

A Review of Optimal Inflation Targeting, What Should Be the Threshold Inflation Target?

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Abstract

Although it is widely acknowledged that most of developed countries have inflation targeting in order to control sustainable economic growth these review attempted to answer some questions about the optimal inflation target for the European central bank. The review was made based on secondary data from Eurostat data base, different articles and annual reports of the central bank of Europe. We found that the threshold inflation target to be in the form of interval with an upper bound of 4 percent and lower bound of 2 percent. Based on the objectives of maintaining sustainable economic growth in the region, the threshold level of inflation is found to be 11 - 16 percent per year for low income countries, 15 - 21 % per year for lower middle-income countries, and 4 - 5 % for upper middle-income countries. Hence, 2 % as well as 4 % of current upper bound of inflation target in Euro Area fall within this range. The interval from 0 percent to 2 percent is reasonable because low positive inflation is easier for firms to decrease real wages to maintain employment (downward rigidity) when it is necessary without reducing nominal wages. Accordingly, the measures taken by ECB³ to deal with the problem active quantitative easing program (QE), as shown in the experience of USA, UK and Japan, are not solely efficient.

Keywords: European central Bank, Sustainable economic growth, Inflation Targeting

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1. Introduction

Nowadays, sustainable economic growth concurrently with price stability is the main goals of macroeconomic policy in developed and developing countries. That is why nowadays the common language spoken by economists, researchers and policy makers is the language of setting right inflation target. There exist lots of channels through which inflation and deflation can significantly reduce the welfare of the whole country and even world. After the period of 1970-1980s when the problem of high inflation was experienced by many countries, monetary policymakers around the world adopted the policy of orientation on low inflation rate. But if the high inflation has a harmful effect on the economy and the low inflation has the positive one, then we have to ask which optimal and right level of inflation for an economy is. Some economists recognize the optimal level of inflation rate for higher income level countries (like EA and USA) round 4% (Williams (2009), Blanchard (2010), Ball (2014), Krugman (2014)). Other economists state that for developed countries this target should be in round 2% (Ghosh, Philips (1998), Weber (2010), Bernanke (2010a)). Nevertheless, this question is very controversial and answer on it depends on the number of factors.

Therefore, in Section I we discuss some general issues connected with inflation targeting. For example, properties of right inflation target. Is it a point, point with threshold intervals or zone? We have a look at already followed inflation targets around the world and try to understand why governments set it in a specific form. What does define the inflation target? Which factors have an impact on setting it? Her Majesty Queen Elizabeth II, Donald Trump or, may be some things connected with costs of inflation, inflation expectations and interest rates? To answer this question, we briefly showed the results of econometric model by Horváth and Matějů who collected responses from 19 central banks about setting lower and upper bound of inflation target. Are the optimal inflation targets for Ukraine, UK and USA the same ones? How is it connected with economic growth, interest rate regulation and Taylor Rule? We examine this relationship based on the classification of countries by World Bank and results of empirical studies conducted in the end of 90s. Also in the first chapter we briefly overview a DSGE model from BoJ which defines the optimal inflation rate for Japanese economy and some other specific economies.

In the second and main Section, we concentrate our attention on Euro Area and try to discuss which inflation target is the optimal one for this region based on the risk of new crisis, necessity of dealing with zero lower bound problems, the threat of deflation, huge debts and specifics of inflation expectations in different European countries. We discuss why inflation target should be above 0%, and how far away from 0%. Why ECB keeps inflation target upper bound in 2%? To answer this question, we show estimated losses from moving inflation target from 2 to 4%, examine distribution effects of inflation, distortions in the tax system through inflation and cost of higher inflation in terms of export competitiveness.

In the Section III, we give specific recommendations to ECB and the main one is raising inflation target to

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4% as economic benefits from it would exceed the costs. We support arguments from Oliver Blanchard about necessity to increase inflation target in Euro Area till 4 % as raising inflation target till 4% would increase room for monetary maneuvering in case of economic turmoil, would decrease probability to get into the liquidity trap, dealing with the zero lower bound problem and would increase labor market flexibility within EMU. Also according to BoJ 4% as a target would minimize the welfare costs in terms of redistribution from old to young cohorts. For such countries as Greece and Italy decreasing borrowing costs because of rising inflation target would be possible due to reduction of value of interest payments and seigniorage.

We highlight lessons from Japan, where government has been fighting with deflation for a long time, to EU policy makers. As the current state in Euro Area is called period of low inflation, we show how it is important to anchor inflation expectations promptly and on time shifting and taking decisive action on the early stage of deflation. Last few years ECB conducts QE program buying assets from public and private sector. We have a short look on results of such programs which were conducted in USA, Japan, and UK. To be precise, we try to understand if QE can prevent Euro Area from deflation and liquidity trap.

2. literature Review

2.1 Review of the interval Inflation Target; Zone versus Point

Most central banks which conduct the policy of inflation targeting set this target as a range or point with tolerance intervals. According to Central Bank annual report in 2016 there are 62 countries which target inflation and 41/62 set the zone inflation target or point with thresholds intervals.

Table 1 – Current Inflation Targets around the World

Area, country	Inflation target	Country	Inflation target
EA	≤2%	Sweden	2±1%
USA	2%	Switzerland	≤2%
New Zealand	1-3%	Norway	2,5%
Japan	2%	Iceland	2,5%
Canada	1-3%	Poland	2,5±1%
India	8%	Czech Rep.	2±1%
Australia	2-3%	Hungary	3±1%
South Africa	3-6%	United Kingdom	2%

Source: <http://www.centralbanknews.info/p/inflation-targets.html>

Experience of some different central banks from Sweden, United Kingdom, Canada and New Zealand which is presented by Orphanides, Wieland (1999) shows that these banks set the inflation target as a range or point with tolerance intervals because of the following reasons:

- ✓ To have “hard” floor and ceilings defining the mid-point of inflation (Nicholl, Archer, 1992).
- ✓ It is hard for central bank to anchor inflation in one point. As Charles Freedman stated “With inflation having fallen to the bottom of the bands during the past couple of years and seeming likely to remain there in the near future, the emphasis in the revised targets was put on the inflation bands, thereby indicating that the Bank cannot control inflation all that closely” (Freedman, 1995).
- ✓ Transitory temporary fluctuations in economies which lead to deviation of inflation from target point do not require policy actions. Also zone inflation would involve some countercyclical policy (Orphanides, Wieland, 1999). Heikensten (1997) stated that “It is because of temporary effects that the average level of inflation in 1996 is outside the Rosebank’s target interval. As a rule, the interval surrounding the target figure should suffice to absorb changes of this type in the composition of inflation”.
- ✓ Inflation reflects the imperfect control of monetary policy and this indicator is uncertain, measured by different methods (Orphanides, Wieland, 1999).
- ✓ To avoid excessively activist policy responses (Orphanides, Wieland, 1999). Inflation target range has to anchor effectively inflation expectations at low level, not to provoke the excessive policy, protect credibility by being rarely breached (Bernanke, 1999).

3. Factors to be Considered in the Process of Inflation Targeting

In 2010 based on the analyzed documents from 19 central banks and governments Horváth, Matějů (2011), defined the determinants of inflation target (Appendix #1). Responses from central banks stated that during setting of inflation target they judge about it based on such determinants as costs of inflation, past inflation, inflation expectations, price convergence, measurement error, wage rigidities, zero interest rate bound, foreign inflation, economic growth, risks of deflation, business cycle fluctuations, Maastricht inflation criterion for euro adoption. Also Horváth, Matějů (2011) built an empirical model where explained variable is presented by lower and upper

bound of inflation target and explanatory variables are the following ones:

- ✚ **Consumer price index inflation** measured as one-year change. Was assumed that higher inflation leads to following high inflation target.
- ✚ **Inflation volatility** presented as the sample variance of past de trended inflation record.
- ✚ **World CPI inflation**, in some countries, especially with small economies world inflation could be recognized as reference point for setting domestic inflation targets.
- ✚ **Price level measured by PPP** (purchasing power parity).
- ✚ **GDP per capita**. The hypothesis was that because of higher inflation volatility in poor countries, the central banks tend to set higher inflation for such economies and make tolerance intervals wider.
- ✚ **GDP growth**. It has been suggested that in fast-growing economies in the short and medium terms central banks set higher inflation targets.
- ✚ **Central bank credibility**. Based on Blinder (2000) definition, in the research paper such credibility is defined as difference between inflation target and inflation expectations. Authors' hypothesis was that more credible central banks from developed countries set lower inflation targets compared to emerging market economies with low level of central banks credibility. It is connected with the fact that banks with high creditability can control and anchor inflation expectations more effectively.
- ✚ **Central bank independence**. Authors presume that less independent from government banks tend to set inflation target higher as governments are likely to deliver higher inflation.
- ✚ **Orientation of governmental parties**. It was hypothesized that left-leaning governments tends to set higher inflation target (Horváth & Matějů, 2011). Results showed that all of the mentioned factors are taken into consideration by central banks in the process of making the choice of inflation target.

3.1 How Interest Rates define Optimal Inflation Target?

This issue is impossible to investigate without recalling the four classical economists such as: Keynes, Friedman, Fisher and Taylor. To be more precise – three classical economists and Taylor whose findings are popular among proponents of interest rate rising.

