

Inflation Targeting: Experience and Implications in Advanced and Developing Economies Earlier Not Explored

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Abstract

Inflation targeting (IT) influences advanced and developing economies differently. Conducting graphical and econometric analysis the Ineffectiveness in these two groups of countries was studied. Also the supposition about third-party factors that caused global disinflation was made. The article provides some explanation why some factors (institutional, economic and financial), distinguishing advanced and developing economies, reduce the effectiveness of the IT regime or even worsen some macroeconomic indicators due to IT implementation

Key words: Inflation targeting; Panel data regression; advanced economies; Developing economies.

Highlights

- Slowdown of global inflation had begun before the IT was introduced by pioneer countries.
- Advanced economies achieved basically positive results from IT in terms of inflation. Developing economies mostly were not prepared – there were no impact on inflation. Employment was harmed (!) in both country groups and particularly in developing economies.

Introduction

IT regime was pioneered in New Zealand in 1989 and further implemented in many countries. At present time it is the most effective system of monetary policy for the majority of the advanced economies. The movement to IT was dictated not only by attractive features of this regime. The impetus for IT implementation was also given by success in pioneered countries (Mishkin and Posen, 1997) and financial crisis caused by the fixed exchange rates policy. Before the movement to IT the transformation of monetary policy was passed the development in several stages analyzed below (HM Treasury, 2013).

Starting from 80th a great amount of central banks applied money supply targeting, which implies the stable link between the level of money supply and the inflation rate. However, theoretical assumptions as of the link between these variables did not find empirical confirmation. Thus, even theoretical money demand models lost their points with the development and deepening of financial markets. After that central banks have begun to change their monetary policy towards exchange rate targeting or eclectic approach with several objectives. However, countries that were trying to target exchange rate, conducted expansionary fiscal policy to a great extent (Dutttagupta and Tolosa, 2005). At the same time, they were under the influence of external shocks. As a result, domestic and external imbalances were accumulated and countries began to abandon the exchange rate pepsin favor of more flexible exchange rates.

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Many economies preferred IT, because such regime was able to resolve a set of problematic issues, aroused during implementation of previous regimes. In particular, unlike monetary targeting, IT did not require a stable link between money supply and inflation. However, IT implied a stable monetary anchor as a low inflation for all market participants. Unlike exchange rate targeting it did not suffer direct influence of external conditions, and vice versa it absorbed external shocks. IT can be easily understood by the public (Sivák, 2013) and it is one of the advantages of this regime. Permanent communication policy increases the central bank credibility and reduces uncertainty. Since the objective has always been predetermined and approved by legislative mandate, as the duty of the central bank, the central bank is always accountable to the public on its achievements. First central banks, which have implemented IT, determined only price stability as the strategic goal of their monetary policy. They also identified interest rate as the main tool which ensures the achievement of price stability in the long-run period. The convenience of this mechanism and the maintaining of the discipline among market agents were highlighted. An important argument was that price stability has been prerequisite for aiming on other macroeconomic objectives that had to be achieved by economies as a whole.

Banking systems and financial markets have been developing a lot. And it was evident that ensuring price stability as the only duty of the central bank could not ensure macroeconomic stability and could not protect IT countries from financial crises (Antipa and Matheron 2014). The vivid example is Iceland where the central bank had implemented IT and for many years had been conducting monetary policy successfully. The inflation rate was low, about 2-4 percent, but the lack of attention to issues of financial stability, inadequate banking regulation and prudential supervision of the country had led to severe financial and political crisis. Later some economists tended to believe that IT as a monetary regime has been overcoming crisis. Famous Sweden scientist Lars Svensson gave the comment (Svensson, 2009) on this topic, identifying IT as a flexible framework, which is being developing and transforming together with the development of the economy and financial markets. Initial traditional approach, when the central bank used the inflation as one objective only, was changed into flexible IT framework which takes into account the economic cycle and focus on financial stability issues. After the crisis, the central banks, inflation-targeters determined second basic function for their policy. It was financial stability (Macklem, 2014).

Nowadays monetary policy makers are increasingly focused on state institutions quality. Monetary policy results, the effectiveness of financial market regulation and prevention of the bubbles on housing and security markets highly depend on effectiveness and quality of state institutions. The article considers the gap in this area being one of the most important barriers to successful IT. *In general, the study reveals how successful was IT as the monetary policy regime, what are the costs of transition to this regime for different groups of countries and what are the main challenges, according to the author, of inflation targeting implementation.*

The low rates of inflation are evidently the most convenient for the economic development. High inflation rates negatively affect economic growth. Namely it leads to the uncertainty increase (Fischer and Modigliani, 1978). In contrast low inflation environment allows easy business planning and also making long-term investment decisions more attractive and effective. Under conditions of low inflation saving behavior of households is formed. Therefore, financial intermediation function is more active. These are indisputable arguments in support of low inflation. However, price stability is only the final result. This result is achieved repeatedly and is consistently supported by sending necessary impulses through monetary transmission mechanism. *And if price stability is a positive achievement, the process of its achieving may come into conflict with other goals of macroeconomic policy, such as support for economic growth, low unemployment and financial stability.*

Focusing only on the inflation objective is considered as neglecting other indicators; the central bank should also focus on (Kemp, 2009). As it was mentioned above one of the arguments for IT support is money neutrality theory (Patinkin, 1987). This means that money supply change in the long-run period can affect on nominal indicators only, while GDP and unemployment tend to equilibrium in this period. Despite the fact that economic and monetary views are largely based on this theory, today there are more and more contrary studies (Precious and Palesa, 2014, Dimitrijević and Lovre, 2012).

