries. This result should be considered together with the fact that the net effect of government budget deficits was in that time (the authors analyzed 1994–2004 period) rather small, since they were mostly financed by private savings.

Kohler [26] tried to explain the contradictory results in the case of CEE countries by underlining different levels of integration of these countries with the world financial markets. The author argued that countries with a high level of integration with the world markets may gain more confidence and enjoy a higher level of domestic saving. In the case of strong dependence of an economy on global financial markets the Ricardian equivalence and structural gap theories seem more convincing in the explanation of the links between current account and fiscal deficit.

This paper is aimed at providing a fresh look at the dynamic links between economic growth and budget and trade deficits in ten new EU members in transition in the first decade of XXI century. It is worth to note, that besides establishing directions of causal relationships this paper also derives some suggestions on signs of the dynamic dependencies.

3. The dataset and its properties

The dataset used in this paper contains annual data on GDP per capita in Purchasing Power Standards (PPS) expressed in relation to the European Union (EU-27) average and fiscal and trade balances (expressed as percentages of GDP) in ten new EU member countries in transition in the period from 2000 to 2009.* The choice of such an indicator of output ensures that as well as analyzing the existence of causal dependencies between economic growth and budget/trade deficits one may check whether these links were important for countries under study in relation to the economic growth of the whole European Union, including the old and rich member countries. Thus, any evidence of causality may provide some

* In the period 2004–2007 twelve countries joined the EU. However, Malta and Cyprus have not been taken into consideration in this study since the evolution of the economies of these two countries is significantly different than that of the ten other new EU members (e.g. these two economies have never been in a transition phase).

additional information about the role of both types of deficits in the process of convergence of CEE countries towards old EU members.

Moreover, we used annual data on employment rate for all ten countries, since a simple two-dimensional approach based only on GDP and one deficit-related measure is likely to produce spurious results due to the omission of important variables. The technical aspect is not the only reason for including employment in the model, since this variable is also important in terms of basic theoretical growth models. The data on GDP, employment and fiscal and trade balances was obtained from the Eurostat and World Bank databases.

Table 1 contains some basic facts on the size and economic development of the countries examined in this paper, which should be especially useful for the reader, who is less familiar with the economic profile of CEE economies in transition.

Table 1

Short description of countries examined in this study

Country	**GDP per capita in 2009 as a percentage of EU-27 average (EU-27 PPS)**	**Percentage change in GDP per capita between 2000-2009 with respect to EU-27 average (EU-27 PPS)**	**Total population [million] (2009 data)**	**Area [thousands km^2]**
Bulgaria	44%	+16%	7.60	110.91
Czech Republic	84%	+13%	10.46	78.86
Estonia	64%	+19%	1.34	45.22
Hungary	64%	+10%	10.03	93.03
Latvia	52%	+16%	2.26	64.58
Lithuania	55%	+15%	3.34	65.20
Poland	61%	+13%	38.13	312.68
Romania	46%	+20%	21.49	238.39
Slovakia	73%	+23%	5.41	48.84
Slovenia	88%	+8%	2.03	20.27

Source: Eurostat database

As one can see the group of new EU members in transition is varied in terms of area, population and the level of GDP per capita. However, a common fact across all the ten countries under study is that they have experienced significant economic growth in comparison to the EU average in the period 2000–2009. This paper is partly aimed at answering the question whether during the ongoing process of transformation of these economies the fluctuations in the levels of budget and fiscal deficits have been important factors in the convergence towards highly-developed old EU members.

In this paper abbreviations were used for all variables. Table 2 contains a summary of some basic information on the variables.*

Table 2

Abbreviations and short description of examined variables

Full name [Abbreviation]	Short description
GDP per capita in country *i* in year *t* in Purchasing Power Standards (PPS) expressed in relation to the EU-27 average [$GDP_{i,t}$]	The application of values expressed in PPS, that is a common currency which eliminates the differences in price levels between countries, allows meaningful volume comparisons of GDP between countries and may provide some basic information on the convergence process.
Employment rate in age group 15-64 in country *i* in year *t* [$EMPL_{i,t}$]	This indicator is based on the EU Labour Force Survey, which covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals.
General government deficit/surplus in country *i* in year *t* as a percentage of GDP [$G\_BALANCE_{i,t}$]	This indicator is used to measure the general government net borrowing/lending. It is the difference between the revenue and the expenditure of the general government sector divided by GDP.
Net exports in country *i* in year *t* as a percentage of GDP [$T\_BALANCE_{i,t}$]	This indicator is used to measure the sum of the balance of trade in relation to gross domestic production.

Source: Eurostat database, World Development Indicators

In the initial part of our analysis we examined some basic properties of our data. Instead of presenting a large number of descriptive statistics, we have decided to present the data in plots. Figure 1 contains the plots of analyzed variables for all sample countries.

* Throughout this paper (especially for model presentation purposes) the subscript *i* describes the alphabetical order of sample countries (i.e. for Bulgaria $i=1$, for the Czech Republic $i=2$, etc.).

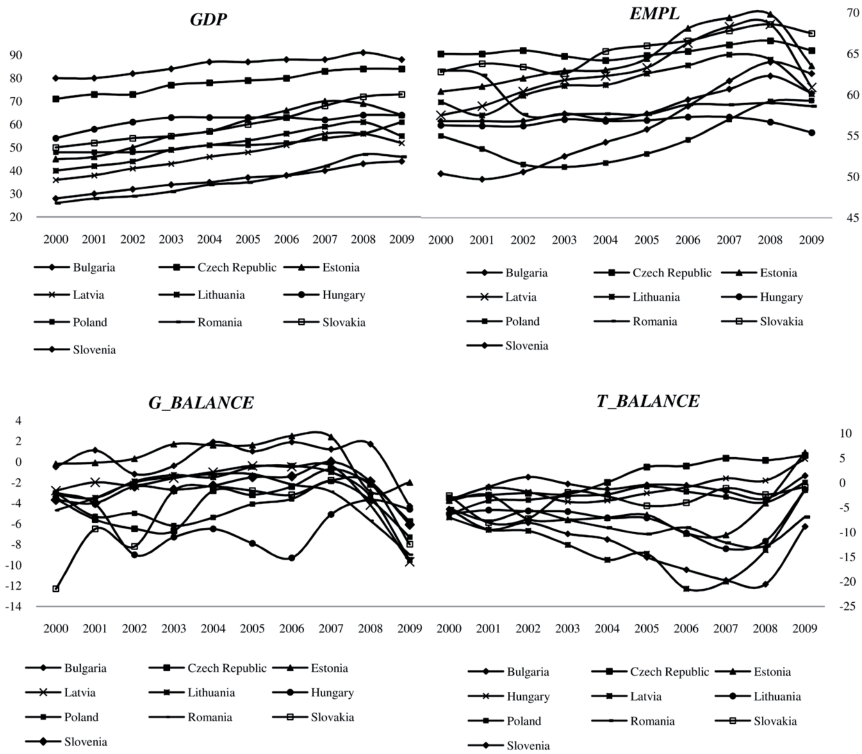


Figure 1. Plots of variables under study

Source: Eurostat and World Bank databases

The aim of Figure 1 is not to reflect the performance of each individual economy, but rather display the properties of the whole group and eventually provide some detail before the formulation of any subgroups. In general, one can easily see upward tendencies in the graphs of $GDP_{i,t}$ for $i=1$, ..., 10 and $t=2000$, ..., 2009. This suggests that in the period under study the group of CEE economies in transition has significantly moved towards the EU-27 average, at least in terms of per capita GDP. In general the upward tendency is also visible in most of the employment rate graphs. However, the fluctuations in these plots are larger than for per capita GDP. Finally it should be noted that Figure 1 provides some general information on the reaction of all the economies to the crisis of 2001 and especially of 2008.

The plots presented in Figure 1 also show the evolution of budget and trade deficits in the group of analyzed countries. In general, it is relatively difficult to describe clear trends in this data. However, one may claim that for most of the economies under study there was a reduction of budget deficit in the period 2000–2009, which most probably was related to EU accession requirements and suitable fiscal reforms. In other words, this could mean that the average value of *G_BALANCE* in ten examined economies has exhibited an upward tendency. We formally verified this observation after fitting a suitable linear trend function to the set $\left\{ \sum_{i=1}^{10} \frac{G\_BALANCE_{i,t}}{10} : t = 2000, \ldots, 2009 \right\}$.

In the case of trade deficit the suitable plots are also varied, as some countries have in general improved their trade balance while others have not. Anyhow, after fitting a suitable linear trend function to the s et of average values of *T_BALANCE* a slight negative tendency was reported, which clearly corresponds to the significant overall rise in imports in the group of countries under study in the years 2000–2009. Different signs of general trends estimated for average *T_BALANCE* and *G_BALANCE* may provide some initial evidence against the possibility that both these deficits move together (act like "twins"), however, some detailed testing is required to formally verify this preliminary supposition.

4. Main research hypotheses

A mere glance at the examined data suggests that per capita GDP of new EU member countries in transition has indeed moved closer to the EU average. In this context two natural questions arise for research and economists. First, one may want to check what the nature of the dynamic links between growth of this group of countries and their current account and government budget balances were. Second, it seems interesting to deeply examine the linkage of the discussed process with the widely discussed twin deficit hypothesis.

Figure 1 provides no clear suggestion on the direction of causality between both types of deficits analyzed. One may claim that changes in the current account, at least in the short-run, precede the reactions of fiscal policy. Therefore, it is likely that the current account deficit may be related to the fiscal surplus by Granger-type causality. Moreover, one may state that causality from the current account deficit to the fiscal surplus is likely to increase as the time lag between an impulse in CADEF and a reaction in BDEF also increases. If, however, the government anticipates a worsening of the current account at time $t+1$ and starts running fiscal surpluses at time t, a causal relationship should be expected in the opposite direction.

Despite using carefully selected econometric methods (described in detail in Section 5) and considering a small group of relatively similar economies, the structure of dynamic interrelations between economic growth and the two types of deficits may still depend, at least to some extent, on the individual characteristics of sample countries. The differences between examined economies are especially visible in the case of government balances (see Figure 1). It is relatively easy to form a subgroup of economies with most positive (Bulgaria and Estonia) and negative (Hungary, Poland, Slovakia) average* budget balances in the period 2000–2009. In other words, even within the group of new EU member countries in transition one may select a high-budget-deficit, and low-budget-deficit clusters. Therefore, taking into account the technical properties of econometric procedures used to test for Granger causality,** we used three possibilities of choosing members of groups of examined economies. Table 3 contains the details.

Table 3.

Groups of countries examined in this study

Group of countries	Countries included
I_0	All sample countries.
I_1	All but low-budget-deficit (i.e. Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia).
I_2	All but high-budget-deficit (i.e. Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Romania, Slovenia).

To investigate all the discussed issues one should test some carefully formulated research hypotheses. These conjectures should reflect both the results of visual inspection of the data as well as the major findings and suggestions of the papers mentioned in Section 2.

Since the data presented in Figure 1 provides a basis to claim that, in general, the relatively fast economic growth of CEE transition economies was accompa-

* This time the 10-element set of averages is calculated in time dimension, i.e. we consider the set $\left\{ \sum_{t=2000}^{2009} \frac{G\_BALANCE_{i,t}}{10} : i = 1,...,10 \right\}$.

** It should be underlined that the outcomes of analysis of causal dependencies for groups containing data only on two specific countries would be seriously biased due to a very small number of degrees of freedom; see Section 5 for more details. Therefore, in order to check the structure of causal dependencies in specific subgroups of the economies we decided to drop mentioned countries from the full sample and next analyze the reduced groups.

nied by a considerable reduction of budget deficits, one could formulate the first research hypothesis in the following way:

Hypothesis 1: The reduction of budget deficits played an important role in the economic growth of new EU members in transition in the period 2000–2009. Moreover, it was one of the factors stimulating the process of convergence of these countries towards highly developed EU members.

For the sake of comprehensiveness we should also ask an analogous question from an opposite research perspective. It seems reasonable to expect that increasing GDP could encourage CEE economies to increase the level of public spending (e.g. in order to speed up modernization of post-communist infrastructure etc.). The later may in turn suggest the formulation of:

Hypothesis 2: Economic growth caused a rise in the budget deficit of new EU members in transition in the period 2000–2009.

An important research avenue is to examine the nature of dynamic dependencies between budget and trade deficits of CEE economies in transition. As already mentioned, the visual inspection of *G_BALANCE* and *T_BALANCE* variables provided some basis to claim that both these deficits were moving in opposite directions. Therefore, is rather hard to expect that the twin deficit hypothesis held true for CEE economies in period 2000–2009. Moreover, if we take into account the expectations reflected in the first hypothesis and the interpretation of the standard net export function* we could formulate the:

Hypothesis 3: The twin deficit hypothesis did not hold in case of new EU members in transition in the period 2000–2009. Instead, there was a negative Granger causality running from trade deficit to budget deficit.

Finally, it is interesting to check whether the results of testing the three abovementioned hypotheses turn to be robust against different choices of subgroups of countries according to the criteria presented in Table 3. It seems quite reasonable to claim that the higher was the budget deficit the more pronounced were the budget-deficit-related causal dependencies. Thus, we could formulate:

Hypothesis 4: The evidence supporting the causalities between GDP and budget deficit as well as the negative impact of budget deficit on trade deficit were strongest in the case of the subgroup of countries with higher budget deficit (group I_1).

* The net export function takes the form $X=a–bY–cR$, where X denotes net exports, Y is the production (income), R denotes interest rate and parameters a, b and c are all non-negative. This well-known dependence suggests that increasing the income leads to a drop in the trade balance, as a propensity to import also increases.

