

Determination of Inflation Targets for Ukraine

This paper discusses determination of inflation targets during the transition from exchange rate peg to inflation targeting. The long-term objective for monetary policy of central bank is achieving price stability that in practice is associated with definite low but not a zero rate of inflation. The necessity for maintaining low inflation may be attributed to a number of factors such as asymmetric nominal rigidities, statistical bias in measuring consumer price index, risk of deflation and liquidity trap. In the medium term, inflation targets should primarily rely on the macroeconomic forecast, assessment of probable disinflation costs and the need for enhancing confidence in central bank. The paper argues for an optimal rate of inflation for Ukraine that would have been corresponding to the price stability concept and may serve as a long-term guide for the National Bank of Ukraine in transition to inflation targeting framework. Also the paper offers the medium-term trajectory of inflation targets to achieve the long-term objective.

Introduction

The general approach to monetary policy has changed significantly over the recent twenty years. Price stability as an objective of monetary policy is increasingly popular in the world practice.

This may be primarily attributed to the belief that inflation involves a decline in the social welfare. The major social and economic implications of inflation are redistribution of income, reduction in real purchasing power of private savings, fall in the real interest rates, growing uncertainty in decision-making by economic agents. As a consequence, the propensity to save and hence the capital accumulation rate — the parameters that determine long-term economic growth — come down.

None of the countries, however, uses zero rate of inflation as target. The necessity for maintaining low (near zero) rate of inflation may be attributed to a number of factors such as asymmetric nominal rigidities of prices and wages, risk of deflation, requisite positive nominal interest rates and statistical bias in assessment consumer price indices used for inflation measurement. The problem of finding a long-term optimal level of inflation is associated with the necessity to choose the minimum possible level of inflation that would have given an opportunity to avoid the negative effects of extremely low inflation.

At the same time, countries experiencing high inflation have to address the issue of identifying the trend to reducing the inflation to the long-term target that is associated both with short- and medium-term losses for the economy stemming from restrictive policy measures, and with potential benefits from lower inflation in the long run.

This paper is an attempt to find the answers to the above questions for Ukraine.

Determination of the Optimal Long-Term Rate of Inflation

Central banks make use of different approaches to determination of price stability. Countries like USA and Japan that do not use explicit inflation targeting apply a general determination of price stability without specific numerical value of inflation associated with it.

Generally, central banks that have shifted to explicit inflation targeting make use of quantitatively explicit and transparent to the public definition of price stability or inflation target. In most cases inflation targets reduced to a range of 0 – 4 percent over the recent decade (see Table 1).

¹ National Bank of Ukraine

Table 1: Long-Term Inflation Targets by Country

Developed countries	Inflation target, percent
Australia	2 – 3
Great Britain	2
Island	2.5
Canada	1 – 3
New Zealand	1 – 3
Norway	2.5
Switzerland	<2
Sweden	2(±1)
Developing countries	
Hungary	3
Israel	1 – 3
Colombia	2 – 4
Korea	3 (±0.5)
Mexico	3(±1)
Peru	2(±1)
Poland	2.5 (±1)
Slovakia	<2
Thailand	0 – 3.5
Turkey	4
Philippines	4(±1)
Czech Rep.	3(±1)
Chile	2 – 4
South Africa	3 – 6

Source: central banks websites

Despite the fact that quantitative objectives are country specific, there is a common incentive to use inflation expectations as a nominal anchor. In particular, the most widely used definition of price stability in the literature is that of Alan Greenspan, former Chairman of FRS: ‘Price stability is the state in which expected changes in the general price level do not effectively alter business or household decisions’ (Greenspan (1996)).

The corresponding level that permits the households and enterprises to neglect future changes in prices meets the annual rate of inflation between 0 and 3 percent that is the range usually assumed as a quantitative long-term target for developed countries (Mankiw (1985)). Many developing economies also shifted to long-term inflation targets that for the most part are slightly higher – 2 to 4 percent (due to accounting for expected changes in relative prices).

Hence, price stability is usually determined as a possibility of achieving low, but non-zero rate of inflation. The main reasons of non-zero inflation are asymmetric price and wage rigidities, the zero bound of nominal interest rates, the risk of deflation, and statistical measurement bias in the CPI. When analyzing potential advantages associated with inflation we identify the level below which inflation may have a positive effect on output growth in the long-run.