Maintenance of low inflation rate, except communications and verbal interventions, requires changing interest rate (the main monetary tool). It means the increase of interest rate to such a level that slows economic growth. Namely the objective is achieved by reducing aggregate demand. But in this case a problem indicated by the economists occurs [0, 0, Arestis and Sawyer, 2005 and Stiglitz, 2008)]. Inflation has different nature. First of all, it is demand inflation, which is caused by excess of the demand above the output in the economy. Also inflation can be determined by supply fluctuations. In particular, the occurrence of negative supply shock, such as an output decline, may speed-up inflation. The last one forces the central bank to use measures to curb inflation, but this only deepens the decline in output.

Also, inflation may have imported (Barbalau, 2014) or administrative nature. In any case the central bank will have the only existing, inadequate to the source of inflation, reaction – restriction of aggregate demand.

As there is a stable link between aggregate demand and employment, employment, according to many researchers (Epstein, 2007) also suffers from tight monetary policy aimed on inflation reduce.

Also in the case of low inflation we can suppose influence on employment, caused by lower flexibility of real wages. In particular, the crisis phase of the business cycles can lead to inability of enterprises to pay wages. A low inflation rate according to economists (Петрик О. И., 2008) causes the «grease effect» that helps to avoid implications of the prices and wages rigidities. In the case of inflation, the reduction of real wages will occur automatically, allowing the employers not to reduce nominal wages or to fire workers. Some studies emphasize the low «dose» of inflation, which may vary for different groups of countries, but usually is in a range of 2-6% (Petryk and Nikolaychuk, 2007). However, some scientists (Pollin and Zhu, 2005) noticed that inflation below 10% (or somewhat higher) is very likely to be consistent with higher rates of economic growth for middle- and low-income countries.

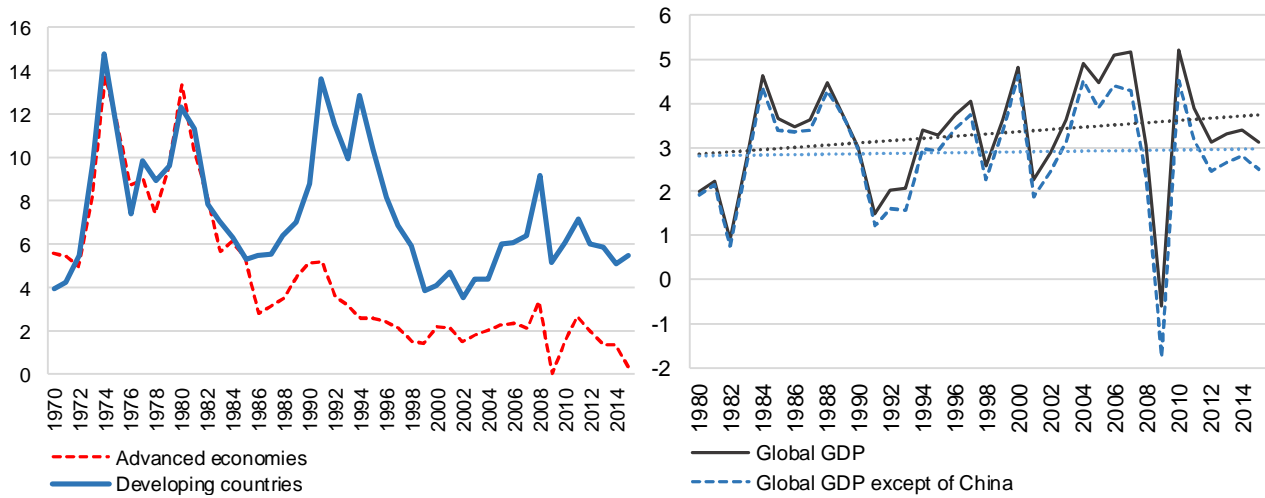
Also there are important clarifications and relative negotiations as of IT influence on macroeconomic indicators. In particular, according to the Phillips curve there is a long-term inverse relationship between the rate of inflation and the unemployment rate. However, later it was added that unemployment and GDP return to its previous level in the long-run, while inflation is irreversible. According to scientists' view, under IT regime, employment and economic activity will decrease only while inflation target is being achieving. Then these indicators will return to the previous level. This is neoliberal view that the economy always tends to equilibrium. So, the only macroeconomic variable that economists should think about is inflation. However, this neoliberal trend is quite disputable. Today there are many research papers which could doubt Keynesian theory described above. However, solutions and guidance for central banks in developing economies are based on neoliberal theory.

In this paper we study the possible impact of IT both on inflation and the real macroeconomic indicators such as GDP and unemployment rate. Our empirical research should confirm or deny such links for to make further relevant conclusions.

Graphical analyses and first assumptions: is a low inflation rate the result of IT or just the coincidence?

A graphical analysis of long inflation and GDP history brought us to a few conclusions. Global inflation rate declined from high levels at the beginning of the study period to a low level at its end. Meanwhile, acceleration of the global GDP growth was mainly due to the spillover effect from the double digits rate growth of the Chinese economy during the decades. This may indicate some structural changes that have occurred in the world economy, carrying disinflation influence without slowing economic growth.