Keynes (1936) thought that nominal interest rates depend on inflation. Following, if inflation is rising, then nominal interest rates also rise. Ability to manipulate inflation via changing interest rates was not showed.

Fisher (1993) the main methodologist in defining relationship between interest rate and inflation. Fisher Effect states that it is impossible to manipulate real interest rates and inflation has a strong positive relation with nominal interest rates (and vice versa). Reciprocally, if inflation declines, nominal interest rates also decline (and vice versa).

In 2011 the running of Fisher effect in Euro Area was proved by Piccinino. He used date from 1999 till 2011 gathered by German Federal Securities. By rational expectations people create inflation expectation based on all available information. Taking into consideration neutrality of money, Okun Law in combination with Philips curve and aggregate demand relation (AD) establish direct relationship between inflation and nominal interest rates.

Friedman (1963) believed that such indicator as a nominal interest rate depends on inflation which in its turn depends on money supply. If nominal rates are high, it is the result of very gentle monetary policy. Answering on question if central bank can manage nominal interest rates he would say that yes, but only via inflation manipulation, and inflation manipulation is possible only with increasing or decreasing of money supply. Guess, he would be really happy with ECB implementing of QE program.

According to Friedman Rule the optimal inflation rate has to be negative and equal to the real interest rate (its absolute value). He advocates, following Fisher equation, that nominal interest rate has to be zero as opportunity cost of holding money by private agents has to be equal to social cost of creating money (emission). As a cost (marginal) of creating money is approximately zero, nominal rates should be zero also. It is possible when inflation is negative (Klaeffling, Perez, 2003).

The Rule from Friedman to EU policymakers: for reaching zero nominal interest rate, ECB has to move toward a deflation rate, which is equal to the government bonds real interest rate (Sinclair, 2003; Friedman, 1963).

Nevertheless, Sinclair (2003) showed imperfections in Friedman Rule which are based on non-included in the Friedman's Rule market imperfections: continuously clearing of market failures, public finance considerations, overall currency attractiveness, occasional recessions, unchanged prices for firms for longer periods. Sinclair depicted that such imperfections lead to the necessity of targeting not a negative inflation rate (as was proposed by Friedman), but a slightly positive one.

Taylor was the first economist who recognized inflation as function of interest rates. Before him, the only one working tool for manipulation was money. Taylor opened the important point that central banks can control the interest rates. He is also the author of the Taylor rule which says that it is necessary to reduce inflation to increase nominal rates. So, when liberal economists say that increasing of interest rates leads to reducing of inflation, they are based on Taylor believes and ignore Keynes, Friedman, Fisher. Taylor (1993) thought that inflation is a function of output gap, and when output gap is positive, inflation is rising. For inflation reduction it is necessary to increase interest rates. Then output gap begins to decrease and inflation falls. So, the Taylor rule is the linear

rule of central bank monetary policy:

$$r = 2 + \pi + 0.5(\pi - 2) + 0.5y \dots\dots\dots(1),$$

where, r - federal funds interest rate; π - the inflation rate over the previous four quarters; y - % deviation of actual GDP from the potential GDP.

The constant, equal to 2 is a long-term equilibrium interest rate (Petersen, Kenneth, 2007). Taylor (1993) recommended for successful forecasting purposes of equilibrium interest rate the following ones: real interest rate has to be more than inflation rate in 1,5 times, equilibrium occupies when there is a 2% steady state of inflation and we have to look on real output against potential one (Appendix #3). Inflation in Taylor Rule is driven by Consumer Price Index which includes food and energy prices, prices of producers and Employment Index.

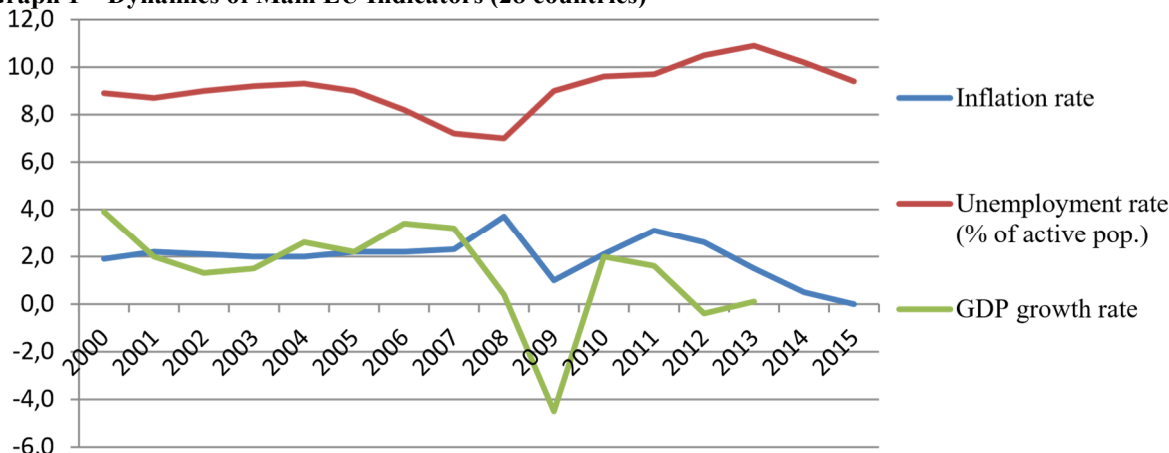
The Rule from Taylor to EU policymakers for stabilizing the economy in short term and inflation over a long period: when inflation is above target or when GDP growth rate is too high and above potential ECB should increase interest rates, when inflation rate is under target level or GDP growth rate is too low and under potential level, ECB should decrease interest rates.

Interest rates said to be neutral when inflation achieved target and GDP grows at its potential (Twomey, 2014). But with time it became clear that he had made a mistake in the basic premise: positive output gap brings not the inflation, but deflation. In the current world it is obvious due to example of Euro Area, Japan and China (Orphanides, Athanasios, 2007). Nevertheless, Teräs (2015) in her econometrical research showed that Taylor Rule has been accurate in determining the ECB steering rate during the period 2000-2014. Taylor Rule follows the path of the ECB steering rate almost in all periods, but Taylor Rule was more volatile. But, for example, according to the Bloomberg research agency results, Taylor Rule for Euro Area is ineffective as interest rates observed in this area in period of 2006-2015 considerably deviates from the forecast rate obtained by the Taylor Rule. The rate of change is much slower than the rule assumed. Secondly, the gap between potential and actual GDP is interesting for ECB only as a factor which influences inflation (Bloomberg, 2015). However, with some appropriate modifications, the Taylor Rule can be used effectively in the Euro Area. Such modification should: smooth policy, focus on the inflation gap, pay less attention to the gap between potential and actual production, include money market rates and exchange rates, and if necessary - change the hypothetical target inflation.

3.2 The Likelihood of Inflation Targeting to Euro Area

During the period 1999-2008 in Euro Area we could observe stable economic growth, low unemployment and stable inflation, but with trend to reducing in last 5 years (Graph 1). But we can observe significant declining in output and employment after the beginning of recession in 2008. In 2009 decreasing demand on goods and lower commodity prices pushed inflation to 1%. In 2014 government of EU lowered interest rate (Graph 2) from 4 % (2007) to 0,125 % (2014) to tackle crisis consequences and provide liquidity to market. Decreasing of nominal interest rate has a **bound** which is called **zero**. In this point money demand comes infinitely elastic and changes in money supply have no effect on economy. According to Krugman (2010) monetary policy when bonds are exchanged on money becomes ineffective because for people bonds become equal to cash which is held as a store of value. Changing money supply gives no effect on economy because people believe that it is temporary intervention of central bank and in such case central bank cannot generate higher inflation expectations and set lower interest rate. Such situation is called **liquidity trap** (Lenel, Tinaztepe, Tourn, 2010). Such situation is partly being observed in Euro Area.

Graph 1 – Dynamics of Main EU Indicators (28 countries)



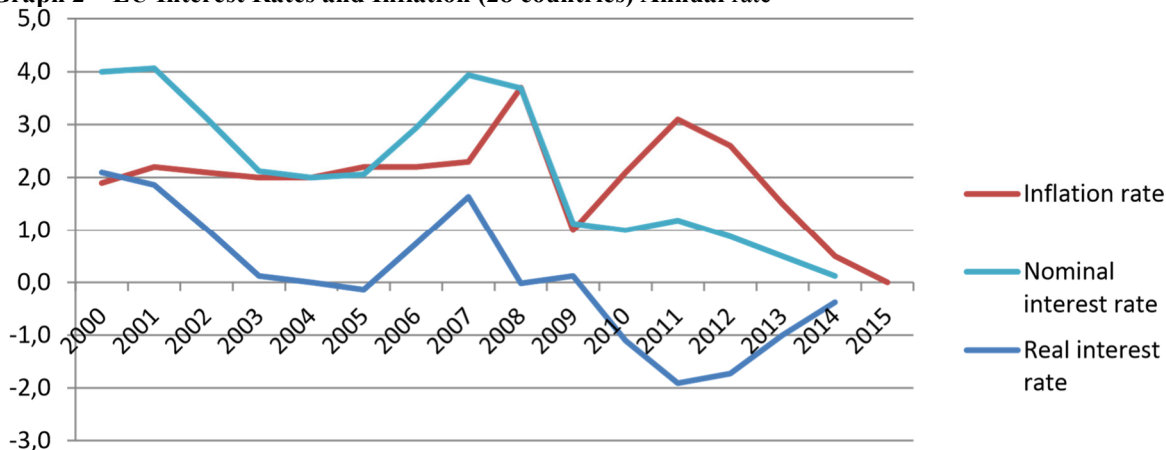
Source: Eurostat, 2016

When inflation expectation is low and nominal interest rate is zero bound, the real interest rate which is the nominal one subtracted by the expected inflation rate will be higher than optimal. In such case committing higher

inflation is very hard. According to Blinder (2000) there is several ways to deal with it: depreciation of the currency, open-market operations, commitment to a moderate inflation target or increasing money supply. But, again, according to Blinder (2000) such actions are effective only in the case of their simultaneous implementing. Following, current QE program would be ineffective without abovementioned actions and increasing inflation target at least to 4 %. Nevertheless, after the start of financial turmoil, ECB declined annual inflation till 1 %.

