Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2017, t. 73, nr 2

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The Transformation of the Currency Regulation System in the Context of Financial Instability of the Economy

Abstract. *The global financial crisis raises questions over the objectives of financial regulation as well as over how to best meet these goals. Capital requirements have always been the cornerstone of bank regulation. In terms of economic instability, government regulation of basic macroeconomic indicators on the one hand, and market instruments geared to stimulating the growth of businesses on the other, are the key responsibilities for the government of any country. At the same time, it should be noted that during a financial crisis, the relevant instruments of economic regulation are not same as those applied during periods of stability. The effect of their implementation is not only unpredictable, but could also adversely affect the financial market. The paper presents a critical analysis of the transformation of the currency regulation system in the context of financial instability of the economy.*

Keywords: *economic challenges, economic instability, macroeconomic indicators, currency regulation, financial instability, financial market*

Introduction

World financial crisis has shown that the business cycle and financial cycle are not synchronized, implying these risks can come forward especially in the periods of "cut off" between the business cycle and financial cycle. The search for

the right phenomenon continues against the very low inflation, subdued growth and low interest rate environment.

The currency regulation instruments were chosen in period of one year from 1998 until 2015. This period was chosen for the understanding the long-term effect of the use of exchange rate instruments. As a short-term effect of each of the governmental regulation instrument in Ukraine was offset by the people influence, banks and companies which actively buying foreign currency, and hence the daily fluctuations.

In this case it is necessary to analyze the specific characteristics of the currency regulation. This certainly will be the subject of our further research, but first needed to explore and utilize the basic financial tools of the currency regulation.

1. Conceptual framework

Research instability of the economy of Ukraine and the influence of various macroeconomic indicators took place on the basis of the formalization process interdependencies GDP of unemployment, exchange rate and public debt. Entry data (Relative GDP, Unemployment Rate, Exchange rate, Growth rate, Volume of public debt) are presented in the Annex 1. All figures took in percentage to reflect the dynamic change of an indicator compared to the previous year.

As a tool of currency regulation was chosen Consumer price index, Foreign exchange reserves and Trade balance (Annex 2).

2. Mathematical tools

Defining the interdependence of GDP and destructive impacts on it happening based on the correlation and regression analysis. Setting the time-limit of the instrument currency regulation was carried out using statistics such as building a Correlogram. Further investigation of the relationship tools including currency regulation and logs directly exchange rate, as delivered in the regression equation.

3. Results

As a result of regression interdependence GDP growth of unemployment, the rate of growth of the exchange rate, the growth rate of foreign debt, the authors got:

$$GDP = 0{,}7707 - 15{,}7222x_1 + 95{,}4131x_1^2 - 0{,}0067x_2 + 9{,}7291 \times 10^{-5}x_2^2 + \\ + 0{,}0003x_3 + 0{,}0001x_3^2 \quad (1)$$

where:

x_1 – unemployment,

x_2 – growth rate of the exchange rate,

x_3 – growth rate of public debt.

The level of adequacy of the constructed model is high enough; the coefficient of determination is about 0.7 points. Fisher criterion actual value is 3.62 points and it is higher than the critical level; Student test confirms the significance of the regression coefficients.

Through the analysis of the equations the authors noted that received a second degree polynomial for each factor variable step sent the parabola uphill. There is an inverse relationship between productive and factor variable.

This dependence is quite logical for the reality of the national economy. Thus, the increase in unemployment leads to lower GDP, at some point in the unemployment rate is so significant that the statistics do not reflect the reality in terms of what the majority of unemployed people working in the informal sector with GDP, thus begins direct correlation between these indicators.

The exchange rate also has first reverse effect on GDP, and then when economic agents have adapted to the growth of the GDP begins to grow as the export much cheaper and thus more competitive.

Public debt conversely tends initially to stimulate GDP growth, and then to reduce it. It is also quite logical since received credit tranches initially stimulate economic process in the country, and, as a result of the low efficiency of the reforms or even their absence GDP growth decreases. The exchange rate along with other macroeconomic indicators significantly affects the economy of Ukraine.

Further, the authors have built a correlogram using statistics (adequate level of interdependence currency regulation instruments), it set the time intervals (lag) of each of the tools in the exchange rate. Adequate level of interdependence currency regulation instruments, adequate level of interdependence currency regulation instruments, adequate level of interdependence currency regulation instruments and standard errors are presented in the Annex 3, 4, 5 respectively.

Analyzing all the results under the authors got the following table 1. Based on this table the authors construct a model the impact of monetary policy instruments (the consumer price index, foreign exchange reserves and balance of payments) on the exchange rate:

$$ER_t = -112{,}748 + 1{,}1393I_{t-1} - 0{,}1641I_{t-5} - 0{,}4472Z_{t-3} + 2{,}8853Z_{t-7} - 0{,}0003P_{t-1} + 0{,}0021P_{t-4} \quad (2)$$

where:

ER – exchange rate,
I – CPI,
Z – reserves,
P – consolidated balance of payments.