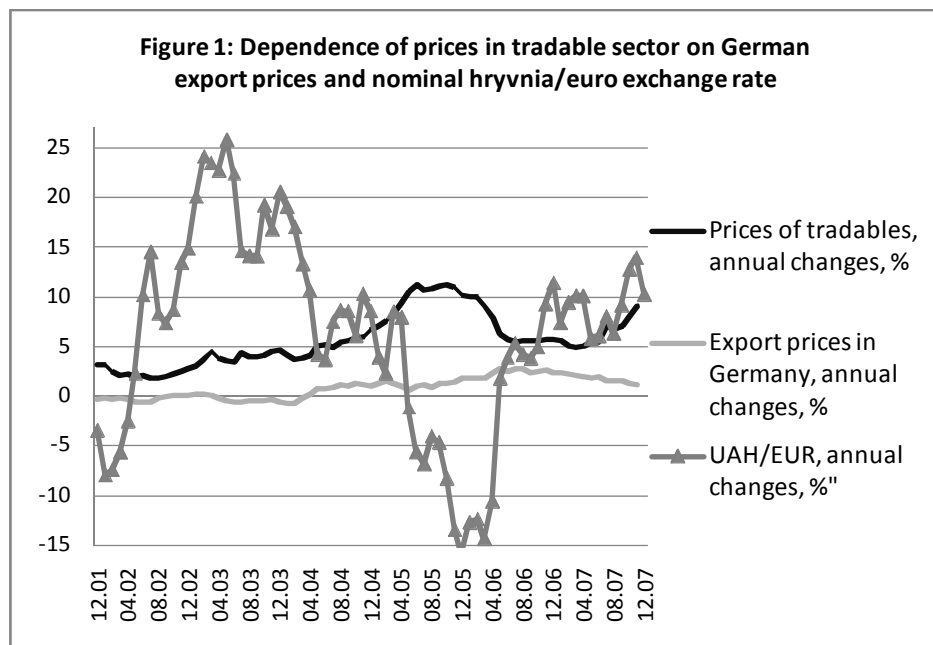
Accordingly to the most commonly used argument, inflation contributes to more flexible price and wage adjustment with the lack of their downward flexibility. Negative shocks to demand or output

induce the companies to cut either prices or wages. If prices and/or nominal wages lack downward flexibility with the price level targeting, it is not possible to reduce relative prices or real wages to restore the balance. In the consequence the companies are induced to reduce output and hence employment thereby adversely affecting the economy.

Thus with asymmetric nominal rigidities, zero inflation may involve difficulties in the efficient allocation of resources and higher level of “natural” unemployment. At low inflation, wages and individual prices may fall in real terms without any reduction in their nominal values. Generally, too low inflation may give rise to long-term trade-off between inflation and output. In this case inflation has a “grease effect” and contributes to an increase in the volume of potential output and to decrease in its volatility.

As appears from the above discussions, the optimal inflation level in any economy depends on nominal rigidities and types of shock.

Let us consider now the effect of asymmetric nominal rigidities on the requisite minimum inflation level in Ukraine. As follows from previous research, the hypothesis on asymmetric nominal rigidities of prices in Ukraine can neither be fully proved nor rejected (Petryk and Nikolaychuk (2007)). Accordingly, a quantitative estimate of the “grease effect” is based on assumption that tradable inflation in Ukraine shall not be lower than that of its trade partners (as an approximation we use the changes in export prices of Germany¹ with average inflation amounted to 0.9 percent per year in recent years) (Fig. 1). Therefore we assume that the National Bank of Ukraine may set an inflation target of 1 percent for tradables and succeed in its achievement. This level which is slightly higher than the equivalent indicator for Hungary, Czech Rep. and Poland (Kiss and Kreko (2004)) will make it possible for inflation to act as “grease” for tradables.



Further calculations will be based on the fact that in the long-run the inflation differential in tradable and nontradable sectors is determined by difference in the productivity in these sectors. Actually, there exist other factors (for example, terms of trade in the world markets) effecting relative prices in both sectors. We assume, however, that their aggregate effect is zero in the long-run.

¹ Euroarea products account for the major share of consumer imports in Ukraine. We have used in our paper the export prices of Germany as an proxy of consumer imports prices due to their accessibility

Hence the inflation equation may be written as:

$$\pi_i = \alpha\pi_i^N + (1-\alpha)\pi_i^T = \pi_i^T + \alpha(\pi_i^N - \pi_i^T), \quad (1)$$

where π_i is overall inflation; π_i^T and π_i^N is inflation of tradable and nontradable components, respectively; α is the share of nontradables in the CPI basket.