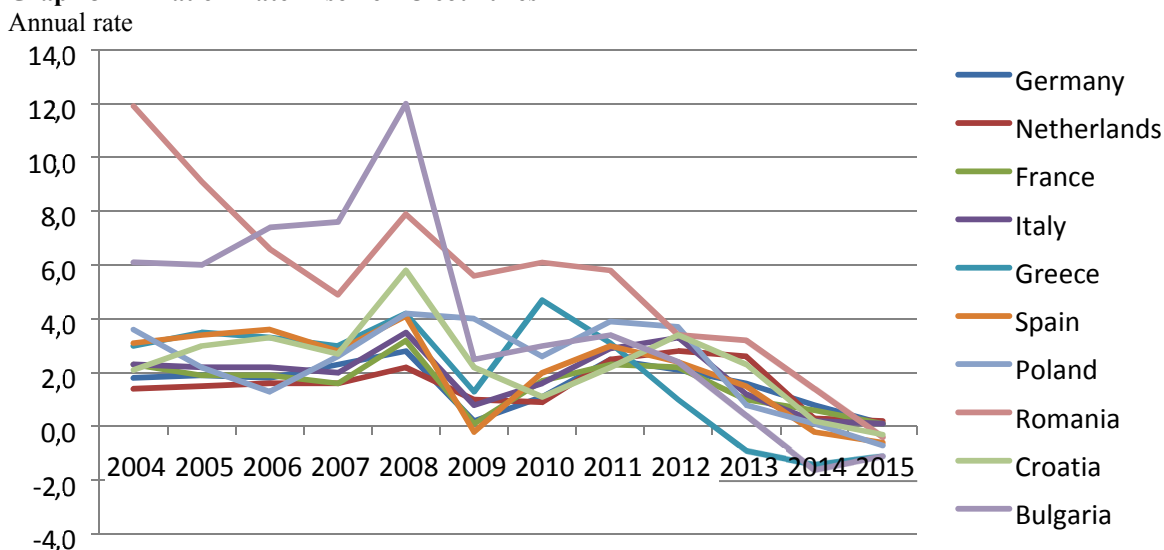
Recently, the European Union looks like in a difficult situation. In addition to a number of political, social and other challenges EU economy faces the **prospect of deflation** in the area. In almost all countries of Central and Eastern Europe (Poland, Hungary, Romania, Croatia), where usually euro even is not their main currency, the unthinkable combination of healthy economic growth in the range of 2 - 4 % and deflation of -0,2 % to -1,5 % is observed (Graph 3).

Graph 2 – EU Interest Rates and Inflation (28 countries) Annual rate



Source: ECB and Eurostat, 2016

Graph 3 – Inflation Rate in some EU countries



Source: Eurostat, 2016

In Western Europe, the average inflation is positive, but during last few years the range is only slightly above the zero. In October 2016, annual inflation in the EU was 0,4 %. The risk of deflation has become a common one for European countries, since September 2013 inflation rate in the EU dropped above 1 %, and regularly slides each 2-3 months (especially in February-April) in the negative zone. The biggest deflation was observed in Cyprus (-1,5 %, 2016), Bulgaria (-1,1 %, 2015), Greece (-1,1 %, 2015), Slovenia (-0,4 %, 2015), Switzerland (-0,8 %, 2015). Norway (2 %, 2015), Serbia (1,5 %, 2015), Belgium (1,6 %, 2015) are defined as countries with the highest inflation (Eurostat). That is why the period of last 2-3 years in EU is called as “lowflation” or very low inflation.

In such conditions the right (optimal) inflation target for EU countries has to provide safer barrier against slipping into deflation and following cutting of production and wages (which have downward rigidity). Deflation is not less dangerous than inflation as Japanize experience showed. The demand for goods falls as often as postponed demand when consumers are in no hurry to buy the goods, hoping to get lower prices in the long term. Forecasts of wage also reduce, and consumers are more inclined to save rather than spend. The volume of bank

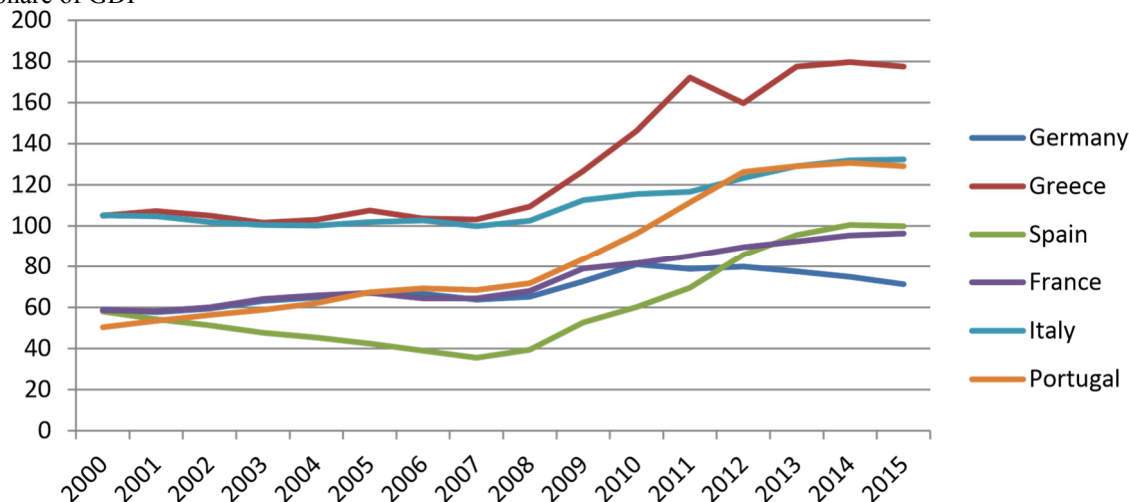
lending is also reduced, since to pay for debt is not profitable. Buyers are losing as the goods purchased by them falls in value over time. Salary fall because of deflation, but debt remains the same. During the inflation interest rates do not have the ceiling, and during deflation, they tend to zero. Banks at 0 % do not lend, and when the rates are higher than zero, banks are making money, but borrowers lose it. Unemployment increases and wage declines as companies struggle for profits what has a negative influence on the whole economy.

However, Draghi (2014) defines deflation as a situation of declining the values of the commodities and services happening in most of the countries; across majority goods in the market that has a higher share for the economy and in a self-fulfilling way. Based on this definition the current threat about deflation in Euro Area seems to be overestimated.

Nevertheless, it is especially difficult to deal with deflation for weakening economy, which are also burdened with huge debts. To pay off debts with decreasing wages becomes very difficult. When people are waiting for further reduction in prices, they save all their major assets, thus weakening the economy further. For now, such situation threatens to Southern Europe, mainly Greece and Italy (Graph 4).

Graph 4 – General Government Debt

Share of GDP

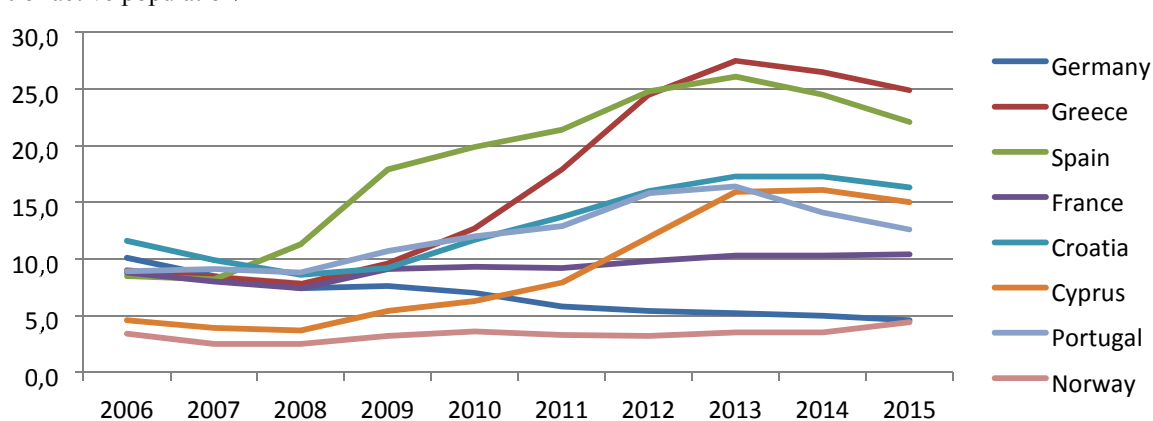


Source: Eurostat, 2016

For most developed and industrialized countries, specially a country that is in a high debt condition, a lower inflation target is dangerous for the economy because deflation improves the relative price of the goods and hence it improves exports and the current account balance of country or union. EU countries are forced to stick to the low levels of inflation, as country with high inflation automatically gets an opportunity to "rob" the neighbors. Due to Maastricht Treaty Eastern European countries that joined the EU in 2004 were forced to use inflation targeting (Mishkin, 2003) - despite the fact that for these countries it probably was connected with significant costs. Another danger generated by the low level of inflation – unemployment (Graph 5). Some of the highest unemployment rates shows Greece (24,9 %, 2015), Spain (22,1 %, 2015). This is an example of how low prices hinder the growth of the income. The government and households due to low inflation are not able to repay their debt effectively.