All the hypotheses listed above will be verified by carefully selected econometric methods. The details on methodological issues are presented in the next section.

5. Methodology

In this paper we applied the method of evaluating panel datasets developed by Granger and Huang [14]. This approach focuses on the forecasting properties of examined models rather than on significance tests (as in the case of the traditional approach). It has often been used in recent empirical papers dealing with panel-based causality analyses (e.g. [37], [31], [16]), since it is quite simple to perform, does not require complex pretesting procedures and may be applied even for a short time series or a small number of observations in each cross-section.

In order to present this idea we will analyze the case of testing for causality in the direction from government surplus/deficit to economic growth.* Let I denote the group of examined countries (e.g. all examined countries, high-budget-deficit countries or low- budget-deficit countries) and T denote the number of time points. Next, consider the following two models:

$$GDP_{i,t} = \mu_i + \sum_{j=1}^{p} \alpha_j GDP_{i,t-j} + \sum_{j=1}^{p} \beta_j EMPL_{i,t-j} + \sum_{j=1}^{p} \gamma_j G\_BALANCE_{i,t-j} + \varsigma_{i,t} \quad (3)$$

$$GDP_{i,t} = \mu_i' + \sum_{j=1}^{p} \alpha_j' GDP_{i,t-j} + \sum_{j=1}^{p} \beta_j' EMPL_{i,t-j} + \varsigma_{i,t}', \quad (4)$$

where $i \in I$, p denotes the lag length and $t=p+1$, ..., T. A constant source of conflict in the panel-related literature is the use of fixed and random effects. It is surprising that previous studies used different, and often even incompatible, definitions of these two effects.** In consequence the same factor could be "fixed" according to one definition and "random" in the sense of another. The reason of this common misunderstanding was not only the subtle intricacies in mathematical aspects of suitable models, but often the lack of a clear concept of conducting the research. Following the suggestions of Gelman ([13]) we do not use the overloaded terms "fixed" and "random", but instead we consider two types of effects (coefficients) in a multilevel model: "constant", if they are identical for

* Testing for causality in the opposite direction and/or based on the application of different variables requires an analogous procedure.

** The Hausman test is often applied to choose which type of effects should be considered. However, this procedure has relatively poor small sample properties and its results should not always be treated as more important than the well-justified theoretical structure of the model.

all members of a group, and "varying", if they are allowed to differ from country to country. Therefore, in the models (3) and (4) we assume varying effects in the intercept terms.* When turning to estimation details (including the choice of method in evaluating the variance of the error term), we decided to rely on the standard least-squares-related methods. The reason for this is that in the case of our dataset it is rather hard to justify the need for using an approach based on linear unbiased prediction [34].**

One should also bear in mind that in the case of samples as small as the one used in this paper, several problems occur during the estimation of panel models for variables in their levels.*** One of the simplest solutions is to use first differences, which may easily eliminate individual characteristics (varying effects expressed in intercepts μ_i and μ_i^t) and significantly improve the performance of least square estimators. Thus, instead of analyzing equations (3) and (4) we evaluate the following equations:

$$\Delta GDP_{i,t} = \sum_{j=1}^{p} \alpha_j \Delta GDP_{i,t-j} + \sum_{j=1}^{p} \beta_j \Delta EMPL_{i,t-j} + \sum_{j=1}^{p} \gamma_j \Delta G\_BALANCE_{i,t-j} + \varepsilon_{i,t} \quad (5)$$

$$\Delta GDP_{i,t} = \sum_{j=1}^{p} \alpha'_j \Delta GDP_{i,t-j} + \sum_{j=1}^{p} \beta'_j \Delta EMPL_{i,t-j} + \varepsilon'_{i,t} \quad (6)$$

One can easily see that formulas (5) and (6) describe two competitive models of changes in per capita GDP in the countries included in group *I*. If model (5) forecasts a change in GDP more accurately than model (6), one may claim that information on the past values of government surplus/deficit is indeed important [14]. In other words, *G_BALANCE* Granger causes economic growth in the countries listed in group *I*.

Following papers of Granger and Huang [14], Weinhold and Reis [37], Pérez–Moreno [31] and Gurgul and Lach [16], we used two forecast–based testing procedures to test for Granger causality in the discussed framework:

* Preliminary results (not presented in detail to save the space, but available from the authors upon request) based on significance tests provided no clear evidence in favor of adding any time trends (constant or varying in Gelman's [13] sense) in models (3) and (4).

** The application of one (simple) model constructed for a very large group of (often dissimilar) countries may sometimes lead to the formulation of spurious conclusions. In this paper we aimed at describing the structure of deficit-growth causal links only for a particular and small group of (relatively similar) CEE countries. In other words, in our research the sample used *exhausts the underlying population*, which actually makes the decomposition of the variance of error term needless [13].

*** The estimation of varying intercepts in models (5) and (6) (using e.g. a least squares dummy variable model) would significantly reduce the number of degrees of freedom.

PROCEDURE I
(*count method*)

1. Set $i_0 \in I$.
2. Estimate models (5) and (6) using $i \in I \setminus \{i_0\}$ and $t=p+1, ..., T$.
3. Obtain two sequences of forecasts for i_0-th country for $t=p+1, ..., T$ using models (5) and (6).
4. Obtain two sequences of forecast errors, i.e. $\left\{\eta_t^{i_0}\right\}_{t=p+1,...,T}$ (forecast errors for model (5)) and $\left\{\xi_t^{i_0}\right\}_{t=p+1,...,T}$ (errors for model (6)).
5. After performing points 1–4 for all possible choices of $i_0 \in I$, define $p_1 = n\left(\left\{(i,t) \in I \times \{p+1, ..., T\} : (\eta_t^i)^2 > (\xi_t^i)^2\right\}\right)$ and $p_2 = n\left(\left\{(i,t) \in I \times \{p+1, ..., T\} : (\eta_t^i)^2 < (\xi_t^i)^2\right\}\right)$, where n(A) denotes the number of elements of set A.
6. Let $z_{1-\frac{\omega}{2}}$ denote the $\left(1-\frac{\omega}{2}\right)$-quantile of standard normal distribution. If:
   a) $\frac{p_1}{p_1+p_2}$ lies outside the interval $\left(\frac{1}{2} - \frac{z_{1-\frac{\omega}{2}}}{2\sqrt{p_1+p_2}}, \frac{1}{2} + \frac{z_{1-\frac{\omega}{2}}}{2\sqrt{p_1+p_2}}\right)$;
   b) the variance of $\left\{\eta_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$ is smaller than the variance of $\left\{\xi_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$,

   then the $\Delta G\_BALANCE_{i,t}$ Granger causes $\Delta GDP_{i,t}$ for countries included in group I at % significance level.

PROCEDURE II
(*out–of–sample sum–difference test*)

1. Conduct points 1–4 from PROCEDURE I.
2. Define $\left\{SUM_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}} := \left\{\eta_t^i + \xi_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$ and $\left\{DIFF_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}} := \left\{\eta_t^i - \xi_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$
3. Estimate via OLS the regression: $SUM_t^i = a + b \cdot DIFF_t^i + \varepsilon_t^i$
4. If:
   a) the result of a Student's t–test rejects the null that b=0 (at chosen significance level);
   b) the variance of $\left\{\eta_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$ is smaller than the variance of $\left\{\xi_t^i\right\}_{\substack{t=p+1,...,T \\ i \in I}}$,

   than the Granger causes for countries included in group I (at a chosen significance level).

In general, PROCEDURE I and PROCEDURE II are based on finding out–of–sample forecasts for models (5) and (6) and then testing whether the augmented model is indeed more accurate than the restricted one. PROCEDURE I is not always as powerful as PROCEDURE II, however, it is robust to any covariance between and heteroscedasticity of the errors [14]. For the sake of the comprehensiveness of our research we additionally applied a traditional in–sample Granger causality procedure:

PROCEDURE III
(*in–sample test*)

1. Estimate model (5) using all available information (i.e. $i \in I,\ t = p+1, \ldots, T$).
2. Test the null hypothesis that $\underset{j=1,\ldots,p}{\forall} \gamma_j = 0$.
3. If the null hypothesis is rejected at the chosen significance level then the $\Delta HERITAGE_{i,t}$ Granger causes $\Delta GDP_{i,t}$ in the case of countries included in group I.

Note that when the Granger-Huang [14] approach (PROCEDURE I and II) is applied to the panel of two countries the forecasts for each country are based only on the data on the other one, which may lead to significant errors, especially in the case of weak similarity between the two economies. Moreover, the statistical performance of all approaches (including traditional PROCEDURE III) is also likely to suffer from the small (extremely small in the case of two economies) sample considered. These two remarks clearly justify the strategy of choosing the subgroups of countries listed in Table 3.

At this place we should also underline two specific problems, which arise while performing significance tests (e.g. t-test, F-test) of regression coefficients on the basis of asymptotic distribution theory (as in step 4a of PROCEDURE II or step 2 of PROCEDURE III) or establishing asymptotic-based confidence intervals (step 6a of PROCEDURE I). First, if some of required modelling assumptions do not hold, the application of asymptotic theory may lead to spurious results [29]. Second, the distribution of the test statistic may still be significantly different from an asymptotic pattern when dealing with small samples, even when all modelling assumptions are generally fulfilled. One of ways to overcome these difficulties is to use the bootstrap procedure. This approach is used to estimate the distribution of a test statistic (or to construct a confidence interval) by resampling the data. Since the bootstrap distribution depends only on the available dataset, one may expect that this procedure does not require assumptions as strong as parametric methods.

The bootstrap procedure applied in this paper was based on resampling leveraged residuals, which minimizes the undesirable influence of heteroscedasticity [18].* This approach has often been applied in recent empirical causality investigations conducted on the basis of relatively small datasets (see e.g. [15], [17]). In the case of PROCEDURE I we applied percentile bootstrap confidence intervals.

In recent years the academic discussion on the establishment of the number of bootstrap replications has attracted considerable attention (see e.g. [22]. In this paper the procedure of establishing the number of bootstrap replications developed by Andrews and Buchinsky [2] was applied. In every case we aimed to choose a value of the number of replications which would ensure that the relative error of establishing the bootstrap critical values (at a 10% significance level) would not exceed 5% with a probability equal to 0.95. The Gretl script including the implementation of PROCEDURES I–III is available from the authors upon request.

In addition to standard linear Granger causality tests, the impulse response (IR) analysis was also performed. The traditional Granger causality analysis provides an opportunity to establish the directions of causal links between variables under study, however, it does not tell anything about the signs of these relationships. Therefore, in order to examine the reaction of the effect variable to the shock in the cause variable we generated impulse responses for the horizon of 20 periods.

For the sake of the comprehensiveness two values of the lag parameter were applied for each of the pairs of models (augmented and restricted) analyzed. Despite using first differences, we also examined the stationarity properties of the (differenced) data, since the LS–based approach is likely to produce spurious results for the short (in both the time and cross–sectional dimensions) nonstationary panels and time series (see e.g. [32]). Moreover, at present there are only some (rather preliminary) theoretical results on the availability of bootstrap to provide asymptotic refinements when dealing with integrated or cointegrated data [22]. Thus, before performing the panel–LS–based tests of significance (PROCEDURE III) we applied a number of unit root tests allowing for common (Levin, Lin and Chu test, Breitung test) or individual (Im, Pesaran and Shin test) unit root processes. Similarly, we used ADF, KPSS and PP tests before performing each sum–difference time–series–based test (PROCEDURE II). We applied the Schwarz criterion for choosing the optimal lag length before unit-root testing and the Newey and West [30] method for bandwidth selection. In all cases (different types of deficits, different groups of countries, time series tests (PROCEDURE II) and panel–least-squares–based tests (PROCEDURE III)) we found no evidence of nonstationarity at a 5% level.

* In order to deal with heteroscedasticity one may use the well-known concept of so-called *wild bootstrap* [28]. For the sake of the comprehensiveness we additionally considered this standard approach. Since the results obtained after the application of both bootstrap approaches were not significantly different, in further parts of this paper we will report only the results obtained by the leverage-based scheme.

6. Empirical results

In this section the results of examining causal dependencies between economic growth and budget and trade deficits in new EU members in transition are presented. The data analyzed in this paper covers the period from 2000 to 2009, which naturally means that the data in first differences covers the period from 2001 to 2009.

6.1. The impact of budget deficit on economic growth

Table 4 contains the results of testing for Granger causality in the direction from government surplus/deficit to the economic growth. All the testing procedures were performed at a 10% significance level.* Results obtained after the application of bootstrap-based methods are presented in square brackets.**

As we can see the results presented in Table 4 provided evidence to claim that budget surplus/deficit was a causal factor for economic growth in ten CEE economies examined. Moreover, we found some support to claim, that this causal link was especially strong for all but low-budget-deficit countries.

Table 4

Results of testing for causality from government surplus/deficit to economic growth

		Testing procedure					
Group of countries	**Lag**	**PROCEDURE I**		**PROCEDURE II**		**PROCEDURE III**	
		Result[a]	**Details**	**Result[a]**	**Details**	**Result[a]**	**Details**
I_0	1	✓	-	×	p-value=0.23 [p-value=0.44]	✓	p-value=0.09 [p-value=0.02]
	2	✓	-	✓	p-value=0.04 [p-value=0.01]	✓	p-value=0.00 [p-value=0.01]
I_1	1	✓	-	✓	p-value=0.18 [p-value=0.08]	✓	p-value=0.03 [p-value=0.06]
	2	✓	-	✓	p-value=0.09 [p-value=0.04]	✓	p-value=0.12 [p-value=0.08]

* In Tables 4–6 we used shading to mark the finding of significant causality (in case of conducting several tests for one specific direction the shading was used whenever the asymptotic-based or bootstrap-based p-value was smaller than or equal to 0.10).