Hence we can derive the optimal inflation level from the formula:

$$\pi^o = \pi_T^* + \alpha(\pi_N - \pi_T), \quad (2)$$

where π_T^* is the optimal inflation rate of tradables; $(\pi_N - \pi_T)$ is the changes in relative prices (tradables/nontradables inflation ratio).

The key point in the estimation of optimal inflation level shall be calculation of the gap in productivity level of different sectors which determines the equilibrium differential between inflation of tradable and nontradable components of CPI. The size of gap depends on the rate of Ukraine's progress towards the development level of its trading partners (particularly, in Euroarea). Hence we need to estimate the actual convergence rate. We will use for our purposes the average value of this indicator for the period of 2003 – 2007 as a proxy of equilibrium inflation differential between tradable and nontradable components of CPI. According to our estimates, the level amounted to 4.2% (as compared to 5.6% for Hungary and 4.2% for Portugal (Kiss et al., 2004))¹.

On these assumptions then the optimal inflation rate for Ukraine is:

$$\pi^o = 1\% + 0,66 \cdot 4,2\% = 3,6\% .$$

For Ukraine, “grease effect” of inflation that is required due to expected differential of inflation in the sectors of tradables and nontradables exceeds the same number for the developed countries as result of higher productivity growth-rates which in turn are governed by actual convergence processes. Moreover, high inflation may be explained as follows: during convergence a lower level of prices corresponds to the stage of economic development compared to developed countries. Thus a price convergence rate and hence an inflation level needed to “grease the wheels” ultimately depends on the speed of real convergence.

Another basic argument against the use of zero inflation target is that zero inflation has by far the greater potential for the economy to shift to deflation. There is a fairly widespread consensus that the losses of public welfare from deflation should prevail the losses from inflation due to:

- debt deflation. Unexpected fall in prices involves a decrease in the collateral value thereby deteriorating the creditworthiness of debtors, and of companies, in particular. This increases the probability of bankruptcy and adversely affects fixed investment, that is involves reduction in aggregate demand;
- delayed consumption. Households waiting for reduction in prices postpone the purchase of certain goods thereby causing additional reduction in aggregate demand.

Since the nominal interest rate cannot be lower than zero (economic agents can always hold their assets in cash), extremely low inflation places a constraint on the possibility of real interest rate reduction that would have stimulated the aggregate demand. In case of negative demand shock

¹ In our opinion, a higher estimate for Hungary may be attributed to the estimation period (1992 – 2002), i.e. the period of drastic structural changes and significant productivity gap between the tradable and nontradable sectors at the beginning of transition period

when deflationary expectations are realized, the real interest rate may be very high despite zero nominal interest rate, and such expectations cannot be reduced by interest policy, i.e. a deflationary spiral may arise (the situation is frequently referred to as "liquidity trap" in the literature) thereby involving simultaneous fall in aggregate demand and prices. Accordingly, the effects of monetary policy are not symmetric in the inflationary and deflationary environments.

Due to necessity to prevent deflation and "liquidity trap", the optimal inflation level depends on: 1) the probability of deflation and zero level of nominal interest rates; 2) losses resulting from the situation

Higher growth rates in transition economies as compared to these in the developed economies shall be reflected in higher real returns on capital employed, which for a closed economy means higher real interest rates, i.e. the probability for nominal interest rates to approach zero level is low. However, the situation may be quite different in the economy with competitive capital market since the real interest rate depends on the uncovered interest parity in real terms:

$$r = r^{usd} - \Delta rer^{usd} + rp, \quad (3)$$

where r is a short-term real interest rate (for overnight loans in the interbank money market); r^{usd} is a real interest rate in US dollars; Δrer^{usd} is changes in real hryvnia/USD exchange rate; and rp is a risk premium.