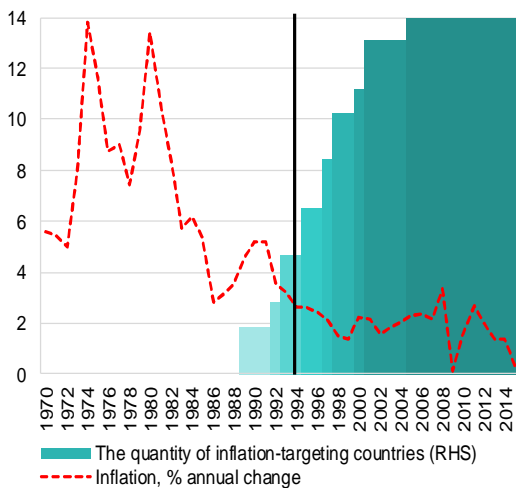
Graph 1: Inflation by groups of countries, Graph2. Global GDP, % annual change



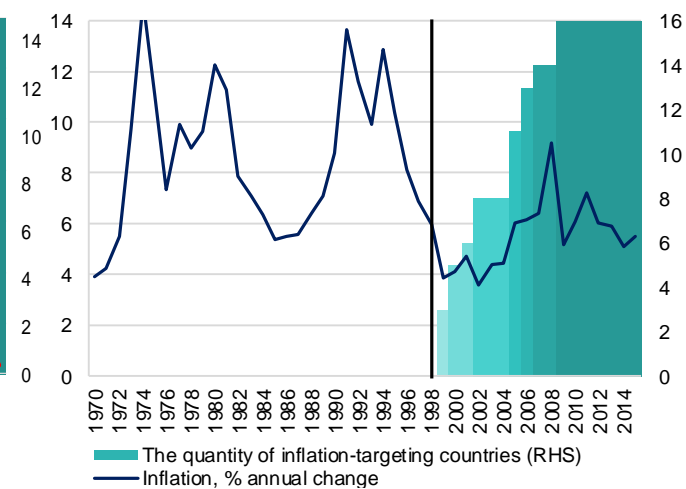
Source: IMF. Source: IMF; author`s estimates.

From the diagrams we can conclude that inflation slowdown occurred before the movement to IT. During first implementation of IT in the advanced economies (New Zealand and Canada - in 1989, the UK - in 1992, Finland and Australia - in 1993) the average inflation rate in the whole group of countries has been about 3%. Active use of IT caused unsustainable trend to further inflation slowdown. If we observe developing economies, the inflation rate declined to 4% level even before the first introduction of IT.

Graph3. Inflation in advanced



Graph 3. Inflation in developing economies and IT spread- over economies and IT spread-over



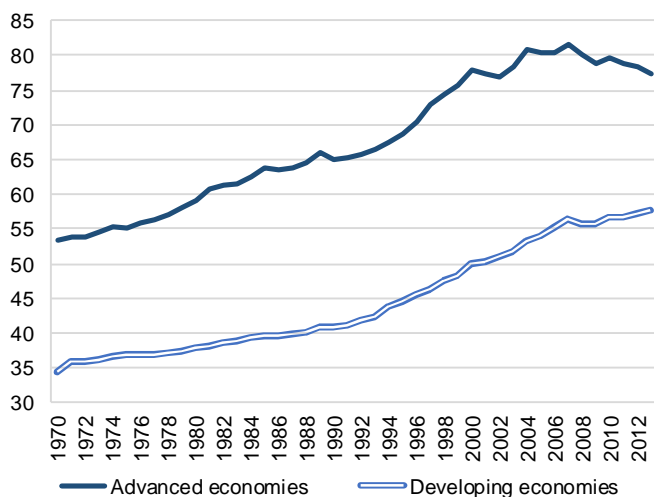
Source: IMF; central banks web-sites;

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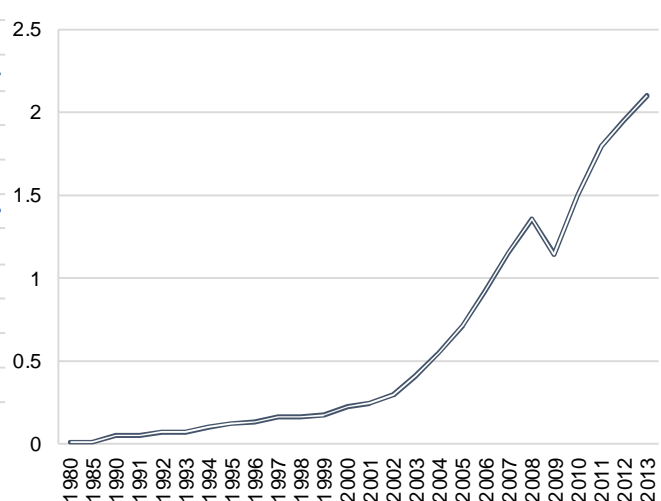
We can assume that IT policy kept inflation on the low level. However, it is evident that overall inflation in the world declined due to other factors. Also, perhaps, these factors explained continued low inflation. The rapid development of globalization is among such factors. Reduction of tariff and customs barriers among countries, intensification of trade and competition, as a result, caused significant disinflation in the global economy.

Also, the supply shock was a significant factor of inflation decline. On the one hand it was caused by the reduction of costs owing to technological innovations. At the end of the last century there was a steady increase in productivity (Arestis and Sawyer, 2013), which pushed some prices down. On the other hand, a shock was caused by the entrance of China and other low-cost producing countries into the global commodity market. This gave the impetus to competition and formed the supply of cheap products.