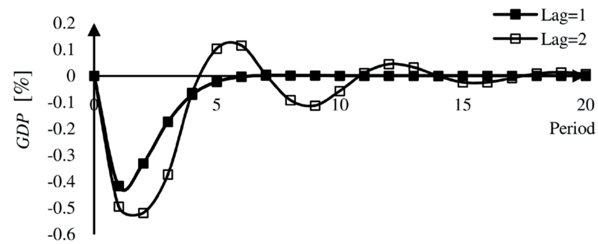
** The number of replications chosen according to Andrews and Buchinsky ([2]) algorithm varied between 1999 and 3319 for each bootstrap application. In general, results obtained after construction of asymptotic- and bootstrap-based confidence intervals were not significantly different in the case of each conducted test, thus we present results of the asymptotic variant only.

Table 4 cont.

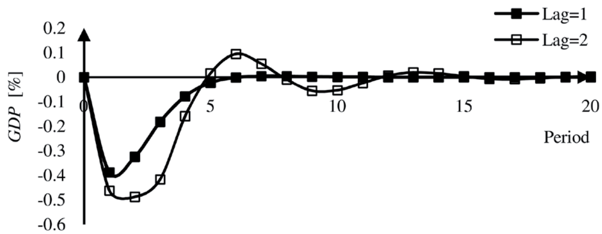
I_2	1	✓	-	×	*p*-value=0.63 [*p*-value=0.56]	×	*p*-value=0.17 [*p*-value=0.28]
	2	✓	-	×	*p*-value=0.73 [*p*-value=0.94]	×	*p*-value=0.15 [*p*-value=0.22]

[a]The symbol ✓ (×) denotes finding (not finding) causality at a 10% significance level

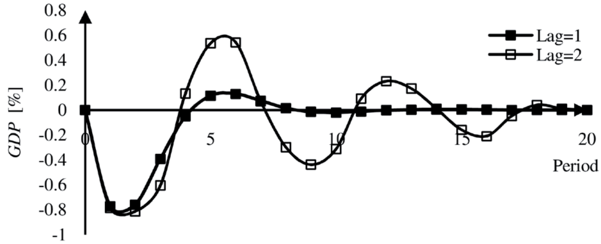
After finding statistically significant Granger causality from *G_BALANCE* to *GDP* one should examine the signs of this link. IR functions obtained for all three groups of countries are presented in Figure 2.



Accumulated response (group I_0):	
Lag=1	-1.02%
Lag=2	-1.44%



Accumulated response (group I_1):	
Lag=1	-1.12%
Lag=2	-1.49%



Accumulated response (group I_2):	
Lag=1	-1.62%
Lag=2	-1.81%

Figure 2. Responses of *GDP* to a one-unit drop in *G_BALANCE*

Source: own calculations

In general, a one-unit drop in *G_BALANCE* (which corresponds to a rise in budget deficit by 1% of GDP) causes negative responses in the first four years in all groups of countries examined. This phenomenon together with the results presented in Table 4 provides a basis to claim that Hypothesis 1 is indeed true. In other words, in case of CEE economies in transition large budget deficits were slowing down the economic growth and the process of convergence toward rich EU members in the period 2000–2009. It is also worth to mention that all accumulated impulse responses were negative and oscillated in the range between –1% to –1.8%. This implies that a rise in deficit by a 1% of GDP caused over a 1% drop in the subsequent output in the long-run.

6.2. The impact of economic growth on budget deficit

Table 5 contains the results of testing for Granger causality in the direction from economic growth to budget balance. The empirical outcomes are presented in similar fashion like in the case of the previous table.

Table 5

Results of testing for causality from economic growth to government surplus/deficit

Group of countries	Lag	Testing procedure					
		PROCEDURE I		PROCEDURE II		PROCEDURE III	
		Result[a]	Details	Result[a]	Details	Result[a]	Details
I_0	1	×	6b) unfulfilled	×	4b) unfulfilled	✓	p-value=0.04 [p-value=0.00]
	2	×	6b) unfulfilled	×	p-value=0.92 [p-value=0.87]	×	p-value=0.43 [p-value=0.22]
I_1	1	×	6b) unfulfilled	×	4b) unfulfilled	✓	p-value=0.07 [p-value=0.01]
	2	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.23 [p-value=0.29]
I_2	1	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.19 [p-value=0.38]
	2	×	6b) unfulfilled	×	p-value=0.84 [p-value=0.79]	×	p-value=0.16 [p-value=0.27]

[a]The symbol ✓ (×) denotes finding (not finding) causality at a 10% significance level

As we can see the results presented in Table 5 provided only weak evidence of causality running from economic growth to budget surplus/deficit in ten CEE economies examined. Moreover, this weak evidence was supported by results obtained mostly for all but low-budget-deficit countries. In other words, we found only weak evidence in favour of Hypothesis 2.

Similarly, to the previous case, we present the results of the IR analysis conducted only for those research variants, in which significant causality was confirmed by at least one testing procedure.

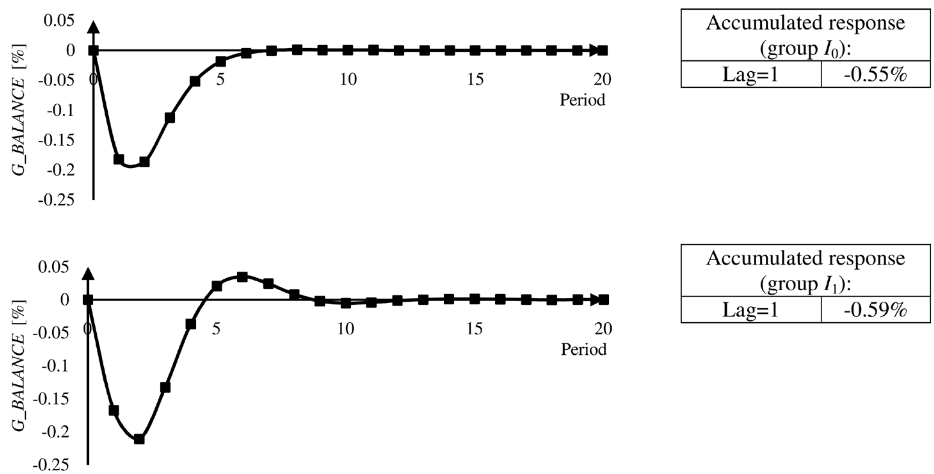


Figure 3. Responses of *G_BALANCE* to a one-unit rise in *GDP*

Source: own calculations

In general, a one percent rise in GDP also causes negative responses of *G_BALANCE* in the first four years in both groups of countries examined (Figure 3). The later means that in the period under study a rise in GDP caused a rise in budget deficit in subsequent periods. It is also worth to mention that both accumulated impulse responses were negative and oscillated around -0.5%. This implies that a one percent rise in GDP caused around 0.5% rise in the budget deficit in the long-run.

6.3. The dynamic relations between budget and trade deficits

In this section the results of testing for causality between budget deficit and trade deficit in the case of CEE transition economies in the years 2000–2009 are presented. As already mentioned, this part of the analysis is expected to provide a formal examination of dynamic dependencies between both types of deficits, including the verification of the twin deficit hypothesis. Table 6 contains suitable results of Granger causality tests.

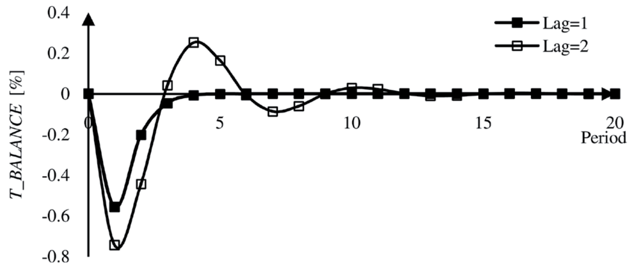
Table 6

Results of testing for causality between *G_BALANCE* and *T_BALANCE*

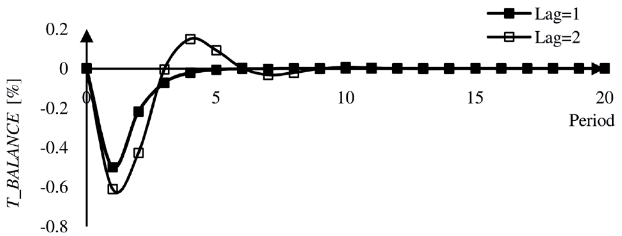
Group of countries	Lag	PROCEDURE I		PROCEDURE II		PROCEDURE III	
Testing for causality from *G_BALANCE* to *T_BALANCE*							
		Result[a]	Details	Result[a]	Details	Result[a]	Details
I_0	1	✓	-	×	p-value=0.16 [p-value=0.33]	✓	p-value=0.05 [p-value=0.01]
	2	✓	-	✓	p-value=0.02 [p-value=0.14]	✓	p-value=0.01 [p-value=0.00]
I_1	1	✓	-	×	p-value=0.35 [p-value=0.38]	✓	p-value=0.04 [p-value=0.02]
	2	✓	-	×	p-value=0.12 [p-value=0.24]	✓	p-value=0.09 [p-value=0.03]
I_2	1	✓	-	×	p-value=0.19 [p-value=0.23]	✓	p-value=0.00 [p-value=0.00]
	2	✓	-	✓	p-value=0.01 [p-value=0.01]	✓	p-value=0.04 [p-value=0.07]
Testing for causality from *T_BALANCE* to *G_BALANCE*							
Group of countries	Lag	PROCEDURE I		PROCEDURE II		PROCEDURE III	
		Result[a]	Details	Result[a]	Details	Result[a]	Details
I_0	1	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.75 [p-value=0.81]
	2	×	6b) unfulfilled	×	p-value=0.83 [p-value=0.65]	×	p-value=0.38 [p-value=0.42]
I_1	1	×	6b) unfulfilled	×	p-value=0.74 [p-value=0.81]	×	p-value=0.98 [p-value=0.75]
	2	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.73 [p-value=0.48]
I_2	1	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.81 [p-value=0.68]
	2	×	6b) unfulfilled	×	4b) unfulfilled	×	p-value=0.25 [p-value=0.27]

[a]The symbol ✓ (×) denotes finding (not finding) causality at a 10% significance level

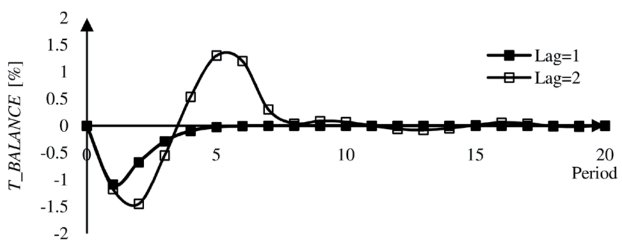
As one can see, the test outcomes provided solid basis for claiming that in the period under study budget surplus/deficit caused trade balance. On the other hand there was no statistically significant causality in the opposite direction. In order to measure the signs of the significant causal dependencies we also calculated impulse responses for the horizon of 20 periods. Suitable results are presented in Figure 4.



Accumulated response (group I_0):	
Lag=1	-0.80%
Lag=2	-0.84%



Accumulated response (group I_1):	
Lag=1	-0.81%
Lag=2	-0.83%



Accumulated response (group I_2):	
Lag=1	-2.17%
Lag=2	-0.23%

Figure 4. Responses of *T_BALANCE* to a one-unit rise in *G_BALANCE*

Source: own calculations

In general, the plots presented in Figure 4 suggest that a one percent rise in *G_BALANCE* causes negative responses of *T_BALANCE* in first few years in all groups of examined countries. In other words, in the period under study a rise in budget deficit Granger caused an improvement in the international trade balance. It is also worth to mention that all accumulated impulse responses were negative and in most cases oscillated around -0.8%. This implies that a one percent rise in budget deficit led to around 0.8% drop in trade deficit in the long-run. All these arguments provide a solid basis to accept Hypothesis 3. To summarize, these empirical results provided a basis to claim that budget deficits caused a slowdown in GDP and a rise in international trade balance. Both these causal links are simply connected through a basic macroeconomic theory (comp. the net export function).

Therefore, one may present the structure of the dependencies between variables under study in the following figure:

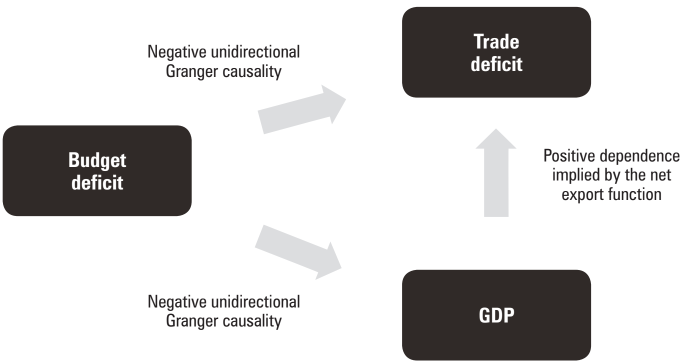


Figure 5. The structure of dependencies between the *GDP*, budget deficit and trade deficit in CEE transition economies in period 2000–2009

Source: own elaboration

Figure 5 summarises the empirical evidence on direct (see Table 6) and indirect (comp. Table 4 and the macroeconomic net exports function) negative impact of budget deficit on trade deficit. We should also underline that this figure presents the structure of dependencies between the variables under study, which was evidently supported by our empirical results and the macroeconomic theory. Some other causalities (in opposite directions to those presented in Figure 5) were also reported, however, empirical evidence supporting these results was too weak to consider them as indeed significant.