As follows from our estimates of equilibrium values of macroeconomic variables obtained by using the Kalman filter (Nikolaychuk and Mariyko (2007)), the trend of real interest rate in USD is 3%, and the risk premium is 2% for the Ukrainian economy. We estimate that the trend to strengthening the real rate of hryvnia to USD will be about 7% a year as a result of real convergence processes (Petryk and Nikolaychuk (2007)). Then the equilibrium level of short-term real interest rate in hryvnia will be:

$$r = 3\% - 7\% + 2\% = -2\% .$$

On the assumption that the minimum equilibrium level of nominal interest rate required to stimulate the economy in case of negative real shocks is 2 percent, we can derive the value of inflation target level preventing the nominal rate from cutting to zero level:

$$r = r^{usd} - \Delta rer^{usd} + rp .$$

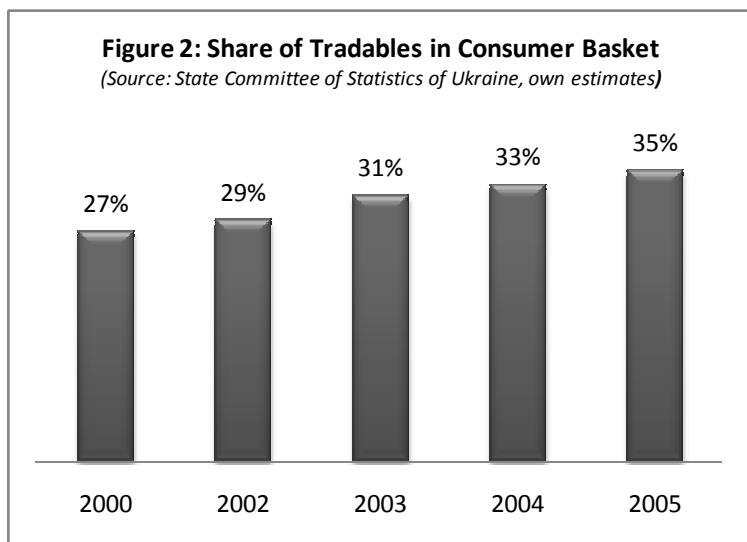
When identifying an optimal inflation level in the context of deflation prevention, let us first of all discuss the accumulated experience of other countries in this field. As follows from the results of some papers, deflation can be avoided with the inflation rate target of 2 percent (Krugman (1999), Orphanides and Wieland (1998)), others papers suggest that an inflation of 1 percent can also be a sufficient insurance against deflation and "liquidity trap" (Bernanke et al. (1998), Mishkin (2000)). The history of shocks in European countries evidences that the probability of interest rate fall to zero is low, and a 1-per cent inflation target can prevent the occurrence (Vinals (2000)). There is a widespread consensus on the sufficiency of 1 – 2 percent consumer inflation to prevent the likelihood of deflation. Moreover, we believe it highly improbable that deflationary expectations will arise in Ukraine due to a long history of high inflation.

It should further be noted that in the context of small open economy, the possibility of exchange rate devaluation serves as an efficient instrument of averting deflation and "liquidity trap". Under conditions of Ukraine this measure would be a fairly powerful proinflationary instrument in case of necessity.

Statistical problems associated with inflation measurement serve as an additional argument for inflation. According to a widespread view, the Consumer Price Index (CPI) is frequently higher than actual changes in the cost of living. This may be attributed to the following:

- product substitution. CPI cannot take into account product substitution since the weights for consumption basket components shall be calculated in advance, i.e. CPI does not reflect the ability of consumers to substitute away from product whose relative price has increased to the one of lower price. As a result, the cost of living is growing slower than CPI;
- changes in quality. When the quality of any product improves, only a certain part of its price growth may be attributed to the growth of the cost of living. Generally, special adaptations are used to take into account the effect of changes in quality at CPI measurement. However, it is hardly possible to estimate the changes in quality in full;
- changes in distribution. The growing share of large distribution centers that have an opportunity to apply lower trade margins (for example, hypermarkets) may, all other factors equal, reduce the cost of living. This, however, is not fully reflected in the CPI, because new outlets are included in the observation programs with a certain delay.
- new products. Due to failure or lag in new products inclusion in the consumer basket, CPI can't represent the growth of consumer welfare associated with new goods.

For a few of reasons, CPI measure is generally upward biased more in transition economies rather than in developed ones. The first and seemingly main reason is that quality improvement and introduction of new products is a stronger factor in the economies moving through the period of convergence to more developed economies. Secondly, the growing share of hypermarkets and big shopping centers supposes



that the changes in distribution conditions also exceed the level admissible for developed economies. Moreover, some authors surmise that overstatement is more significant for transition economies due to change in relative prices (e.g. see Filer et al. (2002) for Czech Rep.). In Ukraine, we can also observe a steadily increasing tendency for consumption of tradable goods, in particular, due to reduction in their relative price by the Balassa-Samuelson effect (*Fig. 2*).