Graph 5 – Unemployment Rate

% of active population



Source: Eurostat, 2016

Low inflation does not give an opportunity for central banks to deal with a new recession. Usually, during the growth of the economy banks raise interest rates. If the economy slips back into recession, the central bank, bankers are powerless as now interest rates are hold on zero level. ECB keeps the Euro Area target inflation at “below, but close to, 2 % over the medium term” (ECB Monthly Bulletin, 1999). Due to ECB believes, this value of rate is enough to avoid risk of deflation and hold interest rates on zero level (The Monetary Policy of the ECB, 2011). Prices in ECB are defined via the Harmonized Index of Consumer Prices (HICP) (The Monetary Policy of the ECB, 2011). IMF, especial Oliver Blanchard (2010), recommended EU to raise an inflation target till 4 %, but such idea was rejected and 2 % target is still being using by ECB.

Based on ECB Monthly Bulletin (1999) there was strategy for achieving the target level of inflation. “Two-pillar” approach was proposed: The monetary one which uses the quantity theory equation of exchange is given as follows:

$$M*V=P*Y \dots\dots\dots(2)$$

$$\Delta P=\Delta M+\Delta V-\Delta Y \dots\dots\dots(3)$$

$$\Delta M=\Delta P+\Delta Y-\Delta V \dots\dots\dots(4)$$

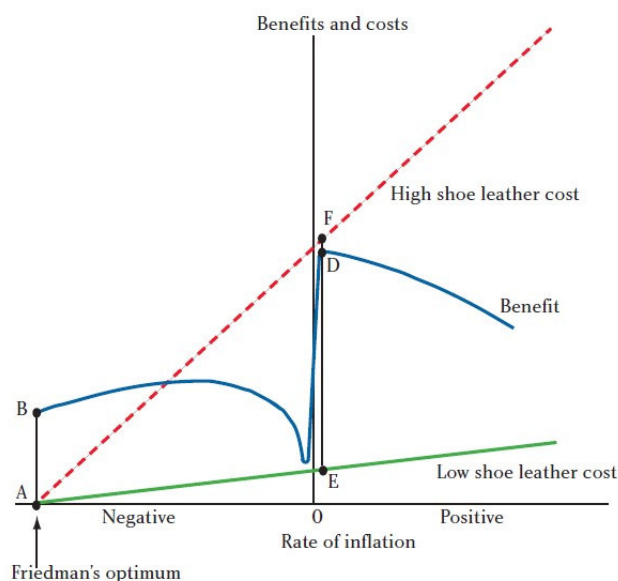
After adding logs, the equation can be interpreted in the following way: ECB makes a prediction of the future growth of real GDP (ΔY), future velocity of money (ΔV), changings in money supply (ΔM), and defines optimal inflation rate (ΔP). The one which gives no exact actions in dealing with inflation, but gives opportunity to regulate it based on the set of indicators. “These variables include, *inter alia*, wages, the exchange rate, bond prices and the yield curve, various measures of real activity, fiscal policy indicators, price and cost indices and business and consumer surveys” (ECB, Monthly Report, 1999). Appropriate tools for achieving future price stability come from this list of indicators which can be expanded (Grauwe, 1999).

3.3 why a positive inflation target?

Low Inflation makes it easier for firms to decrease real wages to maintain employment when it is necessary. Low inflation allows central banks to keep interest rates near 0 % that gives opportunity to raise them during recessions or as in answer to economic weakness. Measurement error. Most popular measure tools of inflation have a tend to overstate inflation (are biased upward). In 2008 Gordon estimated that CPI (consumer price index) which is based on “market basket” (changeable each 2 years) has a bias of 0,8 % annually. PCE (personal consumption price index) is less biased as it is calculated based on each year market basket. The second one is more used by US Bureau of Economic Analysis, when the first one is close to Harmonized Index of Consumer Prices (HICP) which is used in Euro Area (Boskin, 1998). Wynne (2008) found that the HICP over estimates real inflation by 1,0-1,5 %. So, when ECB has a goal to achieve 2 % increase of HICP, it means ECB wants to achieve real inflation around 1% (Billi, Kahn, 2008).

Downward rigidity. Having a little inflation allows firms to decrease real wages without reducing nominal wages. It is possible by increasing nominal wages with the lower rate than the rate of inflation (Akerlof, Dickens, Perry, 1996, 2000). Costs of small inflation can be lower than costs of higher inflation as lower inflation diminish the risk of facing with deflation. Deflation causes situation when nominal assets value comes reduced and nominal value of debts increases. It increases cost of servicing debt as debtors have to pay in euros that are increased in real value. Current example: Japan where deflation lead to stagnation, banking crisis and great increasing of real debt. That is why policymakers recognize low positive inflation as “buffer” which protects economy from deflation and possible recession.

Zero inflation destroys possibility to control economy by manipulating interest rates because of zero lower bound problem. There will be no space for interest rate manipulation in case of recession as this rate will be already zero (Bili, Kahn, 2008).

Figure 1 – Costs and Benefits of Inflation

Source: Sinclair, 2003

The above figure showed two possible relationships between annual inflation and welfare. Green line shows the case when “shoe leather cost” is quit moderate (cost of deviation from Friedman’s optimal rate). The red one depicts massive “shoe leather cost” where Friedman’s full liquidity proposition remains best. “Shoe-leather costs” (opportunity cost of spending, or holding less cash) are connected with inconvenience of a reduction in money holding during the raising inflation. During these periods people have a tendency to make more frequent but smaller cash withdrawals.

Third blue curve shows such benefits as average profits of firms, net menu costs (cost of changing prices, and lock-in costs because of running of nominal rigidities), average surplus of consumer’s (monetary expression of difference between utility which consumer gains from consumption and money which they pay for these goods). This curve is continuous, reach its bottom when inflation rate is slightly negative, and peak when inflation rate is slightly positive one. Prices are adjusted very frequently when inflation rates are relatively too high or too low that leads to less benefit. That is why blue curve has such pattern. The distance AB is the social net benefit at the Friedman optimum, which is less than DE distance, or net benefits with moderate shoe leather curve and bigger than loses with red curve. When the inflation rate is a little bit negative, the long interval between nominal price cuts and society detriments presented. When deflation increases, average menu costs become bigger, marginal reducing of monopolistic prices end away.

3.4 Why ECB¹ Keeps Inflation Target in 2 % as an Upper Bound?

Is the net cost of targeting 4 % inflation higher than of 2 %? According to Alfred Weber calculations, - yes, the acceleration of inflation in the euro zone to 4 % would lead to a slowdown in GDP growth by at least 0,5 %. Danziger (2001) indicates the stickiness of the production side of the economy which produces under their full capacity. He also predicts the cost of increasing inflation targeting from 2 % to 5 % to be 0,5 % of the GDP of the economy.

Levy (1997), put the cost of inflation quantitatively and indicates that in the perfectly flexible condition prices adjust continually but in reality the change of a prices is costly and this will happen unnoticeably. In a dynamic market one of the properties of price is its rigidity.

Raising inflation target till 4 % would be disastrous for investors who have made countless decisions based on expectations that inflation will be tied to the level of about 2 %. Decision to raise the target level may undermine the loyalty to the ECB and also may generate variability in relative prices and distortions of the EU tax system.

When inflation rises higher than 3 %, it has tended to keep on rising if governments start adjusting wages automatically for inflation (Mishkin, 2011). It is more difficult to anchor expectations at 4 % than at 2 %. Some economists argue that acceptance of 4 % inflation may lead to increase of inflation above 4 %, or, at least, generate such expectations. Bernanke (2010a) asserts that “inflation would be higher and probably more volatile under such policy” and “inflation expectations would also likely become significantly less stable”. Friedman (1977) believes that business hesitates about the ability of central banks to manage high inflation. It is connected with the fact that

¹ European Central Bank

it is harder to anchor higher inflation as this one is less predictable. Evans, Wachtel (1993), find strong evidence for the volatility of inflation rate using the US time series data by the application of the ARCH (autoregressive conditional heteroscedasticity) proven quite useful in examining the correlation between inflation and its uncertainty. Empirical results show that inflation is recognized as costly one due to higher uncertainty in long-term periods.