Graph 5: Average index KOF of economic manufacturing goods, trln of USD



Source: KOF Swiss Economic Institute; estimates.



Source: National Bureau of Statistics author's of China.

In addition, the 90 th and the first half of the 2000s were characterized by relatively moderate dynamics in commodity prices. Stabilization of the world exchange rates dynamics (a significant reduction of their volatility) played a significant role in lowering of inflation pressure.

And finally, low inflation rate may be explained by the increased attention to this indicator. Although central banks kept other monetary policy regimes, their attention to inflation increased. Important contributory factors also may have been a substantial fiscal consolidation and continuing programme of supply-side reforms (Benati, 2005).

Thus, there were enough factors for reducing inflation in the 1990s and early 2000s. The impact of certain factors could have a significant role.

Graphical analysis indicated that inflation rate decline was widespread even before the movement to IT. This emphasizes non-political nature of disinflation.

However, we can assume that the introduction of IT was dictated not only by the desire to reduce inflation. Banks could pursue the goal of *reduction inflation volatility*. This achievement of IT is an important advantage compared to other monetary regimes. The legislative mandate as of quantitative inflation objective and growing central bank credibility in some inflation targeting countries enabled to anchor inflation expectations close to the inflation target.

So, compared to other monetary regimes, temporary supply shocks in inflation targeting countries had no significant effect on the inflation fluctuations.

Econometric analysis and conclusions: whether low inflation is the result of inflation targeting or coincidence? Implications for the real economy

Now we will analyze panel data on inflation, GDP and unemployment rates in different countries. We will use annual data for the period from 1985 to 2015. For inflation, we will take the average annual CPI change. For GDP, annual changes will be used. Regarding unemployment level, we will take unemployed as the share of economically active population. All the data was obtained from IMF web-site (Global Economic Outlook database).

Analysis is done with the help of linear regression with panel-corrected standard errors (PSCE) as the following:

MacroVariable_i = Dummy_IT Dummy_Country_i Dummy_Year_i, where
 MacroVariable_i –macroeconomic variable (GDP, inflation or unemployment);
 Dummy_IT –dummy variable that takes the value one in the year of IT adaptation and keep it further;
 Dummy_Country_i – a set of dummy variables that takes the value one for each country;
 Dummy_Year_i–a set of dummy variables that takes the value one for each year.

The composition of the model in such way allows taking into account significant difference in inflation across countries due to economic and political features. In addition, we take into account typical processes for certain years. We assume that there are some global trends in macroeconomic indicators dynamics. The model conclusions would be wrong in the case of not taking into account these features.

Panel regression were built both for the whole list of countries and separately for developed and developing economies. 1985 was taken as a base year.

It was found that standard errors are heteroscedastic, correlated within and intra group. Taking into account the features of the data (T<N) PSCE estimator was chosen as the best for this case. Additionally for advanced economies FGLS (fit panel-data linear models by using feasible generalized least squares) was estimated, taking into account that T (time periods) is close to N (the quantity of groups) for this case.

Additional information concerning the model is provided in the appendix.

Table: Models results: IT influence on certain macroeconomic variables.