However, an opposite effect is frequently observed in transition economies: despite the increase in relative prices of nontradables their share in the consumer basket rises as well. For example, similar effect has been observed in Hungary and this involved underestimation of CPI though the uncertainties in measurement are statistically negligible (Kiss et al. (2004)).

For lack of reports on accuracy of CPI measurement in Ukraine, reference should be made to some foreign sources on the subject (Table 2). The most comprehensive and extensive investigation was conducted in USA and presented in a widely-known Boskin's Report (Boskin et al. (1996)). According to the report, CPI overstates the actual cost of living in USA by 0.8 – 1.6 percentage points per annum (the most precise estimate is 1.1 percentage points) at inflation of about 3%. Among the investigations of transition economies, it is worthy to notice a report on Czech Rep.: in the period of 1996 – 1997, at an annual inflation of 8.5 percent CPI was overstated by approximately 3 percent-

tage points of which 1.5 percentage points are associated with the effect of new products and change in quality (Filer et al. (2002)). It should be noted that these findings are specific to the early stage of transition to market economy. The accuracy is enhanced in the process of convergence and with the use of more advanced methods of CPI calculation adjustment.

Table 2: CPI Bias by Country

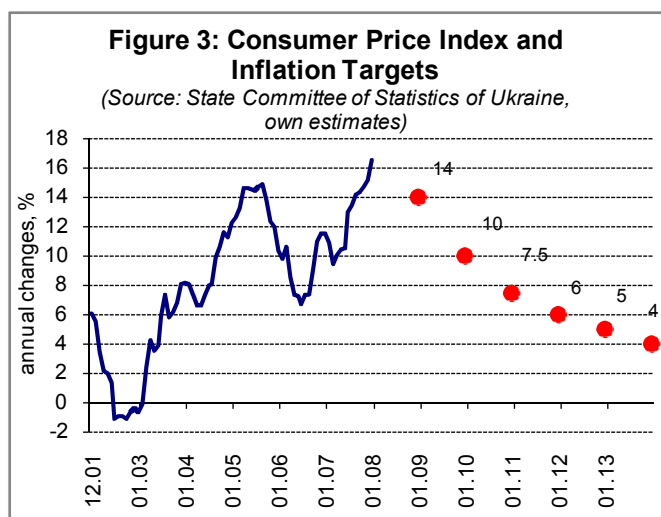
	USA	Germany	UK	Canada	Portugal	Czech	Hungary
Products substitution	0.4	0	0.05 – 0.1	0.1	0.05 – 0.01	0.77	
Changes in quality	0.1	0.1	0.1 – 0.25	0.07	0.25 – 0.5	0.66	
Changes in distribution	0.6	<0.5	0.2 – 0.3	0.3		1.00	
New products		<0.1	0-0.15		-	0.55	
Total	1.1 (0.8 – 1.6)	0.75 (0.5 – 1.5)	0.35 – 0.8	0.5	-	2.98	0.5 – 1
Source	Boskin et al. (1996)	Hoffman (1998)	Cunningham (1996)	Crawford et al. (1997)	Covas et al. (2001)	Filer et al. (2002)	Kiss et al. (2004)

In our opinion, CPI bias in Ukraine should not exceed 1 percentage point, i.e. that of developed countries.

Considering the necessity of selecting a minimum inflation level that would have helped to get rid of all the above-mentioned negative effects produced by too low inflation target, the optimal inflation target shall be determined as the maximum of calculated estimates. As follows from our findings, optimal inflation level (4%) is primarily determined by “grease effect” required to account of change in relative prices, and by ensuring the nominal interest level sufficient for preventing a “liquidity trap”.

Determination of Disinflation Trend

It should be noted that the optimal inflation level we calculated relates to the concept of long-term inflation wherefrom it may deviate in the short-run and medium-run in accord with changes in external conditions and business activity cycle. Thus the disinflation trend to long-term inflation target shall be based on the analysis of macroeconomic conditions and admissibility of disinflation losses at any selected instant of time. In our opinion, useful example in this context could be the experience of the National Bank of Poland that adopted the Medium-Term Strategy of Monetary Policy (1999 – 2003) in 1999, which set a medium-term inflation rate target for the year 2003 to be below 4% and adjusted the next year target with account of the current macroeconomic conditions and the necessity of reaching the medium-rate inflation target in 2003 (National Bank of Poland, 1998). This approach makes it possible to attain a defined objective in the medium run (5 to 6 years) while allowing some flexibility in determination of short-term (one-year) inflation targets. We believe it important that an implicit disinflation trajectory is determined but not disclosed to the public due to the likelihoods of a situation when macroeconomic conditions would have forced to revise the next-year targets thereby undermining the confidence in the policy of the National Bank of Ukraine and complicate control over inflation expectations.