We should also underline that the results presented in Tables 4–6 and Figures 2–4 provided relatively weak evidence in favour of Hypothesis 4. Causalities between budget deficit and GDP were stronger for I_1 subgroup (all but low-budget-deficit) than for I_2 subgroup (all but high-budget-deficit), however, this regularity was not confirmed in the case for causalities between *T_BALANCE* and *G_BALANCE*.

In order to analyze the impact of the financial crisis of 2008 on the structure of established causal links we additionally re-ran all causality tests on the basis of the pre-crisis subsample (2000–2008). In general, we found only slight differences between results obtained for both samples, thus we found no reason to present pre-crisis results in separate tables. However, it is without question that this issue deserves more attention in the future, when data on at least several post-crisis years will be available.*

7. Concluding remarks

The aim of this paper was to examine the nature of causal dependencies between economic growth and budget and trade deficits of 10 new EU-members in transition from CEE region in the period 2000–2009. The specific choice of variables enabled an examination of the impact of fiscal policy on the process of convergence of these economies towards highly developed old EU members. In order to examine the stability of the results we additionally performed empirical investigations on two specific subgroups chosen on the basis of differences in the levels of budget balances of sample countries. Moreover, three methods of testing for Granger causality were applied (two out-of-sample procedures and a traditional in-sample significance test) in asymptotic- and bootstrap-based variants, which was especially important for the validation of the empirical findings.

The results of the first part of the study provided solid basis to claim that budget deficits were indeed significantly slowing down the GDP growth rates in the case of new EU-members in transition from CEE region. Moreover, these deficits had a negative impact on the convergence process of examined countries towards rich European economies. On the other hand, the evidence supporting the existence of causality in the opposite direction was markedly weaker.

We also found relatively solid evidence to claim that in the period under study there was a unidirectional negative Granger causality running from budget deficits to trade deficits. This implies that in the case of CEE economies in transition the twin deficit hypothesis did not hold in the period 2000–2009. In other words, the posi-

* In the case of every group listed in Table 3 the difference between the size of the full and reduced sample is equal to the number of considered countries, therefore it is hard to expect that suitable results (PROCEDURE III) could differ significantly, even in the face of possible structural change in the third quarter of 2008. Moreover, in the case of out-of-sample tests (PROCEDURE I and II) one should also bear in mind that forecasts based on equations (3) and (4) suffer *equally* from all model specification imperfections ([14]). Finally, measuring GDP in relation to EU-27 average additionally made the impact of crisis less apparent.

tive impact of budget deficit on trade deficit (i.e. twin deficit hypothesis), which in theory is usually explained through a rise in interest rates and next the fluctuations in exchange rate, turned out to be much weaker than the often underlined impact of a large rise in imports in CEE economies during the transition period.

After the collapse of the communist system the group of examined countries has started a long and difficult process of transforming towards market economies. The process of modernizing and reforming the economies along with EU-accession requirements were two factors having probably the most important impact on the size of budget deficits in this particular group of economies. This paper proved that budget deficits had in turn a significant and negative impact on the economic growth and convergence of CEE transition economies towards rich EU member states.

The empirical analysis of this paper also proved that for CEE economies in transition budget deficits were negatively causing trade deficits in the period under study. This finding is in line with the latter one if we take into account some basic macroeconomic concepts. The simple connection between both these empirical findings is based on the net export function. This formula, which is one of the fundaments of macroeconomic theory, suggests that a rise (drop) in GDP should cause a drop (rise) in the international trade balance due to a rise (drop) in propensity to imports. Our empirical analysis seems to confirm this theoretical dependence in the case of the analyzed economies. As a consequence, the concept of twin deficits was clearly rejected by the results of the empirical study. One must note, however, that the issue of deficit-growth dynamic links in CEE transition economies still deserves considerable attention from researchers as many important questions remain open.

Acknowledgments

The authors would like to gratefully acknowledge the financial support from the National Science Centre of Poland (Research Grant no. 2011/01/N/HS4/01383) and the Foundation for Polish Science (START 2012 Scholarship).

References

[1] Abell J., *Twin Deficits during the 1980s: An Empirical Investigation*, "Journal of Macroeconomics", 1990, Vol. 12 (1), pp. 81–96.

[2] Andrews D.W.K., Buchinsky M., *A Three–Step Method for Choosing the Number of Bootstrap Repetitions*, "Econometrica", 2000, Vol. 68, pp. 23–52.

[3] Aristovnik A., Zajc K., *Current Account Performance and Fiscal Policy: Evidence on the Twin Deficits in Central and Eastern Europe*, INFER, 2001, Annual Conference – Economics of Transition: Theory, Experience and EU Enlargement.

[4] Barro R.J., *The Ricardian Approach to Budget Deficits*, "Journal of Economic Perspectives", 1989, Vol. 3 (2), pp. 37–54.
[5] Bierens H.J., *Testing the unit root with drift hypothesis against nonlinear trend stationarity, with an application to the US price level and interest rate*, "Journal of Econometrics", 1997a, Vol. 81, pp. 29–64.
[6] Bierens H.J., *Nonparametric cointegration analysis*, "Journal of Econometrics", 1997b, Vol. 77, pp. 379–404.
[7] Bierens H.J., *Nonparametric nonlinear co-trending analysis, with an application to inflation and interest in the US*, "Journal of Business and Economic Statistics", 2000, Vol. 18, pp. 323–337.
[8] Cavallo M., *Understanding the twin deficits: new approaches, new results*, "FRBSF Economic Letter", 2005, Vol. 16, pp. 1–3.
[9] Daly V., Siddiki J.U., *The twin deficits in OECD countries: cointegration analysis with regime shifts*, "Applied Economics Letters", 2009, Vol. 16, pp. 1155–1164.
[10] Etzioni A., *A Matter of Goals: High Growth – Or Deficit Reduction?*, "Journal of Accounting, Auditing & Finance", 1989, Vol. 4, No. 4, pp. 555–570.
[11] Feyrer J., Scambaugh J.C., *Global Saving and Global Investment: The Transmission of Identified Fiscal Shocks*, "*NBER,* Working Paper Series", 2009.
[12] Ganchev G.T., *The twin deficit hypothesis: the case of Bulgaria*, "Financial Theory and Practice", 2010, Vol. 34 (4), pp. 357–377.
[13] Gelman A., *Analysis of variance – why it is more important than ever*, "The Annals of Statistics", 2005, Vol. 33, pp. 1–53.
[14] Granger C.W.J., Huang L-L., *Evaluation of Panel Data Models: Some Suggestions from Time Series*, Discussion Paper 97–10, University of California, 1997.
[15] Gurgul H., Lach Ł., *The role of coal consumption in the economic growth of the Polish economy in transition*, "Energy Policy", 2011a, Vol. 39, pp. 2088–2099.
[16] Gurgul H., Lach Ł., *The impact of regional disparities on economic growth*, "Operations Research and Decisions", 2011b, Vol. 22(2), pp. 37–63.
[17] Gurgul H., Lach Ł., *The electricity consumption versus economic growth of the Polish economy*, "Energy Economics", 2012, Vol. 34(2), pp. 500–510.
[18] Hacker S.R., Hatemi–J A., *Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application*, "Applied Economics", 2006, Vol. 38, pp. 1489–1500.
[19] Harberger A., *Lessons from Monetary and Real Exchange Rate Economics*, "Cato Journal", 2008, Vol. 28 (2), pp. 225–235.
[20] Herrmann S., Jochem A., *Determinants of Current Account Developments in the Central and East European EU Member States – Consequences for the Enlargement of the Euro Area*, Bundesbank, Discussion Papers, Series 1: Economic Studies, 2005, No 32.
[21] Holmes M.J., *A reassessment of the twin deficits relationship*, "Applied Economics Letters", 2010, Vol. 17, pp. 1209–1212.

[22] Horowitz J.L., *Bootstrap methods in econometrics: Theory and numerical performance*, in: *Advances in Economics and Econometrics: Theory and Applications*, Kreps D.M., Wallis K.F. (eds), 1995, Cambridge University Press, Cambridge, pp. 188–232.
[23] Johnson H., *The Monetary Approach to the Balance of Payments: A Non-technical Guide*, "Journal of International Economics", 1977, Vol. 7 (3), pp. 251–268.
[24] Katircioglu S.T, Fethi S., Fethi M.D., *Twin deficits phenomenon in small islands: an empirical investigation by panel data analysis*, "Applied Economics Letters", 2009, Vol. 16, pp. 1569–1573.
[25] Kim S., Roubini N., *Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the US,* "Journal of International Economics", 2008, Vol. 74, pp. 362–383.
[26] Kohler M., *Capital Mobility and Current Account Targeting in Central and Eastern European Countries*, Centre for European Economic Research (ZEW), 2005, Discussion Paper No. 05–51.
[27] Leachman L.L., Francis B., *Twin deficits: apparition or reality?* "Applied Economics", 2002, Vol. 34, pp. 1121–1132.
[28] Liu R.Y., *Bootstrap procedure under some non-i.i.d. models*, "Annals of Statistics", 1998, Vol. 16, pp. 1696–1708.
[29] Lütkepohl H., *Introduction to Multiple Time Series Analysis*, 1993, Springer–Verlag, New York.
[30] Newey W.K., West K.D., *A Simple Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix*, "Econometrica", 1987, Vol. 55, pp. 703–708.
[31] Pérez-Moreno S., *An Assessment of the Causal Relationship between Growth and Inequality in Spanish Provinces*, "European Planning Studies", 2009, Vol. 17, pp. 389–400.
[32] Phillips P.C.B., *Understanding the spurious regression in econometrics*, "Journal of Econometrics", 1986, Vol. 33, pp. 311–340.
[33] Polak J.J., *The Two Monetary Approaches to the Balance of Payments: Keynesian and Johnsonian*, 2001, International Monetary Fund, WP/01/100. .
[34] Robinson G.K., *That BLUP is a good thing: The estimation of random effects (with discussion)*, "Statistical Science", 1991, Vol. 6, pp. 15–51.
[35] Summers L.H., *Tax Policy and International Competitiveness,* in: Frenkel J. (ed), *International Aspects of Fiscal Policies*, 1988, Chicago: Chicago University Press, pp. 349–375.
[36] Vyshnyak O., *Twin Deficit Hypothesis: The Case of Ukraine*, 2000, Kyiv: National University Kyiv, Mohyla Academy.
[37] Weinhold D., Reis E., *Model evaluation and testing for causality in short panels: The case of infrastructure provision and population growth in the Brazilian Amazon*, "Journal of Regional Science", 2001, Vol. 41, pp. 639–657.

AGH Managerial Economics
2012, nr 12, s. 109–118
doi: 10.7494/manage/2012.12.109

Jan Kaźmierski*

The Conception of Cluster Support Policy in the Realities of the Polish Economy

1. Introduction

Upon Poland`s accession to the European Union one could observe growing interest in economic clustering. The formation of a successful cluster is a lengthy process, not a single act or short-term project. Once formally set up, a cluster develops and evolves through different stages and phases. Economic clustering, especially in the era of globalization, is beneficial to the Polish economy as a whole as well as to all businesses involved [2].

The first economic clusters appeared when classical economists noted that businesses are spread unevenly and concentrated in certain geographical areas. Even today, concentration of competing and collaborating businesses is something that differentiate geographical regions [6]. However , it was M. Porter who coined the term *cluster* in 1990 when he presented his new theory on operations.

As defined by Porter, a cluster is "a group of interrelated enterprises located in a certain geographical area, comprising [of] specialized suppliers and service providers operating in related sectors of economy as well as linked institutions like universities, standardization institutions, and trade associations. In certain areas they compete, while in others cluster participants collaborate closely" [9].

A review of subject-matter literature as well as practical experiences connected with the organisation of clusters in Europe, suggest, that after the year 2000, new cluster structures have been created as part of projects proposed by local authorities or organisations mediating between the sphere of science and entrepreneurs. Also, through consulting firms and, less frequently, as entrepreneurs' own initiative. This particularly applies to companies operating in high technology disciplines which require regular supplies of knowledge from research institutions. In eight countries of the European Union, the CLOE project (Clusters

* University of Lodz, Faculty of Management, Department of Logistics

linked over Europe) has been launched. Its main aim is to enable participating nations to share experiences and exchange relevant information in order to facilitate management of clusters.

As cluster awareness rises, they become a predominant element of national and regional plans concerning economic development. There have been launched thousands of cluster initiatives worldwide, which virtually engage all regions and that number is constantly growing. Those initiatives, occurring in varied forms, presently constitute a generally accepted element of economic development. However, systematic knowledge about that initiative, their structure and ways of managing their development – is surprisingly poor among Polish entrepreneurs.

This article is based on the author's own empirical research realised in the years 2007–2011 and source studies for the most part conducted using the *desk research* method. The examinations concerned mechanisms and barriers in cluster development in regional areas. The implications and conclusions can be employed in various regions of a country.

2. A nature and models of clusters

The cluster concept refers to a theory of economic activity localisation. Its essence is based on the usage of spatial concentration of companies which belong to one or more sectors or other entities (e.g. business environment institutions, public administration bodies, scientific and research and development units) to raise their innovativeness and competitiveness [1]. The main feature which distinguishes cluster from other forms of integration is occurrence of intensive interactions based on competition and cooperation at the same time. This cooperation takes place between corporation, administration and research and development sectors as well as between companies themselves.