| Variables | Consumer inflation | | | GDP | | | | Unemployment | | | | |
|-----------------|--------------------|--------------------|----------------------|---------------|--------------------|----------------------|---------------|--------------------|----------------------|-------------|-------------|-------------|
| | All countries | Advanced economies | Developing economies | All countries | Advanced economies | Developing economies | All countries | Advanced economies | Developing economies | | | |
| | PCSE | PCSE | FGLS | PCSE | PCSE | FGLS | PCSE | PCSE | FGLS | PCSE | | |
| IT | nss* | -5.6 | -5.7 | nss | nss | 1.0 | 0.93 | nss | 1.1 | 0.8 | 0.8 | 1.7 |
| Country dummies | ** | . | . | . | . | . | . | . | . | . | . | . |
| 1986 | nss | -9.0 | -8.9 | nss | 0.5 | 0.7 | nss | 0.5 | -0.3 | -0.4 | -0.4 | nss |
| 1987 | nss | -11.7 | -11.4 | nss | 0.7 | 1.8 | 1.51 | nss | -0.4 | -0.8 | -0.9 | nss |
| 1988 | nss | -12.2 | -12.0 | nss | 0.7 | 1.5 | 1.49 | 0.6 | -0.6 | -1.3 | -1.3 | nss |
| 1989 | nss | -11.9 | -11.8 | nss | 0.7 | 1.0 | nss | 0.8 | -0.8 | -1.7 | -1.7 | nss |
| 1990 | nss | -11.2 | -11.1 | nss | nss | 0.6 | nss | nss | -0.6 | -1.9 | -1.9 | nss |
| 1991 | nss | -11.2 | -11.0 | nss | nss | -1.4 | -1.38 | nss | nss | -1.3 | -1.3 | nss |
| 1992 | nss | -11.5 | -11.4 | nss | nss | -0.9 | -1.14 | 0.8 | 0.7 | -0.7 | -0.8 | 1.7 |
| 1993 | 145.1 | -9.2 | -9.0 | 178.0 | nss | -1.6 | -2.14 | nss | 1.3 | nss | nss | 2.3 |
| 1994 | 189.5 | -11.3 | -11.1 | 239.4 | nss | 0.7 | nss | nss | 1.4 | nss | nss | 2.5 |
| 1995 | nss | -12.1 | -12.0 | nss | 1.3 | nss | nss | 1.4 | 1.4 | nss | nss | 2.7 |
| 1996 | nss | -12.8 | -12.6 | nss | 1.8 | -0.5 | nss | 2.2 | 1.3 | nss | nss | 2.2 |
| 1997 | -125.5 | -13.9 | -13.7 | -152.2 | 2.7 | nss | nss | 3.1 | 0.9 | nss | nss | 1.7 |
| 1998 | -148.0 | -14.2 | -14.0 | -178.3 | nss | -1.0 | nss | nss | 0.8 | nss | nss | 1.6 |
| 1999 | -154.9 | -15.2 | -15.0 | -184.1 | nss | 0.3 | nss | nss | 0.8 | nss | nss | 1.6 |
| 2000 | -159.2 | -14.0 | -13.8 | -188.1 | 1.7 | 1.0 | nss | 1.7 | nss | nss | nss | 1.4 |
| 2001 | -165.3 | -13.8 | -13.6 | -194.3 | nss | -2.0 | -1.56 | nss | nss | nss | -0.8 | 1.5 |
| 2002 | -170.4 | -14.5 | -14.3 | -199.6 | nss | -1.9 | -1.57 | nss | nss | nss | nss | 1.6 |
| 2003 | -171.9 | -14.7 | -14.6 | -201.4 | 1.4 | -2.2 | -1.37 | 1.9 | nss | nss | nss | 1.4 |
| 2004 | -172.8 | -14.6 | -14.4 | -202.5 | 2.8 | nss | nss | 3.1 | nss | nss | -0.8 | 0.9 |
| 2005 | -173.6 | -14.1 | -14.0 | -202.3 | 2.2 | -0.7 | nss | 2.5 | nss | -1.2 | -1.3 | nss |
| 2006 | -173.5 | -13.9 | -13.7 | -201.5 | 2.7 | nss | nss | 3.0 | -1.1 | -1.9 | -2.0 | nss |
| 2007 | -174.0 | -14.0 | -13.8 | -201.8 | 2.9 | nss | nss | 3.1 | -1.7 | -2.5 | -2.6 | -0.9 |
| 2008 | -168.9 | -11.7 | -11.5 | -195.9 | 1.4 | -3.3 | -3.43 | 2.1 | -2.1 | -2.4 | -2.6 | -1.6 |
| 2009 | -175.1 | -15.4 | -15.2 | -202.0 | -2.3 | -7.0 | -8.60 | -1.5 | -0.8 | nss | nss | -0.9 |
| 2010 | -175.2 | -14.7 | -14.5 | -202.4 | 1.6 | -0.8 | -1.14 | 1.7 | -0.7 | nss | nss | -1.0 |
| 2011 | -173.3 | -13.5 | -13.4 | -200.3 | 1.4 | -1.9 | -1.90 | 1.7 | -0.9 | nss | nss | -1.1 |
| 2012 | -173.7 | -14.1 | -13.9 | -200.7 | 1.2 | -3.4 | -3.61 | 2.0 | -0.7 | nss | nss | -1.0 |
| 2013 | -173.7 | -15.0 | -14.9 | -200.7 | 0.8 | -3.1 | -3.03 | 1.3 | -0.7 | nss | 0.3 | -1.1 |
| 2014 | -171.0 | -15.6 | -15.4 | -197.5 | nss | -2.4 | -2.44 | 0.9 | -1.0 | nss | nss | -1.3 |
| 2015 | -164.1 | -16.1 | -15.9 | -189.1 | nss | -2.1 | -2.69 | nss | -1.3 | nss | -0.9 | -1.3 |

* Only statistically significant coefficients are shown in the table (we reject null-hypothesis for the significance level less than 10%), otherwise abbreviation "nss" is given.

** Results on dummy coefficients for individual countries are missed in the table due to the large number of countries (180) and no need in the relevant analysis.

IT influence on inflation.

Having analyzed the whole list of countries we can trace a trend of inflation decline, founded at the end of 90s. There is also unstable upward trend in negative value of coefficients. As the effect of IT was considered separately, it is possible to draw conclusions about other general factors that determined worldwide inflation reduction. This is fully complied with our previous assumptions based on graphical analysis.

As regards IT, its coefficient was insignificant, and therefore such are gime had not caused lower inflation in the world. However, in some cases we could assume IT success, but the model reflected the average result for all countries. Despite the conclusion that IT had not led to lower inflation, we offer to divide panel data separately for developed and developing economies.

Regression analysis for advanced economies also indicated the tendency of inflation decline. Its beginning was noticeable from the start of the studied period. Meanwhile IT regime in this case was effective, as corresponding coefficient was significant and amounted 5.6 (5.7 in the case of FGLS estimation). Taking into account negative result for the whole list of countries and positive for advanced economies only there is the reason to expect that IT was in effective in developing economies. Regression analysis confirms our recent assumptions. These countries were also characterized by inflation decline in the late 90sand in the early 2000s. After that inflation had been fluctuating around a relatively stable rate for more than ten years.

So, we can conclude as follows, IT regime was effective in reducing inflation in advanced economies but was mostly ineffective in developing economies.

We stated, that inflation decline was the overall global trend. Nevertheless, IT regime managed to reduce the inflation volatility in some countries and helped to keep its low rate. It is considered to believe that it was achieved by anchored inflation expectations at targeted level through the legislative mandate of the central bank and the system of communications with the public.

IT influence on GDP.