4. Price Rigidity and Inflation Targeting in Euro-Area Countries

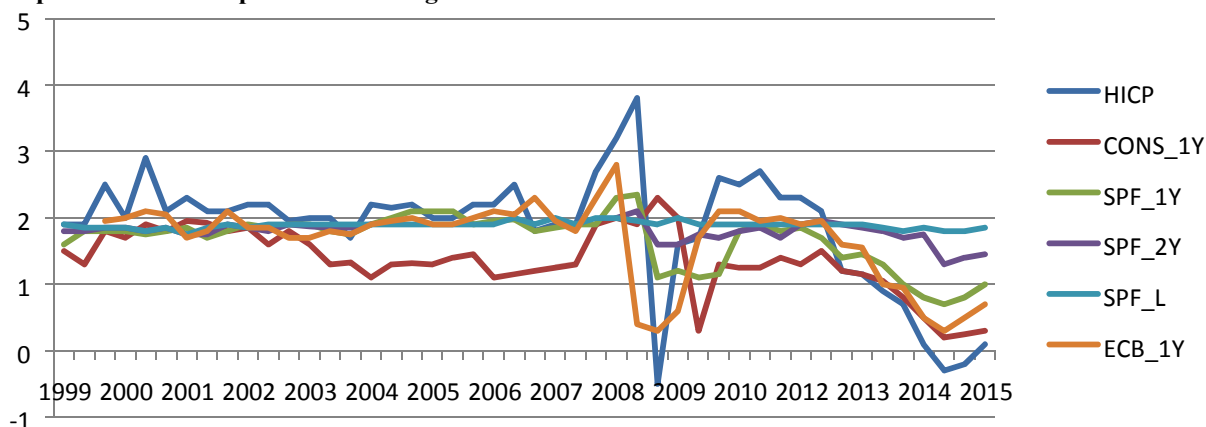
According to Benigno, Lopez-Salido (2002), Euro Area is divided on different areas with different ways of forming future expectation for inflation. There is Germany, where inflation has a significant forward looking component. There is France, Italy, Spain, Netherlands, where inflation expectations are mixed by a forward and a backward looking component. Also there is EU “new-comers” from 2004. According to Łyziak (2003), Polish consumer inflation expectations are heavily dependent on the current rate of inflation. They seem to be more sensitive to increases than to decreases in the current rate of price change. ECB research showed that Poland has long-run bias in inflation expectations. “These usually overshoot inflation ex-post, and thus do not fulfil the rational expectations hypothesis and do not constitute an unbiased predictor of future price movements” Łyziak (2003).

“An inflation targeting policy that assigns higher weight to countries with higher degrees of inflation persistence benefits those countries since once the policy of the central bank is credible, it produces lower inflation rates for them simply because it cares more about those inflation rates.” Benigno, Lopez-Salido, (2002).

4.1 Inflation Targeting and Inflation Expectations in EU, De-anchoring of inflation expectation within the Area

In the ECB Working paper from this year (Łyziak, Paloviita, 2016) the evidence of deanchoring of inflation expectation within Euro Area was showed and proved.

Graph 7 - Inflation expectations among Euro Area %



Source: ECB and Eurostat, 2016

HICP actual inflation rate, **CONS_1Y** one-year-ahead inflation expectations of consumers. Average short (**SPF_1Y**), medium (**SPF_2Y**) and long-term inflation expectations (**SPF_L**) of professional forecasters.

Analysis showed that there are some signs of inflation expectations de-anchoring a year before 2016 when general situation in EU was characterized by low inflation, increased economic uncertainty, ZLB problem and unconventional monetary policy measures. Łyziak, Paloviita (2016) provide evidence of raised sensitivity of longer-term professional inflation forecasts to shorter-term ones and to current HICP inflation in the post-crisis period. Simultaneously, inflation target has less importance in the formation of those expectations. Such results proved their statement about potential increasing of expectations de-anchoring in the case if the reaching of inflation target has been postponed in economic agents’ expectations. Łyziak, Paloviita (2016) stressed the importance of ECB’s inflation projections and inflation target in the process of managing inflation expectations. In Euro Area inflation expectations are more stable than HICP inflation (Appendix #5). In longer period inflation expectation variate more moderate than in the short period (Graph 7) (Łyziak, Paloviita, 2016).

4.2 The experience of Japan, US, England dealing with Low Inflation; lesson for ECB

Theoretically creating new money for buying assets from public and private sectors can raise inflation. Buying financial assets creates additional demand on them and raises its prices. Higher asset prices make their owner richer that leads to increasing of total wealth. Raising price of assets leads to decreasing of cost of borrowing also as higher assets means lower yields. Increases money injections give private sector more financial resources to spend on goods and services. Banks end up with reserves. It leads to increasing of bank lending’s as increased reserves rise lending to households and financial spending. Following, spending and income of households and business

should increase and lead to higher inflation. But would such mechanism work in reality? Does the QE program help for backing actual inflation within EA to its seted target?

In 2015 the average inflation rate fell to 0,5 %, that was much lower than the target, EU policy makers took a decision to start quantitative easing program. Hence, instead of increasing inflation target, ECB decided to avoid the risk of a prolonged period of very low inflation by buying assets from public and private sector. Till the end of 2017 it was planned to give out roughly 1 trillion euro. According to Draghi (2014) such redemption will be carried out until the adjustment of inflation trajectory to reaching nearly 2 %. In the Table 3 and Graphs 9-11 the study showed the impact of implementing QE in Japan, USA and England on the inflation rate, CB balance sheets and exchange rates (see also Appendix #6). The study found that: It is very hard to define “net” impact of QE programs on inflation and exchange rates as it is very mixed one.

In Japan (Graph 9) can observe deflation under second round of QE and a sudden acceleration under Abenomics (period from 2012). After starting of the first round of QE in USA (Graph 10) the inflation rate continued to fall during the following two years. Then it went up, but trended downward despite the implementation of third round of quantitative easing. Nevertheless, FED succeeds in reaching and fluctuation near 2% optimal rate. In UK, QE gave similar results an increase in inflation after the first round of QE in the UK, but a fall after the second one.

The strongest persistent connection between the size of CB balance sheet and inflation in 2007-2014 was observed in Euro Area what could be a pros of QE implementation in this area. But this link was observed few years ago. If we have a look on current situation (Graph 3), we find that across the Euro Area the actual rate of inflation still did not reach its current target and has a downward trend (Gros, Alcidi, Groen, 2015).

Such highly expansionary monetary policy of ECB as QE has largely succeeded in dealing with financial instability and reducing pressure on bank debt and government bonds markets, but has not deal with risk of coming into deflation trap.

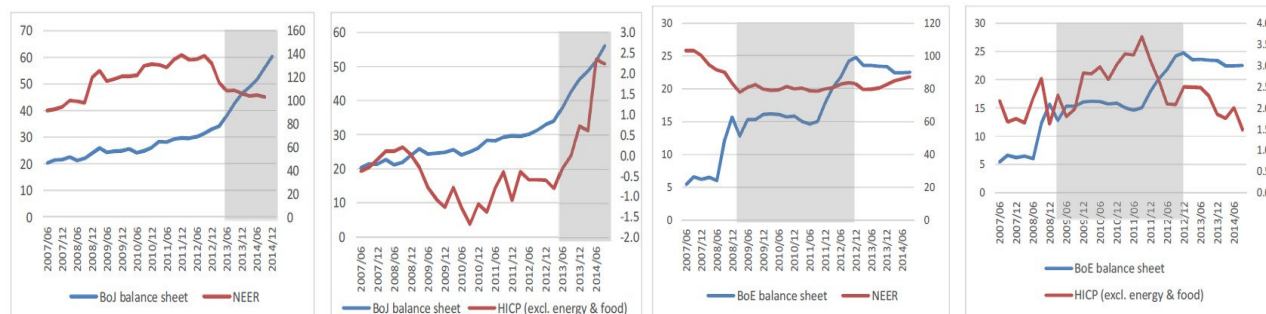
According to assumptions of ex minister of USA Lawrence Summers, the effectiveness of the program in the Euro Area will be significantly lower than in the US, as the rates in the euro zone are too low (0,05 % and - 0,2 % for deposits), and the banking system is not flexible enough to increase lending.

Table 3 - Comparing of QE Programs` design in terms of Tackeling Low Inflation

	Bank of England (Source: Monetary Policy Committee at the BoE)	Bank of Japan	FED	Euro Area
Aim (Objective)	To recover from the severe liquidity problem and maintain sufficient supply of money in the commercial market with a minimum point of the great economic crack. Price stability (2%)	For the real implementation of a targeted 2% inflation rate the country should stop injecting cash to the private banking system to decrease interest rate. Price stability (2%)	To upturn the accessibility of credit in private markets to help revive the home buyers without sufficient cash on hand for acquisition and support the housing market (for first round). To reinforce the financial retrieval and struggle possible Japanese experience through deflation consequence (for second one)	Price stability (2%)
When?	2009-2014	2001-3, 2004, 2014-?	2008-10, 2010-12, 2012-14	March 2015-?
Amounts of money	£375bn, or 22 % of GDP	¥101trn, or 20 % of GDP	\$4,5tn or 25 % of GDP	€1,14 trn or 11,5 % of GDP
The impact on inflation	Inflation fall below 2 % government-set target, hitting a record low of 0,5 % in December 2015.	After first round inflation was kept in the range 0-0,5 %, but in 2 years till 2013 there was negative inflation.	After first round inflation fall till 0,7 % in 2010, after second one – it raised till 1,8 % and was around optimal rate next years.	Inflation rate still have not reached the target and has a downward trend.