There are a number of benefits that stem from the existence of clusters, which increase productivity, innovativeness and competitiveness of implicated enterprises. These advantages result from spatial closeness of numerous independent entities, accumulation of specific knowledge, qualifications and specialisations, easiness in acquiring proper employees and business partners (both associate contractors and service providers) and the realisation of joint actions in some areas (e.g. worker training or promotion). This in turn leads to a reduction of transaction cost (speeding up the process of signing contracts, better access to external financing, quicker technology transfer).

Cooperation between entrepreneurs and the scientific and research sphere entails adjusting program offer and research and development work to local company requirements more effectively. Collaboration with administration in turn enables the development of the essential infrastructure and more rational development funds allocation through adapting it in certain business aggregations [7].

Cooperation between corporations within a cluster takes place in different areas at the same time increasing their competitiveness against external entities (e.g. collective promotion, marketing or participation in research projects). Simultaneously, an extensive concentration of firms tightens competition, which forces them to act more innovatively and to raise the quality of offered products [8].

One of the principal motivations behind global scale research on clusters is to establish a complex typology of local systems of production. The current attempts to classify this phenomenon have failed to define it accurately. Generally, two groups of clusters, based on different kinds of developmental aspects have been recognised;

1. Techno Clusters which are linked by positive value, high technology-oriented and strongly connected with renowned universities and research institutions, where they often originate from.
2. Traditional Clusters (Historical) based on know-how and knowledge accumulated over many years and even generations. Their technological orientation is limited as is their co-operation with research centres.

In relation to several common characteristics defining the concept of a cluster, in practise they can be identified as the following forms:

- Geographically concentrated economic activity of a group of companies from the same or similar field, which are often connected with scientific institutions, such as academies and research centres.
- Vertically integrated production chains, namely, a selected group of sectors, where the neighbouring stages of the production process comprise the centre of the cluster. This form often incorporates scientific institutes, business-related services and intermediate bodies.
- Whole sectors or economic branches that constitute clusters themselves, for instance – chemical or agricultural cluster.
- A specific form of relations between subjects whose cooperation is based on trust and transfer of knowledge. This form may or may not be geographically concentrated.

With regards to the level of integration and innovation of the environment of a given region, several types of network organisations with enterprise participation can be identified. Regional cluster is the basic type; it is characterised by a concentration of independent enterprises, which operate within the same or similar field, and are located in close spatial proximity. The more elaborate kind of network may be referred to as *the regional network of innovation.* Here, the organisation and co-operation between participants are more advanced; mutual relations are based on trust, shared standards and conventions. This also serves the purpose of encouraging and supporting the progress of innovation.

In the second half of the 1990s there appeared a correlated concept which defines the organisation of an enterprise network within a region, called *Regional Innovation System* [11]. The innovation system is a structure located within a given geographical territory, supported by administrative activities, and containing innovative networks and institutions closely linked by mutual interaction and cooperation, which is to ensure increased competitiveness of the firms located within the system. Such a network comprises of research institutes, higher education schools, technology transfer centres, chambers of commerce, banks, investors, local government and government agencies, sole enterprises and their networks as well as industrial clusters [4]. This means that clusters of firms are supported by a well-developed infrastructure of intermediaries and creators of innovation who are responsible for the diffusion of knowledge and technology. Services offered by those institutions correspond with the particulars of the predominant industry of a region, which also refers to clusters operating there.

Clusters may be formed by small and medium-size companies from manufacturing and services sectors as well as high-tech and traditional technology sectors [3].

Clusters, as shown by examples, may emerge in all branches: traditional, modern, in industry, services and agriculture. They are characterised by various levels of innovation and varying sizes as it is difficult to indicate which dimensions are ideal for a cluster [5].

The above typology of clusters is unquestionably incomplete. The economic environment in which clusters develop significantly affects their characteristics as well as the dynamics of their development [10].

It is essential to note that terminology presented by specialists investigating the phenomenon of clustering does not sufficiently reflect the fact that cluster is essentially a symptom of a developing function of logistics, as demonstrated by, for instance, the character of relations between its participants. According to the author, it is therefore appropriate to employ the term logistic cluster.

3. The policy of cluster development support – the conception and organisational models

The policy of regional development based on clusters consists in coordinating actions from different fields of economic, political and scientific life, resulting in a consistent system and a specific communicating vessels mechanism – science supports production technology, education corresponds to actual requirements of labour market, support given to local companies' competitiveness helps them attract foreign investments.

Resignation from a traditional, direct, or, to say outright, manual form of control of a local economy in favour of a indirect and stimulating operation by the self-government authorities poses the main difference between the conception defined above and a classic model of regional development.

Clusters become here a tool of support and revitalisation, they are designed to extort natural enterprise. That is one of the most considerable advantages of conducting CBP – benefits are noticeable for a whole region, not only entities engaged.

In order to define "Cluster-based Policy" by referring to its constitutive features, it can be mentioned, that the policy is:

– Based on cooperation and joint actions,
– Market is its catalyst
– It combines various actors in the so-called triple helix model (usually business, science and local administration)
– It is of a strategic nature, thus helps to generate an overall strategy/vision of of a particular region's development
– It creates new values.

Cluster policy can evince itself in varied models. It might be realised on two grades: central (national politics) and council (regional politics). It can emerge from higher up, i.e. be the aftermath of public of self-government authorities actions. Comparatively, this policy can be the result of bottom-up initiatives, e.g. stem from grassroots initiatives of trade environments. In economic realities, however, the mixed model which embraces creating national frames for the realisation of a regional grade policy is concerned to be the most effective one.

In European Union member states the examples of realisation of the CBP conception can be found in each of these models. Most EU countries have implemented cluster support programs on a national or regional grade. However, there is no general model for that policy. To make a choice of a suitable conception and the tools of realisation, the current state of a country or a region and specific administrational and economic requirements must be taken into consideration.

4. Polish realities – barriers and restrictions in cluster support policy

Barriers connected with CBP policy implementation and with cluster development, which they entail, are so numerous and diversified that "lumping" them together could entangle them and hinder the assessment of a situation. Thus, it is advised to establish specific criteria of division which enables us to create a more orderly analysis.

According to experiences in terms of Polish successfully functioning clusters, an analysis concerning interviews with cluster coordinators and entrepreneurs, as well as getting acquainted with the official documents of institutions which affect cluster structures' functioning, it is possible to single out four main types of development barriers:

– organisational barriers,
– institutional barriers,
– market barriers,
– mental barriers.

The first type refers to a real shape of Polish economy and its individual segments, especially the R+D sector and the system of cluster initiatives' financing. Institutional barriers boil down to relations between already working or potential cluster members and self-government or government administration organs, business environment institutions. Market barriers embrace global economy trends, growth of competitiveness, business cycles (the risk of recessions and crisis). Finally, mental barriers, which can be associated with social and cultural factors, ingrained cooperation rules or lack of social confidence in the public sector.

The barriers of cluster development in Poland mentioned above do not exhaust the subject, on the contrary – it is open to question and as the clustering idea popularises, other obstacles and difficulties occur. Undoubtedly, however, some of them are particularly threatening and of enormous negative potential and impact on the shape of clustering in Poland. Thus, they require special attention. In the general opinion of entrepreneurs themselves small financial resources and low budget are the main hindrance getting in the way of creating a professional cooperation network. To be outright – businessmen complain about lack of money. The outcomes of a research concerning that problem are unambiguous – financial barriers are pointed as most significant by 89,7% of the managers.

That subjective judgement of business representatives cannot be disregarded, as convictions about financial barriers which are not to overcome discourage from making cluster initiatives and facing reality from the very beginning. However, it is not as unfavourable as it is perceived by entrepreneurs. The view of financial stagnation is for the most part a stereotype and a myth.

Thus, it seems that lack of financial resources is not as much a problem as their availability is. Public institutions' aim is to convince business environments that a cluster budget is sufficient to think of realising those initiatives. Change of stereotypical belief in general lack of funds is connected with taking another crucial barrier in stride, which is extortionate bureaucracy. Simplifying the procedures and employing transparent and equal assessment criteria will let entrepreneurs trust public institutions to a larger extent and consequently convince them to use offered means more eagerly.

According to many respondents, mental and structural issues are more important that financial ones. Among mental barriers the most serious problem is mistrust ingrained in Polish society. To a great extent it poses the heritage of the Polish People's Republic. "The culture of distrust" which dominates in Poland results also from low political culture and corruption. That atmosphere is not conducive to build cluster structures, which are formed on the basis of mutual confidence. The success of clusters is directly proportional to trust between entities which form economic connections. Otherwise, it is hard to talk about information and experience exchange, knowledge transfer, innovation diffusions and many other actions, realisation of which is the aim of economic networks.

In the Polish economic system the ideology of competition, rivalry or even open hostility is the dominating one. To some extent it stems from fear of bankruptcy – a lot of Polish, especially small and medium, companies are still not deeply rooted and only just build their position, capture the market. In this situation some reluctance to disclose their know-how to other members of market gambling is partially understandable. In Poland, however, rivalry and completion are too often misapprehended. More openness among entrepreneurs is inevitable. Aversion to partnership and inability to cooperate undoubtedly impede the creation and development of cluster structures.

Another barrier, which is miscomprehension of the cluster idea, in practice means that entrepreneurs' expectations differ from real benefits gained by clustering. These assumptions are usually exorbitant or completely inadequate and deficient. It frequently occurs that the sole motivation to form a cluster structure is availability of public resources (usually European funds). Bringing clusters into existence in order to gain a donation warps the whole idea of clustering. Education, which leads to better understanding of its goals among both entrepreneurs and self-government environments is inevitable here.

To conclude, it is necessary to emphasize that cluster development barriers make up a specific communicating vessels system. Lack of trust in a public area handicaps knowledge transfer and innovation diffusion, which in turn determines low innovativeness of Polish economy. The suspension of these conditions in the long perspective can result in restrictions of European Union resources dispensation. That, in the context of the new Community budget, which gives priority to investments in innovations and knowledge management, becomes a more serious threat.

5. Conclusions

In Poland there is an urge to develop the proper cluster support model and cluster initiatives. Poland, though, is delayed in comparison to other European Union countries. It is assumed that this policy should have a bottom-up nature, which favours entrepreneurs' initiatives. Public authorities (especially regional) should instead serve as a "catalyst for development". They ought to create and stimulate cluster development in the area.

Developing an appropriate cluster support model in Poland should not, however, mean copying or imitating foreign concepts uncritically. Specific realities of Polish economy as well as the proven experiences of other countries must be taken into consideration here.

This approach will help to eliminate a number of barriers which were mentioned above. It will also enable clusters to become a virtual "motor for economic development".

References

[1] Boekholt P., Thuriaux B., *Public Policies to Facilitate Clusters: Background, Rationale and Policy Practices in International Perspective,* OECD, 2009.
[2] Bojar E., Bis J., *Major Threats to Economic Clusters in Poland*, in: *The emergence and development of clusters in Poland*, Bojar E., Olesiński Z. (ed), Difin, Warszawa 2007, p. 40.
[3] Bucka M., *Rozwój klastrów a konkurencyjność małych i średnich przedsiębiorstw*, in: *Konkurencyjność i potencjał rozwoju polskich metropolii – szanse i bariery*, Korenik St., Szołek K. (eds), KPZK PAN, Biuletyn 214, Warszawa 2004.
[4] Cookie P., Schienstock G., *Structural Competitiveness and Learning Regions*, "Enterprise and Innovation Management Studies" 2000, Vol. 1, No. 3, p. 273.
[5] Enright M.J., Ffowcs-Williams I., *Local partnership, clusters and SME globalization*, Workshop 2. OECD, Conference for Ministers responsible for SMEs and Industry Ministers, Bologna, Italy, 14–15 June 2008, http://www.oecd.org/dataoecd/20/5/2010888.pdf.
[6] Grycuk A., *Koncepcja gron w teorii i praktyce*, "Organizacja i Kierowanie", 2003, No. 3(113).
[7] Kaźmierski J., *Clusters as a symptom of developing functions of logistics in region*, "Scientific Journal – Service Management" , 2010, Vol. VI.
[8] Kaźmierski J., *Generatory innowacji*, "Eurologistics", 2011, No. 3, pp. 18–21.

[9] Porter M.E., *Porter o konkurencji*, Polskie Wydawnictwo Ekonomiczne, Warszawa 2001.
[10] *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2005–2008*, Rybnicka A., Tokaj-Krzewska A. (eds), Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2009.
[11] *Regional cluster in Europe*, European Commission, Observatory of European SMEs 2002, No. 3, p. 14.

AGH Managerial Economics
2012, nr 12, s. 119–130
doi: 10.7494/manage/2012.12.119

Piotr Gurgul*

New Mobile Marketing Capabilities of the Android Platform

1. Introduction

The emergence of smartphones, tablets and other intelligent mobile devices proved to bring revolutionary ideas and tools for smart marketing. Moreover, the advances in telecommunications leading to a phenomenon called service convergence [21], will potentially make the mobile internet the sole and uniform communication medium. In fact, by the end of 2014, there will be more mobile internet users than 'desktop internet' users [18]. This change is shown in Figure 1, which extrapolates the existing trends to 2015. Such behavior adheres to the rules of network economy summarized for the first time by Kelly in 1997 [14]. Disruptive innovations are changing the mobile market faster than ever and there is a wide choice of brand new solutions that can revolutionize completely the way mobile devices are used currently for marketing purposes. The need for such new solutions has been voiced in [2], [4] and [13].

