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THE MECHANISM OF ADJUSTMENT TO CHANGES IN EXCHANGE RATE IN BELARUS AND ITS IMPLICATIONS FOR MONETARY POLICY

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1. INTRODUCTION

Knowing fair value of the Belarusian ruble is one of the most vital issues for economic agents in 2011. In the second half of 2010 aggressive expansionary policy led to significant macroeconomic fluctuations. Since then, the pressure at the currency market has been progressing. In March 2011, de-facto multiplicity of exchange rates was settled. Gradually the gap between official rate and the market ones was progressing, which pushed National bank to devalue the official rate by 56% in May. Nevertheless, the uncertainty was not eliminated from the market and the growth of the gap between market rate and a new official one continued.

As a rule, assessments of the equilibrium exchange rate are used to answer such a question. Such an approach of "equilibrium exchange rate" is mostly applicable to the economies that exploit fixed exchange rate regime (with this or that extent of fixity). Besides providing a quantitative benchmark, the methodology of equilibrium exchange rate estimation provides a background for understanding the adjustment processes to a new exchange rate in the economy. The latter seems much more important from a view of economic policy and understanding the patterns of the economy in the situation of a currency crises.

This paper aims at visualizing adjustment mechanisms of the Belarusian economy to changes in exchange rate level and providing correspondent policy recommendations. The paper is organized as follows. Section 2 deals with methodological issues of equilibrium exchange rate estimation and its specifics for Belarus. Section 3 is devoted to analysis of the pass-through effect from nominal exchange rate to prices and its impact on the short-term equilibrium exchange rate. In fourth Section, main conclusions and policy recommendations are provided. Technical issues are presented in Annex A.

2. THE MEANING OF THE TERM "EQUILIBRIUM EXCHANGE RATE" FOR BELARUS IN 2011

A number of theoretical methods are used to define an equilibrium exchange rate category. They differ from each other by the scope of applicability, by the number of macroeconomic variables correlated with the exchange rate included in the analysis, and by the time horizon. In practical purposes, the approaches of macroeconomic balance and external sustainability are most popular. For instance, IMF's

Consultative Group on Exchange Rate Issues (CGER) mainly use just these two approaches. Under these approaches the strategy looks like as follows.

The first step is the assessment of an equilibrium level of a current account balance (sometimes called current account norm) according to the principles of the correspondent method. Macroeconomic balance method defines the equilibrium stance as the simultaneous internal balance (i.e. equilibrium value of savings-investment balance) and external balance (equilibrium value of current account balance). In other words, while macroeconomic identity assumes that current account balance is equal to the savings-investment balance (under zero budget deficit), the equilibrium value of the former will be equal to the equilibrium level of the latter. Thus, estimation of the equilibrium level of the savings-investment balance basing on the projected mid-term values of the macroeconomic fundamentals such as output growth, fiscal balance, population growth, etc. gives also the value of the equilibrium current account balance. Within the method of external sustainability, the equilibrium level of current account balance is defined as one that provides sustainable level of international investment position. Basing on correspondent identity, for deriving equilibrium current account balance one need mid-term values of the following variables: nominal GDP growth (mid-term projection) and international investment position (a targeted or maximum acceptable value is used for this purpose) (Lee et al. (2008), Isard (2007), IMF (2006), Hakura and Billmeier (2008)).

At the second step, as a rule, underlying value of the current account is estimated. The latter is defined as the correspondent level of the current account that is going to prevail in the medium-term in case if the national economy and its trading partners were operating with zero GDP gap (i.e. at their potential level of GDP) and all past real exchange rates movements had fully realized its influence (Isard, 2007). Estimation of the underlying value of the current account balance assumes usage of mid-term projections of the macroeconomic fundamentals as explanatory variables.

The third step contains assessment of the elasticity (semi-elasticity) of the current account balance (as the share of GDP) on the real effective exchange rate. This assessment uses the estimated values of long-term elasticity of exports and imports on real exchange rate (and other components if needed). Herewith, the mid-term forecasts of exports, imports, and GDP are used for the computation.

Finally at the fourth step, an equilibrium real exchange rate is calculated. The latter is defined as the one, which will provide adjustment of the current account balance from its underlying value to the equilibrium one. Hence, knowing semi-elasticity of the current account balance on real effective exchange rate, one may compute needed change in the latter in order to provide needed adjustment in the former. Needed changes of the real effective exchange rate may be projected at the nominal effective exchange rate (under certain conditions) if needed.

At the second and the third stages of the calculations a number of technical assumptions and precondition may seriously alter final results and their economic sense. Different assumptions and preconditions on time-horizon, on the impact of the exchange rate movements on the macroeconomic variables other than exports and imports substantially modify the content and sense of the term "equilibrium exchange rate". From this view, different meaning of the "equilibrium exchange rate" may lead to different policy recommendations as well.