Sources: AMECO, ECB, BoE, BoJ, FED and IMF.

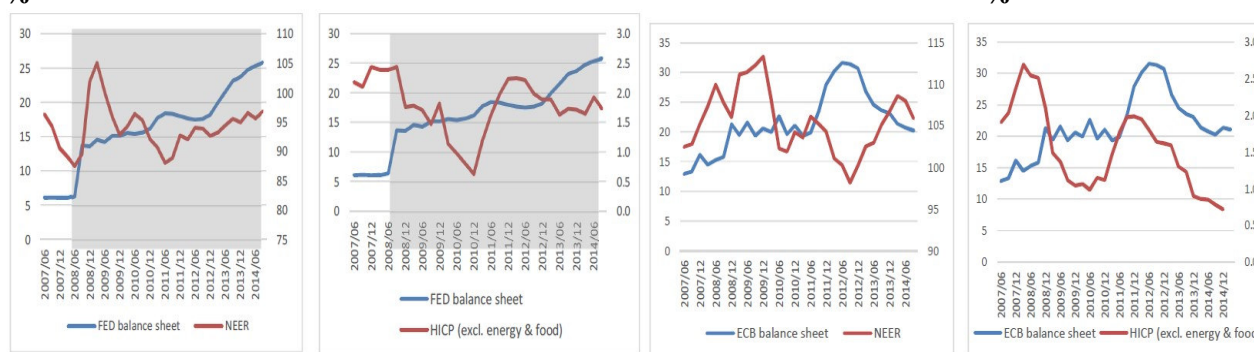
Graph 9 – Japan: CB balance sheet, exchange rate and inflation **Graph 11 – UK: CB balance sheet, exchange rate and inflation**



Source: Bank of Japan, Gros, Alcidi, Groen(2015).

Source: Joyce (2011a), Gros, Alcidi, Groen(2015).

Graph 10 – USA: CB balance sheet, exchange rate and inflation **Graph 12 – Euro Area: CB balance sheet, exchange rate and inflation**



Source: FRS, Gros, Alcidi, Groen (2015). Source: ECB, Eurostat, Gros, Alcidi, Groen (2015).

Whelan (2015) states that expansion of monetary base doesn't lead automatically to increasing in money supply equally. Such situation is possible if money multipliers fall sharpen after implementation of QE program. Also he states that "there is very little evidence in modern economies for a direct link between the growth rate of the money supply and either nominal GDP growth or inflation". Experts from Morgan Stanley noted that increasing of inflation in Japan and EA is locking by China, which continues to make its currency weak.

Based on the above mentioned results there is a high risk of not reaching 2 % inflation target and not anchoring inflation expectations in a quick way by implementing QE program only. We suppose the solution given by Krugman (2014) and Blanchard (2010) to increase the inflation target till 4 % is the appropriate one for dealing with prospective deflation. Not achieving "below but close to 2 percent" will lead to the deviation of expectations. Firms as well as households can start making decisions about wages and prices with different ancore in minds what is very dangerous. Hence, once, again, we recommend ECB to raise inflation target till 4 % despite the Draghi's (2015) statement that "Asset purchases are unconventional, but not unorthodox".

5. Conclusions and Recommendations

These review attempted to answer some questions regarding the optimal, or right, inflation target on the assumption of both its features and its costs and benefits for different economic subjects. In general, the right inflation target should be set in the form of zone with upper and lower bounds to have "hard" floor and ceilings which could define the mid-point of inflation. The main argument against point target was that it is hard for central bank to anchor inflation in one point and frequent fluctuations in economy leads to deviation of inflation from this point. The right inflation target should come based on such factors as costs of inflation, past inflation (CPI of country and world CPI), inflation expectations, price convergence, measurement error, wage rigidities, zero interest rate bound, foreign inflation, economic growth (GDP per capita), risks of deflation, business cycle fluctuations, CB credibility.

When we talk about right inflation target in terms of economic growth, it is to say about the deviation from which in the direction of reducing is less harmful for economic growth than the same deviation upwards. Economists (Sepahre, Moshiri, 2004) calculated that in terms of economic growth the threshold level of inflation should be 11 - 16 % per year for lowincome countries, 15 - 21 % per year for lower middle-income countries, and 4 - 5 % for upper middle-income countries. Hence, 2 % as well as 4 % of current upper bound of inflation target in Euro Area fall within this range. After clarifying these theoretical aspects, our attention was concentrated on the

current situation connected with inflation in Euro Area. We tried to weigh and consider most of the factors due to which ECB leaves the highest border of inflation target at 2 % as well as reasons for the necessity to raise this border to 4 %. Our research showed that currently set inflation target in EA (below, but close to, 2 % over the medium term) is reasonable, but not during the current processes in EA.

The gap from 0 to 2 % (not negative) is reasonable because low positive inflation makes it easier for firms to decrease real wages to maintain employment (downward rigidity) when it is necessary without reducing nominal wages (Akerlof, Dickens, Perry (1996, 2000)). Such inflation allows central banks to keep interest rates near 0% what gives opportunity to raise them during recessions. Most popular measure tools of inflation are biased upward that leads to overstating of inflation. HICP, which is used in Euro Area for measuring inflation, overestimates real inflation by 1,0-1,5 % (Wynne, 2008). That is why it is necessary to target a non-negative inflation rate. Also low inflation allows skipping risk of coming in the zone of deflation. As showed an example of Japan, cost of deflation are higher than cost of small positive one as it causes reduction in value of all current assets and increasing of real value of debts. But the most important reason why targeting small positive inflation rate is better than 0% or negative one is connected with problem of zero lower bound on nominal interest rates. 0% inflation rate leads to 0 % interest rates and in the case of recession policy makers would not have enough space for stimulation economy lowering the interest rate.

It is estimated (Weber, Danziger, 2001) that increasing upper bound of inflation target in Euro Area to 4 % will decrease GDP by 0,5 %. It will undermine the loyalty to the ECB, especially from investors who have made countless decisions based on expectations that inflation will be tied to the level of about 2%. It is harder to anchor expectations when CB set higher inflation target because it has tended to keep on rising (Mishkin, 2011). Higher inflation can lead to structural changes in economy, can generate variability in relative prices and distortions of the Euro Area tax system as in EU countries which do not have indexed tax system higher inflation provokes changes in the effective tax rate because taxes are levied in nominal terms rather than on real income. Increasing of inflation target decreases the international competitiveness of country, or area, in our case, by making its exports relatively more expensive.

Also higher inflation leads to appearance of “menu costs”, “shoe-leather costs”. Nevertheless, the current situation in the Euro Area is rather alarming. Zero bound problem, during which money demand becomes infinitely elastic and changes in money supply have no effect on economy, impotence in generating of higher inflation expectations and setting lower interest rate because of being in liquidity trap (Krugman, 2010). Prospects of deflation in EU, as in almost all countries of Central and Eastern Europe we can observe deflation from -0,2 % to -1,5 % last two years. Since September 2013 the average rate of inflation in the EU dropped above 1%, and regularly slides each 2-3 months. Moreover, deflation is combined with burdened with huge debts of some Euro Area countries such as Greece and Italy. Differences in price rigidity and different mechanism of forming inflation expectations in Euro Area countries lead to de-anchoring of inflation expectation within the Area. As a consequence, Inflation expectations in the EA have fallen significantly in the last years. Short-term expectations are oriented on 1% inflation rate instead of official ECB target of close but below 2%.

The measures taken by ECB to deal with these problems (active QE program), as showed experience of USA, UK and Japan, are not solely efficient. According to Blinder (2000) these actions to be efficient should be combined with depreciation of the currency, open-market operations, and commitment to a moderate inflation target. That is why above mentioned factors and conditions force us to agree with Oliver Blanchard about necessity to increase inflation target in Euro Area till 4 %.

This recommendation is based on the following reasons. Increasing of upper bound inflation target will extend the room for monetary maneuvering in case of economic turmoil's and help to avoid the risk of recession. To Blanchard (2010) mind, during non-crisis period having 4% inflation would allow to keep short-term interest rates in the segment 6-7%, and the ECB will be able to reduce them more rapidly if necessary. Raising inflation target decreases probability of going to the liquidity trap and eliminates the zero lower bound problem. Higher inflation also eases the debt that some Euro Area countries have. Firstly, it is possible by “inflating away” a part of payments and secondly, by bringing higher seigniorage revenues that would reduce debt to GDP ratios across Europe. Wyplosz (2001) found that raising inflation till 4% will increase labor market flexibility within EMU as higher inflation increases not only the speed of wage adjustment between sectors, but also between countries. It is needed because European labor market suffers from downward wage rigidity and lack of flexibility as unit labor cost differs between low and high inflation rate countries. Also Tobin (1972) showed that to avoid unemployment in the short term after negative shock, it is necessary to cut wages fastly. To do it is easier when inflation is higher. Also based on the experience of BOJ, we recommended ECB to keep inflation expectations within Euro Area firmly anchored, especially short and middle-term ones, do not make decision based on long-term one.