Moreover, the smartphone market size and value have risen tremendously over the past few years, making it very attractive for advertisers. It is no longer an experimental niche [17]. Figure 2 shows the percentage of mobile media users among citizens of eight selected, developed countries.

However, most businesses allocate only a small percentage of their marketing budgets to this form of promotion. Even if they already apply mobile marketing, its use is mostly limited to very basic features, such as plain SMS advertising.

Nevertheless, smartly leveraged mobile media can help to increase the quality of advertising and therefore boost conversion rates together with improving metrics such as *cost per acquisition*, *cost per click* or *cost per loyal user*.

* AGH University of Science and Technology, Department of Computer Science,
email: pgurgul@agh.edu.pl

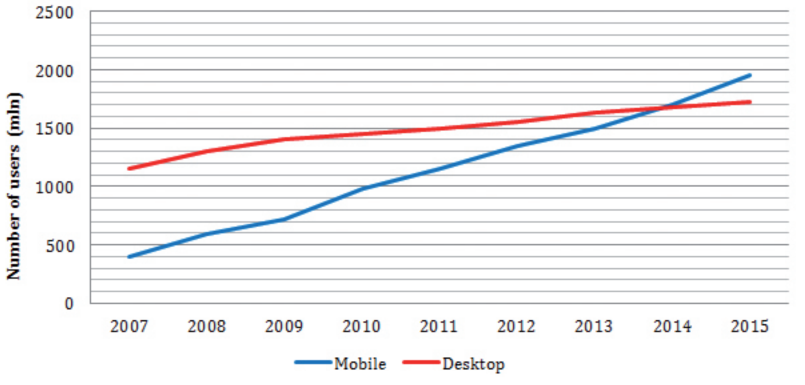


Figure 1. Anticipated increase of mobile and desktop internet users

Source: own elaboration based on [18]

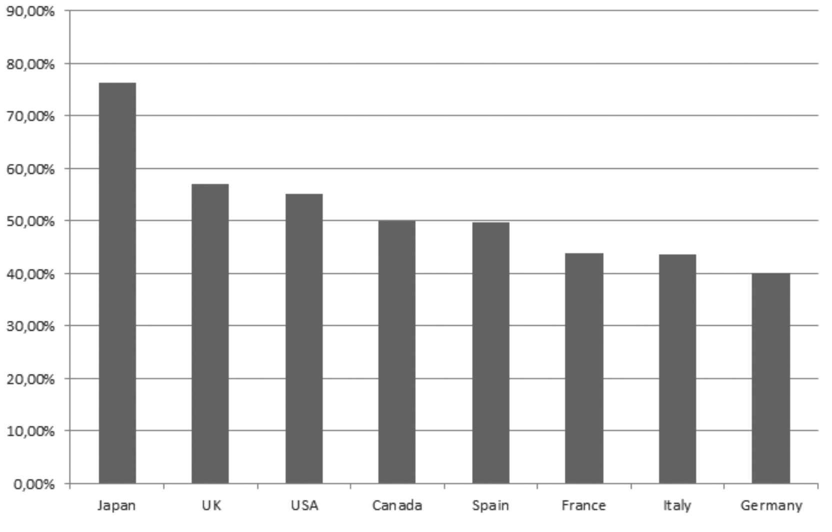


Figure 2. Penetration of markets by mobile media in selected countries

Source: own elaboration based on [5]

Smartphones definitely favor more intelligent and widely understood mobile marketing. Usually equipped with numerous gadgets and features like barcode scanners, front camera or GPS navigation they are even better than computers at discovering and satisfying their owners' needs. Moreover, they tend to be far more personal devices than ordinary mobile phones used to be. This is easily explicable, since nowadays they carry much more sensitive information than just text messages or call logs. A smartphone is aware of a user's e-mails, location, social network activities etc. As a result, aggressive marketing methods such as spamming will be perceived even less tolerantly than it is in the case of e-mails. Using mobile media involves accepting both up and downsides.

Konkol [15] emphasized two most important properties of mobile media:

– Mobile media are rich and allow communication in many different configurations.
– They provide return channel that is integrated with other communication tools.

A convenient return channel facilitates not only user response to call to action statements, but is perfectly suitable for more personalized and complicated dialogues. In the age of traditional mobile phones, the only implementation of this channel were text messages. Smartphones have introduced more a flexible use of them by letting in external applications with internet access.

This paper aims to cover the existing and possible future impact of the new technical features of smartphones and other intelligent mobile devices. Special emphasis is put on the Android Operating System since its business model is fully bound to revenues from mobile advertising.

The structure of this paper is as follows: section 2 presents an overview of Android seen as a marketing platform. Section 3 introduces Android 4.0 Ice Cream Sandwich and the changes introduced. Section 4 focuses on a new way of short-range communication that is very attractive for smartphones (NFC). Section 5 describes metrics for measuring effectiveness and efficiency of mobile marketing. The last section concludes this paper.

2. Android as a mobile marketing platform

Like most IT companies, Android Inc. was founded in Sillicon Valley (Palo Alto) by Andy Rubin, Rich Miner, Nick Sears and Chris White in 2003. Rubin described his mission as creating "(...) smarter mobile devices that are more aware of its owner's location and preferences" [3]. The company operated secretly until it was bought by Google in 2005. Then it started to be clear that Google aimed to enter the mobile market. Unlike its competitors (like BlackBerry or iPhone – see [12]), Google decided to make the platform free and open to enable wide adoption. In the light of Google's sources of income, this is fully understandable.

Although Google sells numerous additional services such a corporate Gmail and Google Docs, Google Earth professional edition or Google Voice credits, their share in company total revenues is less than one percent. The remaining part comes from advertising.

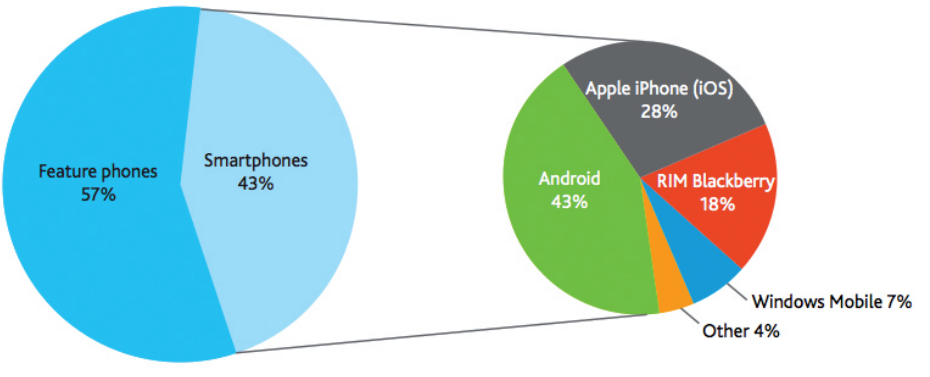


Figure 3. Mobile OS market share

Source: [8]

Using an Android device requires the possession of a Google account, which in most cases implies choosing GMail as e-mail service provider. This allows Google not only to extend their advertising infrastructure by mobile devices, but also to acquire new users on the stationary internet. Having users signed in while browsing the internet allows more accurate targeting of advertising content. Another way of increasing mobile advertising space is cooperation with external publishers. This is achieved by allowing third-party entities to release either paid or free applications in Google's Play Store. Many of them earn on mobile ads that are provided by Google (partner network). The count of applications available in Play Store has already exceeded 550,000 [9]. Since its commercial beginning in 2008, Android has generated $550M in revenues alone [1], which pales into insignificance compared to $38B Google revenues only for 2011. However, mobile advertising earnings are rising very sharply, so this proportion may change dramatically in the future. In terms of market share, Android has already won pole position. Figure 3 shows the Android market share as of Q4 2011. Figure 4 confirms that Android is also a leader in terms of share of the total number of impressions of the smartphone-displayed advertising.

3. New technical features

Android has lot to offer to mobile marketers. The most commonly used features are the simplest ones – mobile banners, context ads and sponsored applications. There have been also several attempts to utilize more advanced capabilities like Bluetooth advertising, geospatial ads, barcode scanners, augmented reality, sponsored widgets and QR codes.

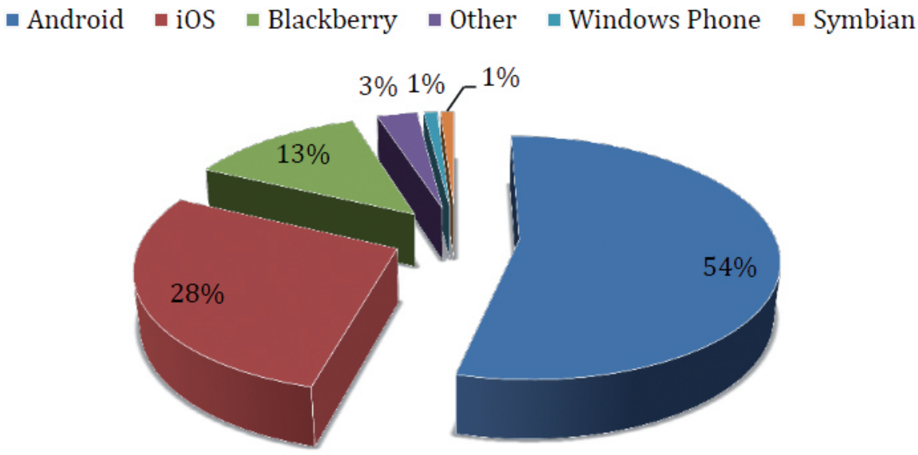


Figure 4. Share of various mobile OS in total number of mobile ads impressions

Source: own elaboration based on [11]

Android 4.0 Ice Cream Sandwich (ICS) was released on October 19, 2011. It is already in its eighth publicly available version. It contains a wide range of improvements and redefinitions of already present features.

One of the most visible changes comes in terms of Graphical User Interface (GUI). It offers increased usability and elegance. There are new, virtual buttons located in the bottom action bar that serve for most common actions like starting a phone call, opening the address book, sending a text message or opening the web browser. As a matter of fact, the entire graphic system has been redefined to fit the needs of high-resolution screens (e.g. AMOLED). The author has tested and compared three devices running different versions of Android (HTC myTouch – Android 1.6, Google Nexus One – Android 2.2, Samsung Galaxy Nexus – 4.0) and the supremacy of the latter one is clearly visible.

Another feature that increases usability are resizable widgets. Now, it is easy not only to make shortcuts on Android desktops, but also to embed fragments of entire applications on the desktop. This is an impressive quality change that allows us to e.g. check for new e-mails and social streams without entering any app.

There has been also introduced a 'favorites tray' that allows dragging and dropping applications and shortcuts for quicker access. While unlocking the screen it is also easy to enter the camera view.

Google also put great effort into improving the e-mail application experience. The improved auto-completion of recipients is definitely worth mentioning. And, in line with what has been mentioned in previous paragraphs, e-mail app can be dragged as a widget.

Receiving and handling incoming calls in ICS is also significantly easier. When the phone rings, now it is possible to respond with a text message even without unlocking the screen. There are also some predefined message templates that mean spending minimum time when busy.

The camera software and photo gallery have been also greatly improved, adding some extra features like panorama mode and built-in face detection. Moreover, quick photo sharing capabilities have been mastered.

As promised by its authors, Android ICS introduces better web browsing experience. The speedup of webpage rendering is now 550% better than its previous version [22]. It is also possible to request a 'desktop' version of a web-page and browse it using easy zoom-in and zoom-out commands.

One of the key security innovations is also a face recognition system for unlocking the screen. The front camera compares an actual face with a saved pattern and decides, if a given face is similar enough to grant access. If this is not the case, the user still can type his PIN to unlock the phone. Unfortunately, this is still more like an experimental feature, since its performance highly depends on current light conditions and angle. According to this author's experience, it usually takes between 2–3 attempts to unlock the phone in bright surroundings and it is virtually impossible when it is dark. This still makes the visual pattern more comfortable alternative.

One of the biggest innovations introduced in ICS is Android Beam for NFC-based sharing. NFC stands for Near-Field Communication and constitutes a set of standards for smartphones that enable easy communication between nearby devices. This communication includes (but is not limited to) contactless transactions and data exchange. The maximum range is just a few centimeters. Apparently, NFC serves not only for communication between devices, but can be used also to exchange data with an unpowered chip, called a 'tag'. Countless existing and prospective marketing commercial applications of NFC will be explored in the next section. Android Beam is an application allowing rapid exchange of data for two NFC-enabled Android devices placed nearby. Such an exchange can include favorite applications, movies, files, contacts, pictures or even comparing game scores.

Android supports Wi-Fi Direct which allows peer-to-peer connection between two nearby (not necessarily Android) devices and instant sharing of various content. Such a connection is completely adhoc and does not require any structured Wi-Fi network (e.g. a router).

Lastly, Android ICS supports one more, but rather specialized way of communication. It is called the Bluetooth Health Device Profile (Bluetooth HDP) and provides easy access to wireless medical devices or sensors present in hospitals and fitness centers. As an example, an Android 4.0 phone can obtain and interpret results from a HDP-ready blood pressure monitor.

4. Commercial use of Near Field Communication

Although NFC Forum was established by Nokia, Phillips and Sony as early as 2004, the Near Field Communication standard is relatively young and poorly explored, especially in marketing. For now, its primary commercial application has been developed by MasterCard to introduce a software PayPass function for smartphones that requires neither a PayPass card nor a sticker.