Despite IMF CGER' strategy is rather unified and provides comparable results in majority cases, its economic sense under this strategy is not always defined explicitly. Strict following to the strategy shown above gives the estimate of the level of the exchange rate, which provides restoration of the equilibrium (according to this or that concept of the equilibrium) in the <u>medium term</u>. It is so due to the usage of the underlying value as the base for current account balance adjustment and correspondent mid-term forecasts of exports, imports and GDP for semi-elasticity computation.

However, for Belarus in 2011 a quantitative assessment of the exchange rate that may clear a market in a medium-term is not so meaningful, while one which <u>may clear the market at current moment is of a great concern</u>. This arises from the peculiarities of the macroeconomic dynamics in the second half of 2010 and the first half of 2011. In this period, aggressive expansionary policy directed at stimulation of the domestic demand led to the substantial deviation of GDP from its potential level. Large positive GDP gap determined huge rise in the demand for imports. Hence, current account balance deviated from its medium-term level (projection under the condition of zero GDP gap) as well. However, while strengthening GDP growth in 2010 was a political task, correspondent stimulation of domestic demand was maintained despite permanent losses in international reserves. Finally, in 2011

economic authorities spent a huge fraction of most liquid reserves and lost the possibilities of smoothing fluctuations at the currency market consequent to the economy "overheating". In this situation, exchange rate has become a "leading" variable through which macroeconomic adjustments in direction to the equilibrium level are going on, while changes in other variables (employment, nominal wages, interest rates, government consumption) that may contribute to the restoration of the macroeconomic equilibrium do not play this role fully either because of real and nominal inertia or direct government control. From a view of equilibrium exchange rate, it means that the government lost a possibility to wait until current account balance will return to its medium-term level and use this level as the base for exchange rate adjustment. In this case, potential devaluation needed to close the gap between underlying current account balance (mid-term projection) and its equilibrium level would not be enough to restore the equilibrium: the deficit would maintain, alternative to exchange rate variables are not used, reserves are not available. Hence, devaluation, which closes the gap between actual (short-term) current account balance and its equilibrium level, is needed. Thus, in case of unavailability of international reserves and the leading role of exchange rate in macroeconomic stabilization, <u>we treat the exchange rate which clears the market immediately (not in the medium-term) as the equilibrium one</u>.

A correspondent estimation for a certain time period (quarter) we get through using actual value of the current account balance (not underlying one) at the second step, and actual values of exports, imports and GDP (not med-term projections) at the third step.

3. EQUILIBRIUM EXCHANGE RATE UNDER THE CONDITION OF A HIGH PASS-THROUGH EFFECT FROM NOMINAL EXCHANGE RATE TO PRICES

The third step of the standard algorithm – assessment of the elasticity (semi-elasticity) of the current account balance (as the share of GDP) on the real effective exchange rate – may be based either on the direct estimation of a correspondent model, or on the theoretical computation, where estimated values of exports and imports elasticities on real effective exchange rate (and other parameters if needed) are used. In our case, direct estimation seems not be a robust tool because the

variables to be used show different dynamic characteristics[1]. Hence, the semi-elasticity of current account is computed according to the second approach (which is used, as a rule, in the IMF's methodology as well).

This approach means that the identity (1)[2] should be decomposed to a relationship of elasticities of real exports and real imports on real effective exchange rate, while getting the value of them is more trivial task. However, in majority of the related studies implicit assumptions on zero pass-through effect from nominal and real exchange rate to prices in the economy, export prices and output are used by default (Isard (2007), IMF (2006), Hakura and Billmeier (2008)). In this case, (1) is decomposed to (2).

In regard to the impact on output, the correspondent assumption may be justified: changes in the exchange rate (both nominal and real) may lead only to a short-term changes in output due to the changes in demand, while in a longer term it does not alter potential GDP from the supply side (from the demand side, in long-term it will only change the proportion between domestic and external demand).

As for the pass-through effect on prices, the logic here is not so straightforward and the relationship may substantially differ among the countries. The economies with an important role of the exchange rate channel in the monetary transmission mechanism will perform strong relationship between nominal exchange rate and prices both in short and long-terms.

In Belarus, exchange rate channel is the dominant one in monetary transmission (Kruk (2008)). Intuitively, it may be explained in a following. Almost for any small economy tradable goods is the basis for such an effect, because prices for such goods are formed abroad in foreign currency. Hence, the dynamics of these prices in national currency is directly depends on the exchange rate. Thus the size of the economy (in a view of the impact on price of tradable goods) and the share of tradable goods in output are the core issues for measuring the strength of the correspondent pass-through effect. Furthermore, this effect may be substantially strengthened due to real and financial dollarization. If that a case, the demand for national currency (both for cash and deposits) is altered, which induces additional pressure on prices (including those on non-tradables and without imports input).