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Appendices

Appendix 1: Inflation Target Setting and Its Determinants

Country	Who sets the target?	Determinants of inflation targets
Australia	Central bank and government jointly	Business cycle fluctuations
Brazil	Central bank and government jointly	n.a.
Canada	Central bank and government jointly	Costs of inflation, Measurement error, Wage rigidities, Zero interest rate bound
Chile	Central bank	Deflation risk
Colombia	Central bank and government jointly	n.a.
Czech Republic	Central bank	Past inflation, Inflation expectations, Price convergence, Wage rigidities, Zero interest rate bound, Measurement error
Finland	Central bank and government jointly	n.a.
Israel	Government	Measurement error, Wage and price rigidities, Zero interest rate bound
Mexico	Central bank	Foreign inflation
New Zealand	Central bank and government jointly	Past Inflation, Foreign Inflation, Target Expectations
Peru	Central bank and government jointly	n.a.
Poland	Central bank and government jointly	Economic growth, Maastricht inflation criterion for euro adoption
South Africa	Central bank	n.a.
South Korea	Central bank and government jointly	Past inflation, Economic fundamentals, Monetary policy flexibility
Spain	Central bank and government jointly	n.a.
Sweden	Central bank	Past inflation, Costs of inflation, Risks of deflation, Measurement error
Switzerland	Central bank	Measurement Error
Thailand	Central bank and government jointly	Foreign inflation, Economic growth
United Kingdom	Government	Sustainable growth

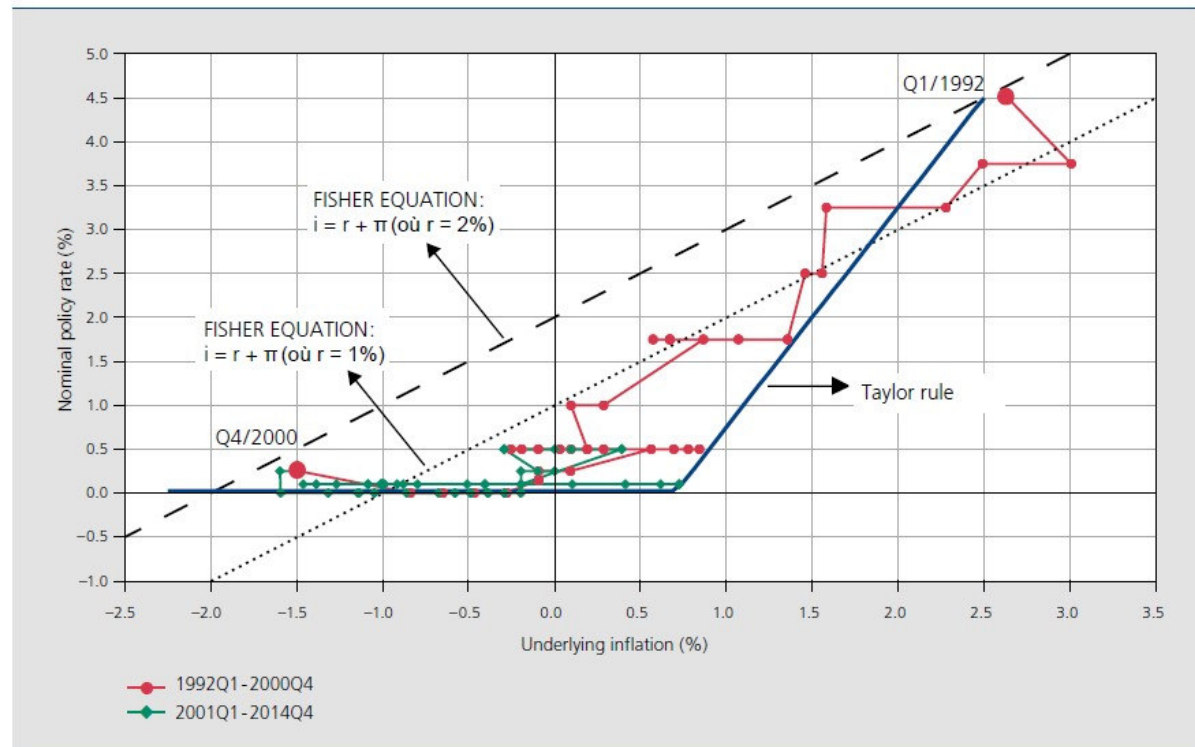
Source: taken from the study of Roman Horváth Jakub Matějů

Appendix 2: Inflation targets determinants (result of research)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CPI inflation	0.50*** (15.75)	0.49*** (14.47)	0.55*** (15.83)	0.49*** (15.15)	0.49*** (15.05)	0.49*** (15.47)	0.50*** (15.55)
Inflation volatility	0.29** (2.61)	0.29*** (2.46)	0.23*** (2.67)	0.23*** (2.64)	0.24*** (2.68)	0.22*** (2.51)	0.31*** (2.71)
GDP growth	0.15*** (3.96)	0.16*** (3.76)	0.16*** (4.11)	0.15*** (3.77)	0.15*** (3.77)	0.15*** (3.75)	0.16*** (4.03)
World inflation	0.12** (2.13)	0.11* (1.75)	0.13** (2.29)	0.13** (2.19)	0.13** (2.24)	0.12** (2.15)	0.11* (1.91)
Credibility	-0.51** (-2.21)	-0.53* (-1.76)	-0.49** (-2.13)	-0.58** (-2.30)	-0.60** (-2.39)	-0.48 (-1.56)	-0.65** (-2.15)
Price level		-0.01 (-0.16)					
Independence			-0.50 (-1.01)				
Gov. party orientation				-0.07 (-0.66)			
(Independence + Gov. p. or.)					-0.09 (-0.68)		
GDP per capita						-2.50 (-0.19)	
Emerging markets dummy							-0.19 (-0.73)
Constant	0.63* (1.95)	0.76* (1.86)	0.88** (2.16)	0.66** (2.03)	0.72** (2.13)	0.65* (1.86)	0.77** (2.04)
No. of observations	134	114	130	130	130	130	130
Pseudo R-squared	0.78	0.80	0.78	0.78	0.79	0.77	0.77

Source: Horváth, R., & Matějů, J. (2011).

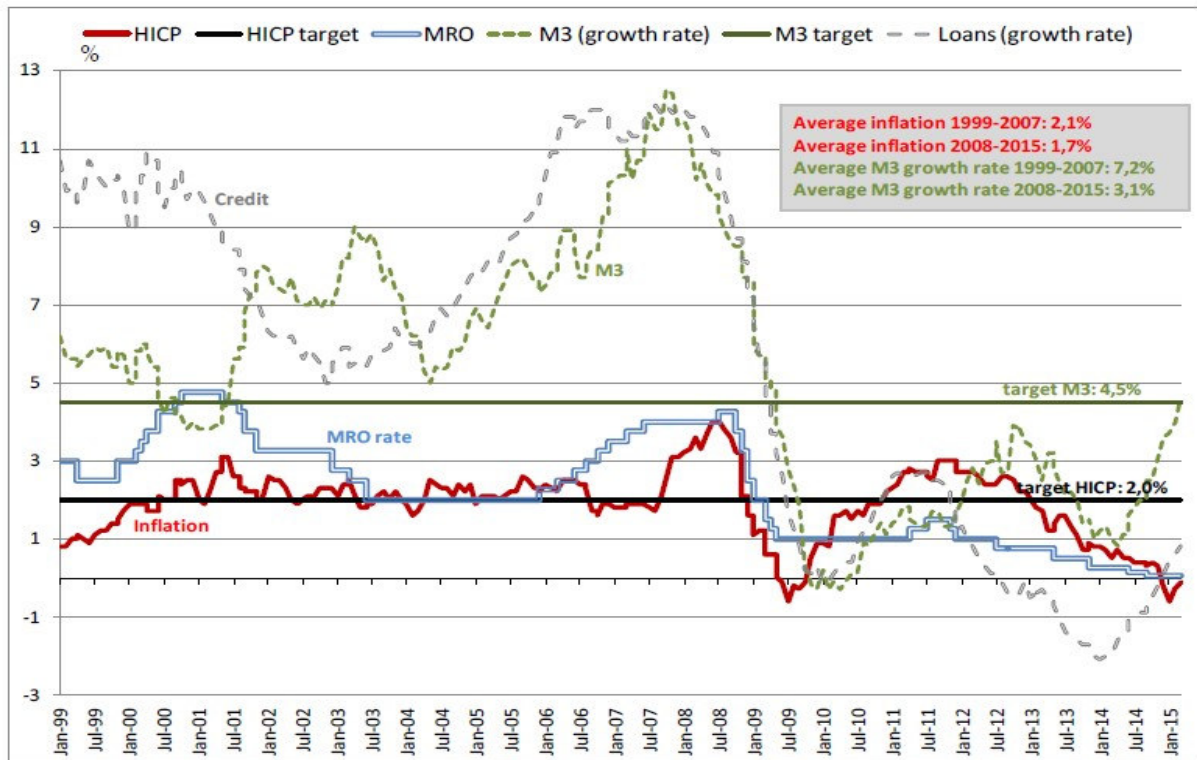
Appendix 3 Policy rates and underlying inflation