Although mobile payments are currently the most common way of using NFC worldwide, marketing applications will certainly follow, because in terms of marketing functionality, NFC is no different from QuickResponse (QR codes) but easier to use. QR codes require enabling camera mode or barcode scanner and code scanning, while an NFC exchange does not require any special action. So far, many businesses use these two technologies alongside each other.

The number of places and items displaying QR codes is skyrocketing and now it is safe to say they are ubiquitous. QR codes, that were once only industry standards for monitoring vehicles during assembly, now serve primarily for marketing. This was caused by dissemination of smartphones and other intelligent devices equipped with a camera and barcode scanner. The main advantage of using a QR code is the fact that they provide virtually effortless access to promotional content like a company website or advertisement. This obviously boosts conversion rates.

NFC stands somewhere between QR codes and Bluetooth advertising. The latter turned out to be too expensive and to raise many privacy concerns. Bluetooth proximity marketing, called sometimes ‘Bluecasting’ was used in just a few dozen major campaigns.

The marketing use of NFC, QR codes and Bluetooth can be divided by subject into several categories:

– **Retailers** may use this way of communication for upselling, when the customer is already in the store.
– Transponders in **malls or markets** may offer free maps and guides, together with special offers and ads ‘smuggled’ into the content.
– **Sports Arenas** where free wallpapers or other gadgets can come along with marketing communications.

One of the earliest NFC-ready applications available in Play Store is a project called EnableTable. For now, it was designed exclusively for Android and serves for the smart increasing of restaurant’s customer loyalty. The basic idea behind this application is simple. When a server brings the bill to the guest table, it is equipped with a special tag that emits NFC data. The data contains a discount ‘thank you’ coupon which is downloaded to the user’s phone upon payment. The most common pattern that the coupon offers is 10-15% off the next payment, which should encourage customers to return. However, the remaining options may be much more sophisticated ranging from a free-drink coupon through free tunes to contests. Understandably, these kinds of offers are nothing new in the marketing world but their existing implementations are somehow inconvenient for customers. It is easy to lose a paper coupon, forgot it or let it expire. Having an e-coupon as a mobile application makes it self-manageable and smart. EnableTable notifies a user when one of the coupons is about to expire. Currently, the main obstacle against the wide adoption of this solution is the small number of participating restaurants. Figure 5 shows the EnableTable functionality scheme.

Figure 5. EnableTable functionality scheme

Source: [6]

5. Measuring results

The aim of this paragraph is to compare and contrast the effectiveness and efficiency of mobile marketing as opposed to internet marketing.

The most common metrics for effectiveness are [16]:

- **Reach r**. The number of unique visitors that have seen the ad.
- **Frequency f**. The average number of times that a recipient has seen the given ad.
- **Click Through Rate (CTR).** The percentage of visitors that have seen the ad and followed its content (e.g. clicked).
- **Conversion Rate**. The percentage of visitors that see the ad and take the desired action (e.g. register or make a purchase).

The MediaMind organization [7] has investigated 230M impressions of internet ads both in traditional and mobile web browsers. It turned out that CTR for mobile ads was 0.61% as opposed to only 0.07% for traditional web ads. These are not only much better results, but most likely, also underestimated. This is due to the 'offline effect' [23], which says that some mobile users just perform the desired action instead of following the ad. As an example, a user walking down the street and reading news on his smartphone spots a sponsored sandwich bar nearby (geospatial advertising, see [20], [23]). Instead of following the ad, the user just goes and visits the sandwich bar. Understandably, this is very rarely the case with desktop computers.

However, critics indicate that some of these clicks may be caused just by accidental tapping of the touchscreen. Mobile phone displays are much smaller and therefore mobile ads occupy relatively more space.

Efficiency parameters can be described in detail by:

- **Cost per Click** – determines the price paid by the advertiser when a user follows (clicks) the ad.
- **Cost per Mille** – determines the price paid by the advertiser for one thousand impressions of the ad.
- **Cost per View** – determines the price paid by the advertiser when the advertised content is displayed to the user. Used for the Pay per View model, mostly for video ads.
- **Cost per Acquisition** – determines the price paid by the advertiser when a user performs the desired action. Used as a basic payment model for affiliate marketing.

As of March 2012, the average Cost per Click for smartphones was \$0.53 as opposed to \$0.83 for desktop computers [10].

6. Best practices and conclusions

Although mobile marketing is still a very young and poorly explored discipline, there are already many guides and manuals available that indicate what makes mobile marketing both successful and efficient.

First of all, mobile phones are treated as very personal, and sometimes even intimate devices, which users are unwilling to share or lend. For this reason, it is much more difficult to persuade a user to accept promotional content. In the first place, it need to be either useful or entertaining. Broadcasting mass-media style advertising through mobile media often ends up in customer ignorance and very low acceptance rates.

It is crucial to provide an honest, clear and attractive Call to Action [15]. This can be either in the form of discount code, free coffee or useful sponsored application.

It is also very important to be aware of the diversity of different devices when planning a campaign [19]. Moreover, communication over mobile media cannot assume definite connection parameters, since they vary.

Mobile marketing on smartphones is definitely a powerful and promising, yet strongly underrepresented means of smart promotion. The numerous technical features useful for marketing seem at least partly undiscovered. There are many attempts to try new possibilities, but only few of them find followers (as happened with e.g. QR codes).

The aim of this paper was to show the raising significance of the Android platform and numerous opportunities brought to marketers by its emergence. Focusing mostly on the newest solutions available, NFC has been explored in detail. Judging by the early results, this is one of the ways to go.

KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

The work described in this paper was partially supported by The European Union by means of European Social Fund, PO KL Priority IV: Higher Education and Research, Activity 4.1: Improvement and Development of Didactic Potential of the University and Increasing Number of Students of the Faculties Crucial for the National Economy Based on Knowledge, Subactivity 4.1.1: Improvement of the Didactic Potential of the AGH University of Science and Technology "Human Assets'', No. UDA – POKL.04.01.01-00-367/08-00.

References

[1] Arthur C., *Google's Android has generated just $550m since 2008, figures suggest*, "The Guardian", 30.03.2012.
[2] Duncan T., Everett S., *Client perceptions of integrated communications,* "Journal of Advertising Research", 1993, vol. 3(32), pp. 30–39.
[3] Elgin B., *Google Buys Android for Its Mobile Arsenal*, "Bloomberg Businessweek", 2005, nr 25.
[4] Hughes M., *Buzzmarketing: Get People to Talk About Your Stuff,* "Portfolio Hardcover", 2005.
[5] http://www.comscore.com.
[6] http://www.enabletable.com.
[7] http://www.mediamind.com.
[8] http://www.nielsen.com.
[9] http://play.google.com.
[10] http://www.simplyzesty.com/mobile/smartphones-will-generate-25-of-paid-search-ads-click-by-dec-2012/.
[11] http://www.techcrunch.com.
[12] Isaacson W., *Steve Jobs*, "Simon & Schuster", 2011.
[13] Kaplan A., *If you love something, let it go mobile: Mobile marketing and mobile social media 4 x 4*, "Business Horizons", 2012, 55(2), pp. 129–139.
[14] Kelly K., *New rules for the new economy,* "Wired", 1997.
[15] Konkol S., *Marketing mobilny*. "Helion", 2009.
[16] Kotler P., Armstrong G., Wong V., Saunders John A., *Principles of Marketing*, "Pearson", 2006.
[17] Leppaniemi M., *Mobile marketing communications in consumer markets*, "Acta Oeconomica", University of Oulu, 2008.
[18] Mobile Internet Report, Morgan Stanley, 2011, http://www.morganstanley.com/institutional/techresearch.
[19] Schultz D., *The next generation of integrated marketing communication*, "Interactive Marketing", 2003, vol. 4(4), pp. 318–319.
[20] Sharma C., Herzog J., Melfi V., *Mobile Advertising – Supercharge, Your Brand In the Exploding Wireless Market*, "John Wiley & Sons", 2008.
[21] Van Dijk J., *The network society,* "Sage Publications", 2008.
[22] V8 benchmark, http://www.android.com.
[23] Ziemiński A., Gamdzyk M., *Telefon wszechstronnie marketingowy*, „Marketing w Praktyce", 2009 (5), pp. 43–46.

SUMMARIES

Marianna Księżyk, Marek Ł. Michalski: **Financialization as a Factor Constraining Economic Growth and Standard of Living Improvement in Poland** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *financialization, financial crises, economic growth, standard of living*

Despite evidence of numerous negative effects of the process of financialization in open markets and under globalization, in Poland, there is a lack of interest in reliable, documented empirical research on the sources and causes of financialization and its impact on economic growth and living standards of all residents.
Recognizing these problems as important for the realization of objectives that were at the foundation of European integration, sources of financialization and its implications for economic growth and living standards of residents of Poland, as an EU country, were characterized.
The state of theory in this area was assessed and the results of empirical research that was conducted were presented.

Joanna Duda: **Role and Importance of Technological Credits in Financing of Innovative Investments by Small and Medium-sized Enterprises in Poland and Lesser Poland** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *SME, sources of financing, bank credit, technological credit, innovations*

As globalisation and internationalisation proceed, innovativeness of small and medium-sized enterprises (SME) has become a key element to building of competitive advantage in the market. Polish SMEs are commonly regarded as not very innovative and encounter a range of barriers to access to external capital, in particular, bank crediting. Therefore, this paper analyses investment spending and sources of financing for innovative activities in this group of enterprises on the basis of literature and empirical studies. An attempt is also undertaken at assessing the potential for obtaining and using of technological credits in order to finance innovative activities.

Henryk Gurgul, Milena Suliga, Tomasz Wójtowicz: **Responses of the Warsaw Stock Exchange to the U.S. Macroeconomic Data Announcements** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *event study, macroeconomic announcements, inflation, industrial production, unemployment, abnormal returns, trading volume*

The relationship between information flows and changes in asset prices is one of the main issues of financial economics. A fundamental assumption of the market efficiency hypothesis is that investors react to new information as it arrives. This reaction results in price changes that

reflect investors' expectations concerning the level of risk and rates of return. The main aim of this paper is to investigate the effect of U.S. macroeconomic data announcements about inflation, industrial production and unemployment on the trading volume and prices of the most liquid stocks listed on the Warsaw Stock Exchange in the period 2004-2011. Using event study methodology we determine when and how forecasts and investor expectations regarding future market conditions changes under the influence of incoming macroeconomic data on the U.S. economy. This methodology also allows us to describe the strength, direction and length of the impact of announcements about these macroeconomic indicators.

Agnieszka Barcik, Piotr Dziwiński: **Leniency Program as an Innovative Legal Tool for Fighting Cartels within The European Union** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *competition law, economy, cartels*

The article focuses on discussing the substance of the institution of leniency which is used against cartel agreements. The study was carried out with regard to the provisions of EU law and Polish law. The paper analyses the factors that determine the effectiveness of the leniency program. Some of the considerations were given to the practical effects of applying the scheme by the European Commission and the Office of Competition and Consumer Protection. The article discusses the issue of the impact of the leniency program on the effectiveness of antitrust proceedings and shows the factors which determine the effective functioning of the program.

Henryk Gurgul, Łukasz Lach: **Two Deficits and Economic Growth: Case of CEE Countries in Transition** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *economic growth, twin deficits, CEE transition economies*

The main goal of this contribution was to provide evidence on the dynamic interdependencies between economic growth and budget and trade deficits in ten new EU members in transition in the last decade. It is worth to note, that besides establishing directions of causal relationships this paper also derived some suggestions on signs of the dynamic dependencies analyzed.
Outcomes of this paper confirmed that the budget deficits were significantly slowing down the GDP growth rates in case of new EU-members in transition. In addition, these deficits had negative impact on the convergence process of examined countries towards the highly developed European economies. The evidence supporting adverse causality was considerably weaker.
The empirical results allow to claim that in the period under study there was a unidirectional negative Granger causality from budget deficits to trade deficits. Therefore, in case of CEE economies in transition the twin deficit hypothesis was not the case.

Jan Kaźmierski: **The Conception of Cluster Support Policy in the Realities of the Polish Economy** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *clusters, regional development, Cluster-based Policy, cluster support models, development barriers*

Over the years clusters have become a phenomenon of every economy. They should be treated as a vital mechanism that activates region development. Therefore, cluster-based policy gains an exceptional meaning. Selecting that model of policy, the problem of public aid and support

instruments' appliance are crucial issues. Beside the aspects that were mentioned above, the author also discusses barriers and limitations which are connected with cluster-based policy. He also indicates the ways to overcome them. The conclusions and implications that are presented are for the most part the aftermath of the author`s own empirical research on cluster development issues.

Piotr Gurgul: **New Mobile Marketing Capabilities of the Android Platform** ▪ AGH Managerial Economics 2012, No. 12

Keywords: *mobile marketing, Android, integrated marketing communication, relational marketing, geospatial advertising, near field communication*

Rapid development of the intelligent mobile devices such as smartphones and tablets created numerous opportunities for new forms of both mobile marketing and marketing in general. The emergence of smartphones complies with the drive for new ways of targeted and measurable marketing as proposed by integrated marketing communication paradigm. New technical features such as barcode scanners, QuickResponse codes, AGPS or Near Field Communication (NFC) enable high level of personalization and engagement. The Android platform additionally increases the potential of smartphone marketing.
The aim of this paper is to explore new technical features available in Android 4.0 Ice Cream Sandwich and investigate their potential use in mobile marketing. The emphasize is put on the special role that NFC may play in the marketing of the future. Besides, the significant part of the paper is committed to existing ways of marketing using smartphone and indicating the superiority of Android over other platforms in terms of results.