As of influence of IT regime on economic activity, the model did not yield an influence for the whole list of countries. However, IT positively contributed to GDP growth particularly for advanced economies. So the conclusions of IT regime defendants about the positive influence on economic activity was approved, but in the great extent for advanced economies. While emerging economies did not experience any GDP impetus. These results are entirely consistent with the results for inflation and could mean that lower inflation has a positive impact on economic activity.

IT influence on unemployment.

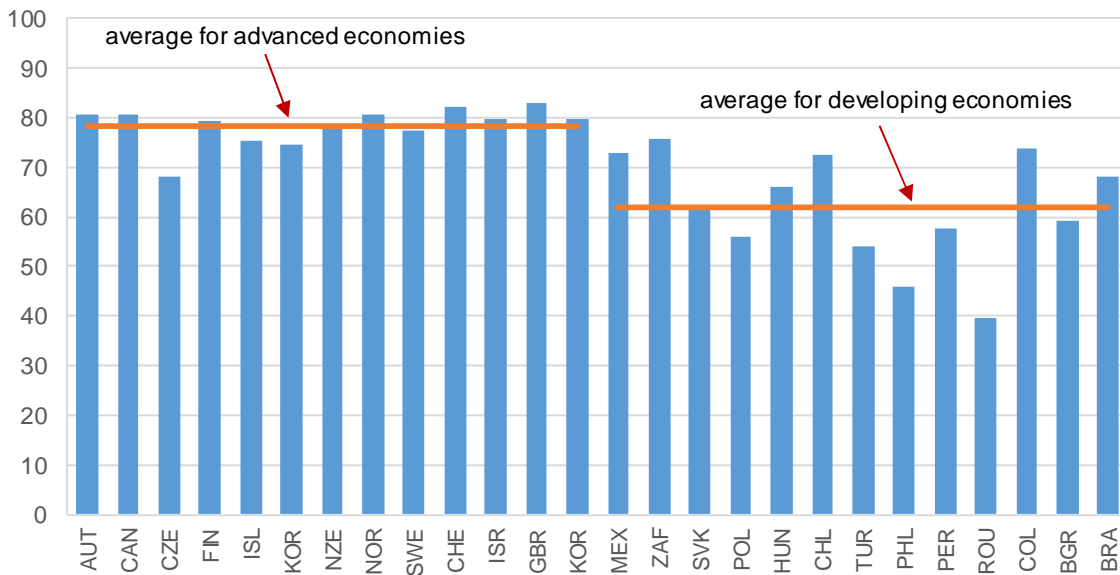
The final step was to analyze the influence of IT on employment as one of the most important indicators of welfare. In the model we used reverse indicator, namely unemployment. According to the model unemployment in average has been declining for several years before the crisis of 2008, but after the crisis it has increased slightly (coefficients that compare unemployment with the base 1985 year remained negative, but their absolute values became lower). However, the greatest value for us represented the impact of IT regime on unemployment. The implementation of this regime caused increase in unemployment (the rate for Dummy IT was statistically significant and positive). Analysis by individual groups of countries demonstrated that this result was censured by both country groups. Meanwhile, developing economies experienced higher impact of IT regime on unemployment.

So, as results of our model, we can conclude that implementation of IT regime accelerated disinflation processes in advanced economies, which in turn contributed to their economic growth. However, the opposite situation occurred in developing economies. IT regime was not effective in the sense of impact on inflation. This may be due to many features of developing economies. In particular, the consumption structure in these countries (graph 7) is in a big portion represented by components, prices of which are not affected by monetary policy. They are determined by supply factors or in administrative manner. The implementation of IT in these countries was fulfilled mainly in the conditions of weak state institutions, and missing structural reforms, particularly in the energy and other monopolistic sectors. Meanwhile, regression results showed that the implementation of IT was accompanied by an increase in unemployment!

Notation

GDP growth and employment reduction, which is the result for advanced economies, is contrary to Okun's law. While some scientists (Rahman and Mustafa, 2015) queried the validity of this law in certain countries, we will not make the emphasize on the last result for advanced economies. Additional motivation (besides Okun's law) for not to underscore this problem for advanced economies is the results obtained by simple panel regression estimation (xtreg) without heteroscedasticity robust standard errors². In terms of IT influence they coincided with PSCE and FGLS for all cases besides unemployment in advanced economies (the influence was not significant). Although hour benchmark models (PSCE and FGLS) point on unemployment increase after IT launching in both country groups, we will pay more attention only for the result for developing economies. Graph 7. The share of CPI components, excluding foods and energy, by some inflation-targeting countries, %

²These estimates were made by the author additionally and are not disclosed in this papers.



Source: OECD, author's elaboration.

Additional thought as of IT.

Some scientists are cautious looking at further expansion of IT. This regime continues to spread among the developing economies despite the little evidence of IT success in promoting economic growth, job creation and poverty reduction, as well as mixed conclusions on the effectiveness of IT in lowering inflation. As a result, in the last two decades, central banks shifted their policies from development objectives to stabilization purposes (Epstein, 2007). In particular, central banks focus on financial and price stability. The justification for such action is theoretical absence of long-term relationship between monetary policy and real economic variables. However, today there is the necessity of seeking new bases for monetary policy, in particular the balanced approach. Taking into consideration undeveloped financial markets and poor transmission mechanism, monetary policy under IT in developing economies may be only partially effective through anchoring of inflation expectations in the case if central bank is able to build the credibility of society. GDP growth and employment will be the tasks mainly for fiscal policy and structural reforms.