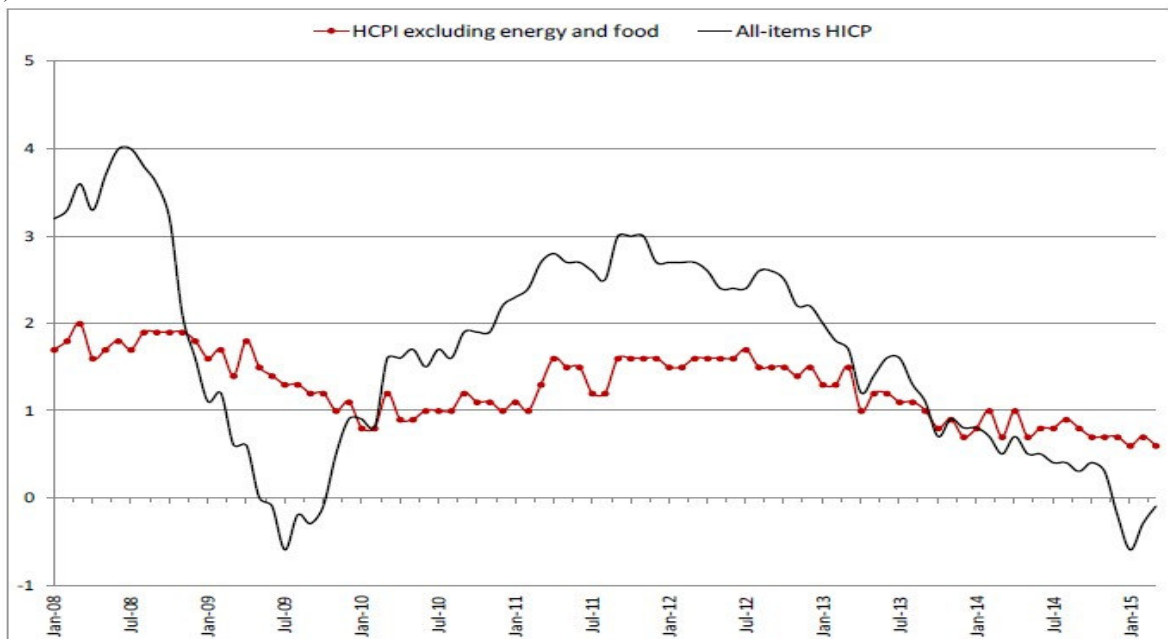
Source: Boeckx, Butzen, Cordemans, Ide (2015).

Appendix 4 Inflation, money and credit growth in Euro Area

(a)



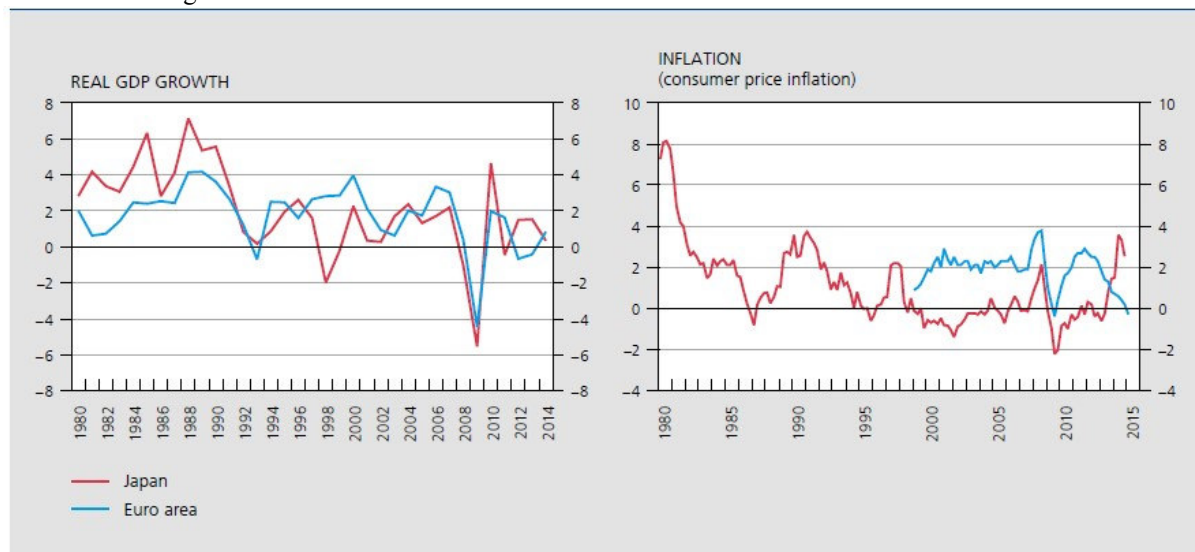
(b)



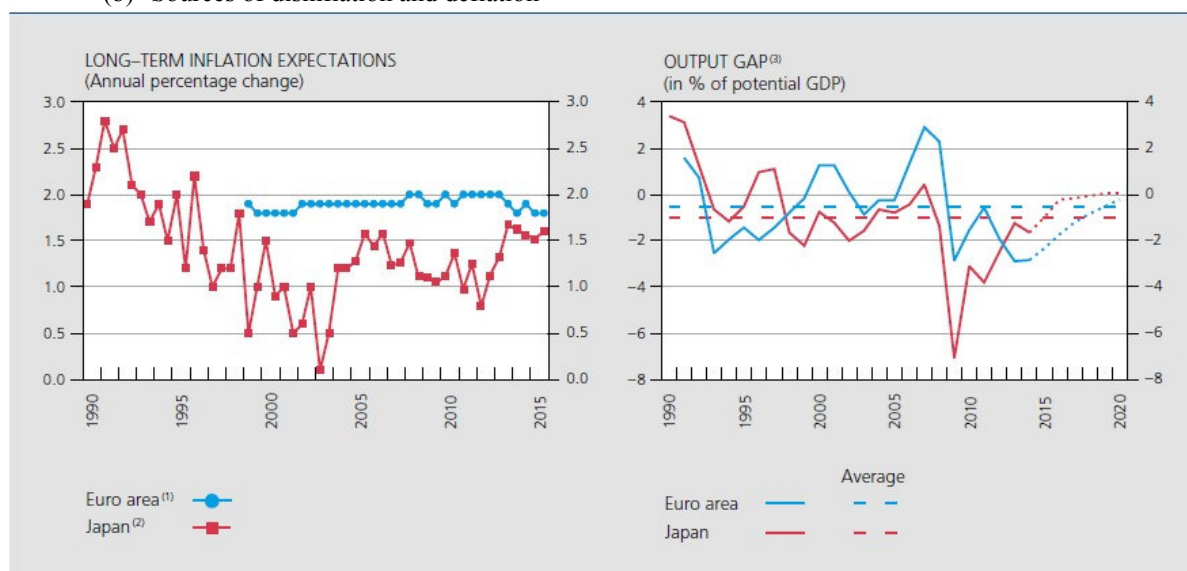
Source: ECB, Eurostat, Miccosi, S. (2015).

Appendix 5 Comparison dynamic of inflation processes in Japan and Euro Area

(a) Economic growth and inflation % change



(b) Sources of disinflation and deflation



Source: Boeckx, Butzen, Cordemans, Ide (2015).

Appendix 6 Impact of QA (quantitative easing) programmes on interest and exchange rates

(a)

	Long-term interest rate (%)				
	Before	At start	After	Change	Compared to euro area (core)
Euro area					
PSPP (Mar2015)	1.6				
United Kingdom					
QE1 (Mar 2009)	4.2	3.5	3.6	-0.6	-0.4
QE2 (Oct 2011)	2.9	2.3	2.2	-0.6	-0.2
United States					
QE1 (Nov 2008)	3.9	3.3	2.7	-1.1	0.1
QE2 (Nov 2010)	2.8	2.9	3.5	0.7	0.0
Twist (Sept 2011)	3.2	2.4	2.0	-1.2	0.0
QE3 (Sept 2012)	1.8	1.6	1.7	-0.1	-0.1
Japan					
QQE (Apr 2013)	0.6	0.8	0.7	0.1	-0.2

(b)

	Nominal effective exchange rate (index 2010=100)				
	Before	Before	Before	Before	Before
Euro area					
PSPP (Mar2015)	100.3	100.3
United Kingdom	104.5	97.2	101.4	-3.1	104.5
QE1 (Mar 2009)	98.4	100.0	101.0	2.6	98.4
QE2 (Oct 2011)					
United States	95.8	106.0	108.8	13.0	95.8
QE1 (Nov 2008)	100.7	97.4	96.6	-4.6	100.7
QE2 (Nov 2010)	93.6	94.2	97.8	4.3	93.6
Twist (Sept 2011)	99.0	98.9	97.5	-1.5	99.0
QE3 (Sept 2012)					
Japan					
QQE (Apr 2013)	91.7	86.1	86.5	-5.1	91.7

Source: Gros, Alcidi, Pieter De Groen (2015).