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[1] For instance, the order of integration for current account is I(0), while real GDP is I(1).
[2] See Annex A.

Furthermore, it should be emphasized that in periods of large devaluation/negative expectations this mechanism may exacerbate this effect considerably. A full range of these reasons are valid for Belarus – impossibility to influence on prices on tradables, large portion of tradables in the structure of output, huge real and financial dollarization. Hence, this effect can hardly be ignored when estimating the equilibrium exchange rate.

Inclusion of this pass-through effect results in substantial complication of the computations and interpretation of the results. If this effect is ignored, obtained assessments of the needed adjustment of the real effective exchange rate may be directly projected at the nominal effective exchange rate. Otherwise, the mechanism looks like as follows: nominal devaluation leads automatically to real devaluation, but later on increase in prices will lead to appreciation of the real exchange rate. Hence, for desired value of real devaluation more sensible (in percentage points) nominal devaluation is needed. Moreover, the bigger the pass-through effect from nominal exchange rate to prices, the bigger is the gap between real devaluation and nominal devaluation.

Furthermore, if we treat general prices and exports prices (the latter is assumed to follow the dynamics of the former) to be the function of the nominal exchange rate, decomposition of (1) changes substantially. We can do it in two steps. First, it may be decomposed in respect to elasticities on real effective exchange rate (see (3)). Second, while elasticity of prices on nominal exchange rate is more meaningful rather than on real exchange rate, we can transform (3) `to (7), basing on of the transformation exports prices (4), imports prices (5) and general prices (6) elasticity on real exchange rate to nominal one.

According to (7) the mechanism of adjustment to a new level of exchange rate substantially differs from the benchmark case in (2). This mechanism includes improvements in nominal exports both due to exports prices and volume, improvements (shrinking) in the volume of imports along with deterioration of trade balance due to growth of imports prices, improvements in trade balance due to the growth of nominal GDP due to prices (growth of real GDP is assumed to be zero).

One more peculiarity should be emphasized. In benchmark case (2), the adjustment coefficient of imports prices on nominal exchange rate (η) is assumed to be 1.

However, for specific case of Belarus, our estimations provide a coefficient 0.793. It means that importers adjust their prices in national currency somehow to a national price level, not only to external prices and nominal exchange rate. In other words, they are not pure price-takers and most probably adjust their prices in national currency varying their mark-up on external price.

In overall, this adjustment mechanism (7) is much more complicated rather than the benchmark one (2). Furthermore in a short-term, the values of the elasicites of prices on nominal exchange rate may significantly deviate from its long-term values. Hence, maintaining fixed exchange rate regime even in a form of a crawling band to a currency basket seem to be extremely difficult task and may cause substantial fluctuations in country's international reserves. However, if the level of the reserves is not satisfactory to require these demands, such a regime loses its role of the nominal anchor for the economy.

4. CONCLUSIONS AND POLICY RECOMMENDATIONS

Maintaining the regime of fixed exchange rate (even with e relatively high degree of floating) under the mechanism of current account balance adjustment mentioned above and which is peculiar to Belarus, assumes rather high probability of a mismatch of the actual rate with the short-term equilibrium rate, driven by macroeconomic fluctuations. Correspondent estimations made in Zaretsky, Kruk, Kirchner (2011) for 2010-1q to 2011-1q visually demonstrates this mismatch. This may stem from:

- Ignoring or undervaluing the pass-through effect from nominal exchange rate to prices[3]. If that a case, fixed by monetary authorities value of the nominal exchange rate may cause unforeseen price adjustment and real exchange rate will not achieve its equilibrium level.

- Large deviations of the values of elasticity of prices on nominal exchange from its long-term values in a short-term under negative expectations and shocks.

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[3] This argument is valid even we consider not a short-term equilibrium rate, but a mid-term equilibrium rate computed basing on underlying value of the current account and mid-term projections of the macroeconomic fundamentals.

- Difficulties in computation of the short-term equilibrium rate on a real-time basis (because macroeconomic statistics is reported with a certain lag) if monetary authorities desired to adjust somehow their peg to a current equilibrium rate.

This means that in order to smooth these short-term fluctuations (in case, when the peg is close to the medium-term equilibrium level) more than standard volume of international reserves is needed. Furthermore, if there is a mismatch not only with a short-term equilibrium rate, but with a medium-term one as well (due to complexity of considering pass-through effect) permanent injections of liquidity and correspondingly extremely high volume of reserves is a necessary condition for a fixed exchange rate regime.

Thus, the advantages of this regime may be realized if: (i) the peg value is close to its mid-term equilibrium, (ii) GDP gap is not considerable and the economy operates near its potential level, which limits fluctuations of the short-term equilibrium rate, (iii) sufficient amount of funds may be accumulated in international reserves. As shown above, problems with meeting first two demands are peculiar to Belarus during last periods. Under these conditions, fixed exchange rate regime may be operated only through accumulating large volumes of reserves, thus making it expensive in a sense.