Despite affecting the employment, IT may aggravate some other challenges and risks for the economy: *inflation targeting regime leads to a redistribution of influence on macroeconomic policy between the spheres of society* (Smith, 2016). It's quite a rare critique of inflation targeting, but it has a clear explanation. Neoliberal approach is based on the maximum depriving government of its influence on the economy. Given that the central bank clearly identifies a single target (inflation) and focuses its responsibility on achieving this goal, it dissociates itself from the problems and issues facing the government. Therefore, the government loses all the influence on the central bank losing also the potential to achieve social goals. And the society finds him in the following situation: it has to soften their demands to the government and also the demands to the central bank should be limited only by inflation. Given that the central bank now has more independence, then the financial elite, including banks, have more lobbying influence.

It mostly removes the responsibility from central banks for other important macroeconomic and monetary purposes if banks do not chose flexible approach in implementing inflationary targeting. In particular, significant narrowing of credit activity will not be the reason to rebuke central banks in the case of successful implementation of inflation targets.

Inflation targeting leads to unequal wealth distribution being implemented in the period of positive supply shock, in particular caused by productivity increase.

Scientists (Beckworth, 2014) stated the following effect: productivity growth leads to lower unit costs of companies. In such cases, the company reduces the price of the product, keeping the profit margin and at the same time expanding its market share. This leads to a positive change in owners' income, and to increase of the workers' real incomes, given the decline in prices. However, the policy of inflation targeting, obliges central bankers to inflation stimulation. So what happens? Prices remain the same, because the central banks stimulus moves them up to the previous level. Owners profits grow significantly and real earnings of workers are relatively unchanged or increase slightly due to only partial redirection of additional owners' income to the payroll.

Inflation targeting creates the risks of bubbles on asset markets (Ito, 2010). Asset prices growth may occur regardless of consumer prices dynamics (particularly in the case of the mortgage boom in the US in 2002 – 2006 or the corresponding boom in Japan in 1995 – 1999). Therefore, the dilemma exists of how the central bank should operate in the case of divergence between consumer inflation and asset inflation. In particular, what should be the central bank interest rate decision when projected consumer inflation is within targets, but asset prices are rising rapidly? Among consequences may be consumer deflation, and, respectively, the loss of public confidence. As the worst-case financial instability may be provoked.

We believe that the central bank should follow an adaptive policy in above-mentioned situations. Where the economy is below its potential level the indicators of aggregate output and employment should be in priority. Also the attention should be paid to inflation, but only when it is caused by demand factors. That is, in the case of certain overheating the central bank can shift attention towards price stability achieving inflation target in the long-run using the flexible IT.

High economic growth does not necessarily lead to high levels of employment. Such conclusions scientists are doing lately. Employment is no longer a derivative of economic growth. In 2006, the United Nations Organization determined the necessity to accomplish policy making by such purposes as productive employment and decent work.

So, the problem of unemployment becomes more important. We believe that governments and central banks should jointly deal with this problem by building their policy regarding employment not only as a derivative of other fiscal or monetary measures, but as a separate direction of the policy.

Conclusions

Oliver Blanchard, former chief economist of the IMF, said about the illusion of only one monetary objective and only one monetary tool for its achievement, meaning low inflation and short-term interest rate respectively. He explained that after the crisis it became clear the necessity of many purposes and mechanisms to achieve social goals.

A key caution for emerging economies is the following: government should prepare economy in a proper way before movement to the IT. From one hand it is necessary to establish effective monetary policy. On the other hand, it is important to form appropriate consumption structure of the population with prices of goods and services largely exposed to political influence. It is also important to pay attention to strengthening measures aimed at financial stability, banking regulation (supervision), structural reforms and the creation of a favorable business environment. Otherwise IT introduction may cause unemployment, financial instability and undermined confidence instead of keep in glow inflation.

The obtained results give grounds to state that IT regime can be effective. However, institutional and economic preparedness of countries is highly important. Advanced economies had these qualities. This enabled them to achieve basically positive results from IT in terms of inflation. In the same time unemployment increase after IT adoption raises concerns. Developing economies mostly were not prepared to effective implementation of such regime and therefore they have suffered adverse effect. In particular employment was harmed significantly, while there was no impact on inflation.

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Appendix

The papers of Reed R. & Haichun Ye (2009) and Hoehle provided the main background for decision to choose PSCE and FGLS models. First of all some approaches proposed by Reed R. & Haichun Ye (2009) were used to test standard errors of the model. For to get heteroscedastic (by assumption) standard errors “xtgls” estimation of the model was used with “panels (heteroskedastic)” option. After that “HETCOEF” was estimated as the measure of the degree of group wise heteroscedasticity present in a given data set. We can see that the errors of all the series are quite heteroscedastic.