Any next-year target shall be based on an unbiased analysis of the current situation and macroeconomic forecast. At the current stage it would be reasonable to determine a disinflation trend, which might look as the one of Fig. 3 with rejected exchange rate peg and transition to inflation targeting. This trend has been developed on the basis of medium-term macroeconomic forecast for Ukraine generated using Quarterly Projection Model (Petryk and Nikolaychuk (2006)). High inflation figures in 2008 – 2010 are primarily attributed to the effect of supply-side factors

(increase in prices of agricultural products and energy products such as oil and natural gas). From the comparison of program scenario, that is based on this disinflation trend and an assumption of all possible monetary measures implementation by the National Bank of Ukraine, with a baseline scenario, that is based on unchanged policy of exchange rate peg, is evident that the cost of achieving 4 percent inflation target by the economy would amount to approximately from 2 to 2.5 percent of annual GDP (with account of the real discount rate of 5 percent, the value will amount to 2.3 percent of GDP in 2008). It is a matter of policymakers to decide whether the costs are high or low, and how they are comparable to the long-term benefits of stable and low inflation is a debating point at present. But most researchers agree that losses from inflation are too high and, hence, any disinflation losses will be negligible as compared to them¹.

Table 3: Comparison of Projection Scenarios

	2008	2009	2010	2011	2012	2013	2014
Baseline scenario							
Inflation, %	14,8	10,7	8,6	7,2	6,1	5,6	5,7
GDP, %	6,5	5,5	2,8	4,8	4,8	5,3	5,5
Interest rate, %	3,4	4,7	5,7	6,3	6,7	7,0	7,0
Exchange rate, UAH/USD	505,0	505,0	505,0	505,0	505,0	505,0	505,0
Program scenario (inflation targeting)							
Inflation, %	14,5	9,7	7,5	5,9	4,7	4,1	4,0
GDP, %	6,1	4,7	3,4	5,1	5,0	5,5	5,5
Interest rate, %	9,8	8,3	7,0	5,9	5,5	4,5	4,5
Exchange rate, UAH/USD	505,0	505,0	500,5	496,2	487,1	479,5	467,2

Conclusions

To summarize, it may be noted that most central banks consider price stability as a primary objective of their monetary policy to avoid public welfare losses due to inflation. However, price stability is determined as low rather than zero inflation level. It may be explained by the fact that extremely low inflation rates also involve losses in public welfare due to downward price rigidities, risk of deflation, zero bound on nominal interest rates and statistical bias in CPI measurement.

It is almost impossible to find examples of long-term inflation targets over 4 percent for developing countries (and developed countries either). We do not mean medium-term targets at disinflation

¹ See the report of Petryk and Nikolaychuk (2007) for literature review

process when central bank is gradually cutting the target throughout a definite transition period. This can be attributed to at least three factors. Firstly, experience has shown that inflation exceeding a definite low level adversely affect the long-term growth rates. Secondly, it is traditionally considered that a long-term target over 4% may undermine confidence in the central bank and lead to instability of inflation expectations especially in developing countries where reputation of monetary authorities is not solid enough. Thirdly, considering the link between inflation level and inflation volatility, inflation targets over 4% will have adverse consequences due to higher inflation volatility, which, in turn, may neutralize one of the most important motives for price stability maintenance, namely minimization of inflation volatility, which is required for predictability of price behavior as precondition for stable economic growth.

Consequently, in our opinion, an inflation level about 4% is optimal for Ukraine in long-run. This level is higher than that for developed countries and most developing countries due to a higher potential of productivity growth in Ukraine as compared to more “wealthy” countries and, hence, higher difference in relative prices. This inflation level shall minimize inflation-generated losses, on the one hand, and be adequate to prevent losses from too low inflation.

Disinflation trend associated with the strategy of transition to low inflation target and more flexible exchange rate shall be implicitly determined for a medium-term period (5 – 6 years), but short-term targets shall be determined in compliance with the current macroeconomic conditions and forecast for each following year.

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