However, as of the current moment, the volume of the international reserves is far from being satisfactory and the rate of official peg is evidently far from its either mid-term or short-term equilibrium. In this situation, maintaining this regime is possible either through permanent revision of the value of the peg, or through the multiplicity of the exchange rates. In both cases, the economic sense of the official peg as the nominal anchor is lost. Hence, changing the exchange rate regime and introducing a new nominal anchor for the economy is worthwhile.

Furthermore, if the variant of the multiplicity of the exchange rates has been chosen, it will be even harmful for the economy. Instead of "anchoring" the expectations and thus the behavior of economic agents, it injects additional uncertainty, which leads to increasing dollarization. The latter strengthens the pass-through effect from the nominal exchange rate to prices, in turn, increases the gap between needed real

devaluation and nominal devaluation. If that a case, the economy might be plunged into devaluation-inflation spiral.

A key policy recommendation is a necessity to introduce a robust nominal anchor, which can stabilize expectations of the economic agents and mitigate the pass-through effect from exchange rate to prices. From a view of the current moment, elimination of uncertainty consequent to a wastrel exchange rate regime and multiplicity of exchange rate is a prior task. In our opinion, introduction of full-fledged floating exchange rate regime may eliminate uncertainty at the current moment, while inflation targeting may provide needed nominal anchor. However, vague decisions in respect to these issues may only deteriorate the situation, while they might struggle with consequences of the currency problems, not with the reasons of them.

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ANNEX A. TECHNICAL COMPUTATIONS

$$El_{\frac{TB}{GDP}} = \frac{\partial \frac{TB}{GDP}}{\partial E} E = \frac{\partial \left(\frac{P_X X - P_M M}{P_Y Y} \right)}{\partial E} E \tag{1}$$

where TB – is the trade balance of goods and services, GDP – is the nominal gross domestic product, E – is the real effective exchange rate, X - is real exports, P_X - is the exports deflator, M - is real imports, P_M - is the imports deflator, Y - is the real GDP, P_Y - is the GDP deflator, El denotes the elasticity of a variable with respect to E (in the case of $El_{\frac{TB}{GDP}}$ it is a semi-elasticity), ∂ denotes a differential.

$$El_{\frac{TB}{GDP}} = El_X * \frac{P_X X}{GDP} - (EL_M - 1) * \frac{P_M M}{GDP} \tag{2}$$

$$El_{\frac{TB}{GDP}} = \frac{P_Y Y \left(X \partial P_X + P_X \partial X - M \partial P_M - P_M \partial M \right) - \left(P_X X - P_M M \right) \left(Y \partial P_Y + P_Y \partial Y \right)}{P_y^2 Y^2 \partial E} E =$$

$$= \frac{P_X X}{GDP} \left(El_{P_X} + El_X \right) - \frac{P_M M}{GDP} \left(El_{P_M} + El_M \right) - \frac{TB}{GDP} \left(El_{P_Y} + El_Y \right) \tag{3}$$

$$\frac{\partial P_X}{\partial E} \frac{E}{P_X} = \frac{\partial P_X}{\partial \left(\frac{1}{e} \frac{P_Y}{P_y^*} \right)} \frac{\frac{1}{e} \frac{P_Y}{P_y^*}}{P_X} = \frac{P_Y \partial P_X}{P_X \left(\partial P_Y - \frac{P_Y}{e} \partial e - \frac{P_Y}{P_y^*} \partial P_y^* \right)} = \frac{\frac{\partial P_X}{\partial e} \frac{e}{P_X} \frac{P_X}{e}}{\frac{\partial P_Y}{\partial e} \frac{e}{P_Y} \frac{P_X}{e} - \frac{P_X}{e}} = \frac{k}{v-1} \tag{4}$$

where e - is the NEER (national currency for one unit of foreign currencies), k - is the NEER-elasticity of exports deflator, v - is the NEER-elasticity of GDP deflator.

$$\frac{\partial P_M}{\partial E} \frac{E}{P_M} = \frac{\eta}{v-1} \tag{5}$$

$$\frac{\partial P_Y}{\partial E} \frac{E}{P_Y} = \frac{v}{v-1} \tag{6}$$

where η - is the NEER-elasticity of imports deflator.

Now we can modify (3) considering (4), (5) and (6).

$$El_{\frac{TB}{GDP}} = \frac{P_X X}{GDP}\left(\frac{k}{v-1}+El_X\right) - \frac{P_M M}{GDP}\left(\frac{\eta}{v-1}+El_M\right) - \frac{TB}{GDP}\left(\frac{v}{v-1}+El_Y\right)$$

(7)