STRESZCZENIA

Marianna Księżyk, Marek Ł. Michalski: **Finansjalizacja jako czynnik ograniczający wzrost gospodarczy i poziom życia mieszkańców Polski** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *finansjalizacja, kryzysy finansowe, wzrost gospodarczy, poziom życia*

Mimo istnienia licznych negatywnych skutków procesu finansjalizacji w warunkach otwartego rynku i globalizacji, w Polsce zauważa się brak zainteresowania rzetelnymi, udokumentowanymi empirycznie badaniami dotyczącymi źródeł i przyczyn finansjalizacji oraz jej wpływu na wzrost gospodarczy i poziom życia ogółu mieszkańców.
Uznając te problemy za istotne, w aspekcie realizacji celów, które legły u podstaw integracji europejskiej, autorzy uczynili treścią opracowania charakterystykę źródeł finansjalizacji oraz jej skutków dla wzrostu gospodarczego i poziomu życia mieszkańców Polski jako kraju UE.
W opracowaniu dokonuje się oceny stanu teorii w powyższym zakresie oraz zamieszcza się wyniki przeprowadzonych badań empirycznych.

Joanna Duda: **Rola i znaczenie kredytu technologicznego w finansowaniu innowacyjnej działalności inwestycyjnej polskich i małopolskich MSP** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *MSP, źródła finansowania, kredyt bankowy, kredyt technologiczny, innowacje*

Wraz z postępującym procesem globalizacji i internacjonalizacji innowacyjność małych i średnich przedsiębiorstw stała się podstawowym elementem budowania przewagi konkurencyjnej na rynku. Powszechnie mówi się o niskim stopniu innowacyjności polskich MSP oraz wielu barierach ograniczających dostęp do kapitałów zewnętrznych, a szczególnie kredytów bankowych. W związku z tym w niniejszym artykule, na podstawie badań literaturowych i empirycznych, dokonano analizy nakładów inwestycyjnych oraz źródeł finansowania działalności innowacyjnej w tej grupie przedsiębiorstw. Podjęto również próbę oceny możliwości pozyskania i wykorzystania kredytu technologicznego w celu finansowania działań innowacyjnych.

Henryk Gurgul, Milena Suliga, Tomasz Wójtowicz: **Reakcje warszawskiej giełdy papierów wartościowych na ogłoszenia danych makroekonomicznych z USA** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *analiza zdarzeń, ogłoszenia makroekonomiczne, inflacja, bezrobocie, produkcja przemysłowa, ponadprzeciętne stopy zwrotu, wielkość obrotów*

Związek pomiędzy napływem informacji a zmianami cen papierów wartościowych jest jednym z głównych zagadnień ekonometrii finansowej. Podstawowym założeniem hipotezy efektywności

rynku finansowego jest przekonanie o szybkiej reakcji inwestorów w odpowiedzi na napływające informacje. Reakcja ta prowadzi do zmiany cen walorów odzwierciedlających oczekiwania inwestorów odnośnie do poziomu ryzyka i stóp zwrotu. Celem artykułu jest zbadanie wpływu ogłoszeń danych makroekonomicznych dotyczących inflacji, produkcji przemysłowej i bezrobocia w USA na wielkość obrotów i ceny akcji największych spółek notowanych na GPW w Warszawie w latach 2004–2011. Przeprowadzone badania wykorzystujące metodologię analizy zdarzeń pozwalają ocenić, kiedy i jak pod wpływem napływających danych dotyczących gospodarki USA zmieniają się prognozy oraz oczekiwania inwestorów dotyczące przyszłej sytuacji na rynku. Umożliwiają one również ocenę siły, kierunku i długości oddziaływania ogłoszeń każdego z badanych wskaźników.

Agnieszka Barcik, Piotr Dziwiński: **Program leniency jako innowacyjne narzędzie prawne służące zwalczaniu karteli w Unii Europejskiej** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *prawo konkurencji, gospodarka, kartele*

Artykuł koncentruje się na przedstawieniu istoty instytucji leniency, stosowanej w zwalczaniu karteli. Omówienia tematu dokonano z uwzględnieniem przepisów prawa unijnego oraz polskiego. W artykule przeprowadzono analizę czynników, decydujących o skuteczności programu leniency. Część rozważań poświęcono efektom praktycznego stosowania programu przez Komisję Europejską oraz Urząd Ochrony Konkurencji i Konsumenta. Artykuł porusza problematykę wpływu stosowania instytucji leniency na skuteczność postępowań antymonopolowych oraz przybliża czynniki determinujące efektywne funkcjonowanie programu.

Henryk Gurgul, Łukasz Lach: **Dwa deficyty a wzrost ekonomiczny. Przypadek krajów Europy Środkowo-Wschodniej w fazie transformacji** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *wzrost gospodarczy, deficyty bliźniacze, gospodarki regionu CEE w fazie transformacji*

Głównym celem tego artykułu było dostarczenie dowodów na istnienie dynamicznych współzależności pomiędzy wzrostem ekonomicznym a deficytem budżetowym i handlowym w przypadku dziesięciu nowych członków Unii Europejskiej będących w fazie transformacji. Warto podkreślić, że oprócz ustalenia kierunków zależności przyczynowych w artykule tym podane zostały też sugestie dotyczące znaków badanych związków dynamicznych.
W świetle wyników empirycznych deficyt budżetowy powodował poważne spowolnienie gospodarcze, jeśli chodzi o stopę wzrostu PKB nowych członków Unii Europejskiej w fazie transformacji. Ponadto deficyt spowalniał konwergencję gospodarek badanych krajów do gospodarek wysoko rozwiniętych państw Unii Europejskiej. Przyczynowość w odwrotnym kierunku okazała się być istotnie słabsza.
Badania wykazały również, że w badanym okresie istniała jednokierunkowa zależność ujemna o charakterze przyczynowym w kierunku od deficytu budżetowego do deficytu handlowego. W przypadku państw Europy Środkowo-Wschodniej będących w fazie transformacji hipoteza o bliźniaczych deficytach nie znalazła zatem potwierdzenia w wynikach empirycznych.

Jan Kaźmierski: **Koncepcja polityki wspierania klastrów w realiach polskiej gospodarki** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *klastry, rozwój regionalny, polityka wspierania klastrów, modele wspierania klastrów, bariery rozwoju.*

Klastry na przestrzeni ostatnich lat stają się fenomenem każdej gospodarki. Należy je traktować jako ważny mechanizm aktywizujący rozwój regionów. W związku z tym szczególnego znaczenia nabiera polityka rozwoju regionalnego oparta na klastrach (*Cluster-based Policy*). Istotną kwestią jest wybór modelu tej polityki, a także problem konkurencyjności regionalnej i pomocy publicznej. Obok sygnalizowanych wyżej aspektów autor omawia również bariery i ograniczenia związane z polityką wspierania klastrów. Wskazuje także kierunki ich przezwyciężania. Prezentowane wnioski i konkluzje są w przeważającej mierze pokłosiem własnych badań empirycznych autora nad problematyką rozwoju klastrów.

Piotr Gurgul: **Nowe możliwości marketingu mobilnego na platformie Android** ▪ AGH Managerial Economics 2012, No. 12

Słowa kluczowe: *marketing mobilny, Android, zintegrowana komunikacja marketingowa, marketing relacyjny, reklamy wrażliwe na lokalizację, komunikacja krótkiego zasięgu*

Błyskawiczny rozwój inteligentnych urządzeń mobilnych takich jak smartfony i tablety stworzył liczne możliwości nowych form zarówno marketingu mobilnego, jak i marketingu w ogóle. Wykorzystanie potencjału tkwiącego w tych urządzeniach zgodne jest z dążeniem do znalezienia nowych dróg skierowanego i mierzalnego marketingu, tak jak zostało to zaproponowane w modelu zintegrowanej komunikacji marketingowej. Nowe możliwości techniczne jak skanery kodów kreskowych, kody QuickResponse, AGS czy też komunikacja NFC pozwalają na wysoką personalizację przekazu i utrzymanie zaangażowania użytkownika. Otwarta i darmowa platforma Android dodatkowo zwiększa możliwości marketingu na smartfonach.

Celem artykułu jest przegląd nowych rozwiązań obecnych w systemie Android 4.0 Ice Cream Sandwich i ocena ich potencjalnego zastosowania w marketingu mobilnym. Duży nacisk położony został na szczególną rolę, którą może odegrać NFC w marketingu przyszłości. Ponadto znacząca część artykułu opisuje dotychczasowe sposoby komunikacji marketingowej z użyciem platformy Android i pokazuje wyższość marketingową tej platformy nad konkurentami.

Instruction for authors

Please send your article with a short summary in English and Polish (printed and electronic versions) to the following addresses:

aduda@zarz.agh.edu.pl

Akademia Górniczo-Hutnicza
Wydział Zarządzania
dr Joanna Duda
ul. Gramatyka 10
30–067 Kraków

Articles which are to be published in *Managerial Economics* should be prepared according to the following guidelines.

Length of the paper should not exceed 22 typed pages (figures and tables included).

The running text of the body of the paper should be followed by figures and tables. Tables, figures and photographs should be placed in the text after the first reference to them.

Title page should include a footnote, giving the author's affiliation.

Figures must be prepared in a form suitable for direct reproduction. Digital artwork at least 300 dpi resolution is accepted. Photographs, on glossy paper (9 by 13 cm or larger), should display sharp contrast. Figures, tables and photographs should be numbered according to their reference in text.

For computer edited texts, please include a disc with a text file, giving the editor programme used (preferably Word or WordPerfect). Illustrations should be edited in CorelDraw (*.CDR), DrawPerfect (*.WPG) or in any other vector graphics form e.g. HPGL, Encapsulated PostScript (*.EPS), Computer Graphics Metafile *.CGM) or bitmaps (*.TIF, *.PCX).

Mathematical equation within the text should be written in separate lines, numbered consecutively (numbers within round brackets) on the right-hand side. Greek characters must be written out clearly. Reference to literature within the text should be given in square brackets.

Papers should be submitted in two copies.

Summery (of 15–20 lines) and keywords should be submitted in both Polish and English on separate sheet containing the name of the author, title of the paper with the heading "Summary".

Authors using Word are requested to employ, as far as possible, text form of mathematical symbols leaving graphic form for the equations longer than single line.

The author should use the numbering style of referencing. References to literature within the text should be given in square brackets. Lists of references should be written in alphabetical-chronological order.

Information about the journal and the deadlines for submitting articles for next issues as well as the tempate according to which the papers should be prepared are presented at

www.zarz.agh.edu.pl/Czasopisma wydziałowe/Ekonomia Menedżerska
http://tinyurl.com/ly68a6

Informacje dla autorów artykułów

Artykuł z krótkim streszczeniem w języku angielskim i polskim prosimy nadsyłać w wersji wydrukowanej oraz elektronicznej na adresy:

aduda@zarz.agh.edu.pl

Akademia Górniczo-Hutnicza
Wydział Zarządzania
dr Joanna Duda
ul. Gramatyka 10
30–067 Kraków

Artykuły przeznaczone do druku w czasopiśmie *Ekonomia Menedżerska* powinny być opracowane zgodnie z poniższymi wytycznymi.

Objętość nie powinna przekraczać 1 arkusza wydawniczego wraz z rysunkami i tabelami.

Tekst powinien być pisany w sposób ciągły. Tabele, rysunki, fotografie należy umieszczać w tekście po pierwszym powołaniu. Na pierwszych stronach artykułów należy zamieścić afiliacje w formie przypisu z odsyłaczem gwiazdkowym u dołu kolumny: Instytucja, Miasto.

Rysunki powinny być dostarczone w formatach umożliwiających ich edycję (grafika wektorowa), ewentualnie w postaci bitmap o rozdzielczości nie mniejszej niż 300 dpi. W rysunkach i tablicach należy unikać dużego zagęszczenia elementów. Fotografie muszą być kontrastowe, o wymiarach 9 × 13 cm lub większym. Rysunki, tabele i fotografie powinny być opisane numerami, pod którymi znajdują się w tekście. Rysunki i fotografie powinny być dostarczone w postaci oddzielnych plików.

Wzory matematyczne muszą znajdować się w oddzielnych wierszach tekstu, a numery wzorów powinny być umieszczone z prawej strony w nawiasach (). Litery greckie powinny być pisane pismem prostym w odróżnieniu od zmiennych, które należy składać kursywą. Autorzy przygotowujący teksty przy użyciu Worda proszeni są o używanie – w miarę możliwości – tekstowego trybu zapisu znaków matematycznych i symboli i pozostawienie trybu graficznego do zapisywania wzorów dwu- i więcejwierszowych, pierwiastków itp.

Powołania w tekście na literaturę należy ująć w nawiasy [], a spis literatury zamieścić na końcu artykułu ułożony alfabetycznie.

Artykuł należy złożyć w dwóch egzemplarzach. Drugi egzemplarz przeznaczony jest dla recenzenta.

Streszczenie artykułu powinno mieć objętość 15–20 wierszy i powinno być sporządzone w języku polskim i angielskim; powinno zawierać również słowa kluczowe w języku polskim i angielskim. Wersje językowe muszą znajdować się na oddzielnych kartkach, zawierających ponadto imię i nazwisko autora, tytuł artykułu i umieszczony na górze napis „Streszczenie".

Informacje o czasopiśmie i terminach składania artykułów do kolejnych numerów oraz szablon, zgodnie z którym należy przygotować teksty, są zamieszczone na:

www.zarz.agh.edu.pl/Czasopisma wydziałowe/Ekonomia Menedżerska
http://tinyurl.com/ly68a6