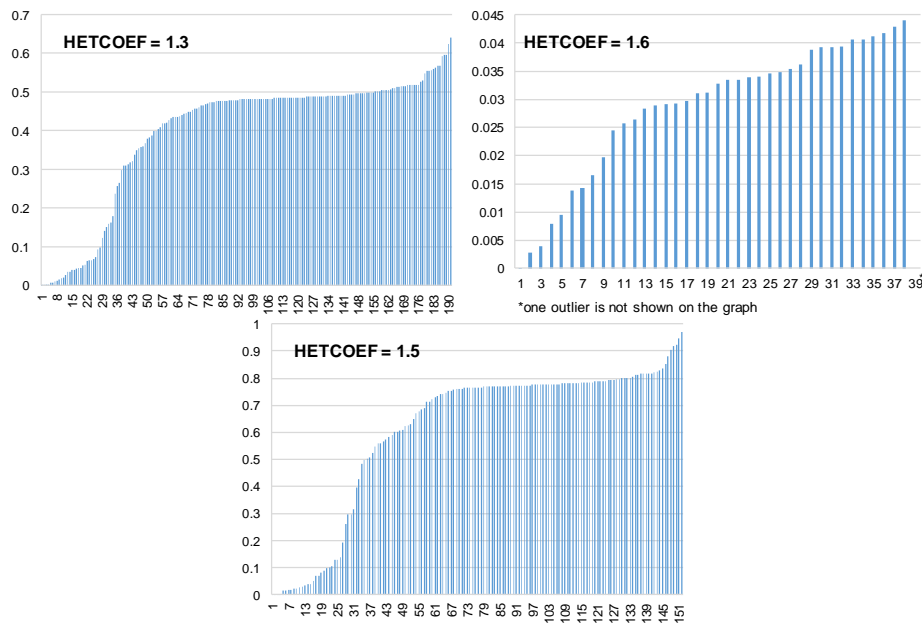
Group-specific SDs sorted in ascending order

Model for inflation

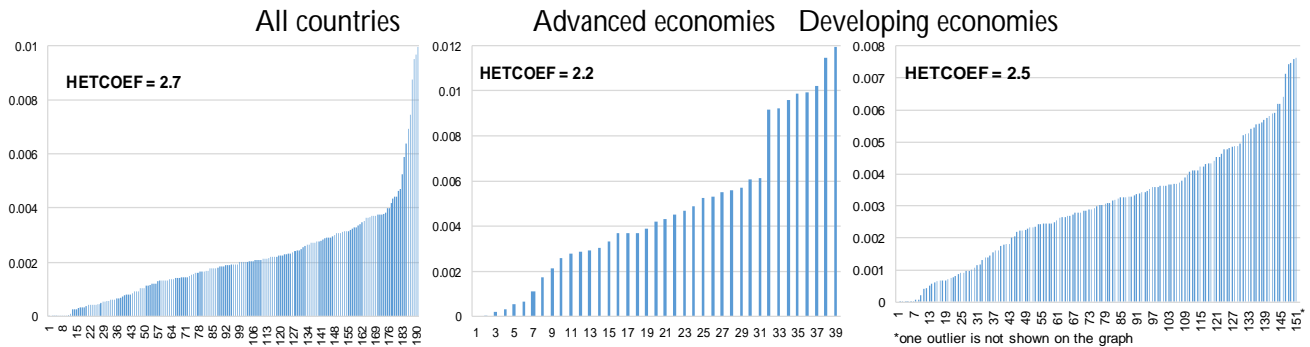
All countries

Advanced economies

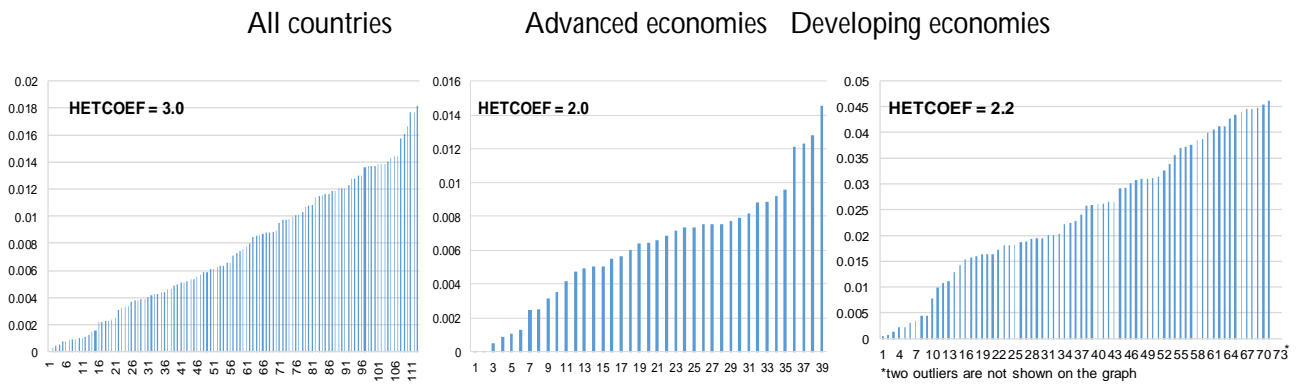
Developing economies



Model for GDP



Model for Unemployment



Although some doubts are concerning inflation model errors, we still assume heteroscedasticity here due to two reasons: according to analysis of number of separate cases standard errors looked like heteroscedastic on the graph; estimation of the inflation model with simple linear regression approach (xtreg) provided the same conclusions with regard to the sign and significance of IT coefficients.

The "RHOHAT" (estimates the value of the common AR(1) parameter using observations from a given data set) was higher than 0.95 for almost all country groups indicating high level of autocorrelation. Also significant cross sectional correlation among standard errors was found.

The number of sections only for advanced economies was close to time periods number (26 in all cases), while in other cases it exceeded the number of periods significantly. All these arguments pushed us to choose PSCE for model estimation with "pair wise correlation (psar1)" option. Taking into account low quantity of sections for advanced economies the FGLS was also estimated for these cases..