Table 1. Results

Year	The exchange rate, growth rate of the previous year (%)	CPI, points (Lag 1)	CPI, points (Lag 5)	Foreign exchange reserves bln. US dollars (Lag 3)	Foreign exchange reserves bln. US dollars (Lag 7)	Consolidated balance of payments, mln. US dollars (Lag 1)	Consolidated balance of payments, mln. US dollars (Lag 1)
1998	31.57	–	–	–	–	–	–
1999	68.62	120	–	–	–	–1 599	–
2000	31.71	119.2	–	–	–	205	–
2001	–1.25	125.8	–	2.360	–	1 002	–
2002	–0.85	106.1	–	0.790	–	1 685	–1 599
2003	0.11	99.4	120	1.090	–	1 236	205
2004	–0.25	108.2	119.2	1.480	–	2 260	1 002
2005	**–3.66**	**112.3**	**125.8**	**3.300**	**2.360**	**2 539**	**1 685**
2006	**–1.46**	**110.3**	**106.1**	**3.360**	**0.790**	**10 721**	**1 236**
2007	**0.00**	**111.6**	**99.4**	**6.950**	**1.090**	**2 408**	**2 260**
2008	**4.30**	**116.6**	**108.2**	**9.720**	**1.480**	**9 421**	**2 539**
2009	**47.92**	**122.3**	**112.3**	**19.390**	**3.300**	**–3 063**	**10 721**
2010	**1.85**	**112.3**	**110.3**	**22.360**	**3.360**	**–13 726**	**2 408**
2011	**0.40**	**109.1**	**111.6**	**31.790**	**6.950**	**5 031**	**9 421**
2012	**0.29**	**104.6**	**116.6**	**34.570**	**9.720**	**–2 455**	**–3 063**
2013	**0.02**	**99.8**	**122.3**	**26.500**	**19.390**	**–4 175**	**–13 726**
2014	**48.71**	**100.5**	**112.3**	**34.580**	**22.360**	**2 023**	**5031**
2015	**83.77**	**124.9**	**109.1**	**31.800**	**31.790**	**–13 307**	**–2 455**
2016	–	143.3	104.6	24.546	34.570	849	–4 175
2017	–	–	99.8	20.415	26.500	–	2 023
2018	–	–	100.5	7.500	34.580	–	–13 307
2019	–	–	124.9	–	31.800	–	849
2020	–	–	143.3	–	24.546	–	–
2021	–	–	–	–	20.415	–	–
2022	–	–	–	–	7.500	–	–

Source: The State Statistics Service of Ukraine (2016) and our own processing data in Statistics.

The model is adequate, as a criterion Fisher actual value is 7.66 points and is higher than the critical level; Student test confirms the significance of the regression coefficients.

Notwithstanding the second level lags, this is a very long period, stopped at the first level lag studied for each of the instruments of currency regulation:

– CPI characterized by a direct relationship, an increase in prices leads to a further increase in the exchange rate, and the effect is evident after one year. So, if the government will restrain domestic prices, the rate will continue to rise.

– Reserves for typical direct relationship and the effect of increasing or reducing manifests itself in three years.

– The consolidated balance of payments as a inverse dynamics of the exchange rate. That is a year excess of exports over imports will reduce exchange rate.

Conclusions

Following the world financial crisis, all countries are beginning to prioritize financial and currency stability through regulation, and looking for to balance this policy priorities with the endorsement of inclusive growth. As we can see in the beginning of our report, in the period of economic instability financial tools of economic regulation proceed differently, than we can see the reason – this is due to lag with which they exercise influence.

That is why the using exchange rate management of foreign exchange reserves, balance of payments and the price index should not take place during the financial crisis, as in Ukraine, and in a period of economic stability. Only by balancing these financial tools in a period of relative stability and then the maximum retention of destructive factors Ukraine will come out of the crisis with minimal losses.

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Annex 1

Table 1.1. Entry data (Relative GDP, Unemployment rate, Exchange rate, Growth rate, Volume of public debt) [%]

Year	Relative GDP	Unemployment rate	The exchange rate, growth rate	The volume of public debt, growth rate
1998	9.88	11.30	31.57	13.40
1999	27.15	11.90	68.62	6.36
2000	30.38	12.40	31.71	–31.62
2001	20.06	11.70	–1.25	–1.25
2002	10.59	10.30	–0.85	2.53
2003	18.39	9.70	0.11	6.17
2004	29.09	9.20	–0.25	24.58
2005	27.92	7.80	–3.66	29.28
2006	23.26	7.40	–1.46	37.59
2007	32.45	6.90	0.00	46.67
2008	31.54	6.90	4.30	27.15
2009	–3.66	9.60	47.92	1.73
2010	18.53	8.80	1.85	13.47
2011	20.28	8.60	0.40	7.58
2012	8.38	8.10	0.29	6.65
2013	3.10	7.70	0.02	5.54
2014	7.68	9.70	48.71	–11.10
2015	26.34	9.50	83.77	–6.00

Source: own processing data in Statistics.

Annex 2

Table 2.1. Entry information (The exchange rate, CPI, Foreign exchange reserves, Consolidated balance of payments)

Year	The exchange rate, growth rate of the previous year [%]	CPI, points	Foreign exchange reserves, US dollars [bln.]	Consolidated balance of payments, US dollars [mln.]
1998	31.57	120	2.360	–1 599
1999	68.62	119.2	0.790	205
2000	31.71	125.8	1.090	1 002
2001	–1.25	106.1	1.480	1 685
2002	–0.85	99.4	3.300	1 236
2003	0.11	108.2	3.360	2 260
2004	–0.25	112.3	6.950	2 539
2005	–3.66	110.3	9.720	10 721
2006	–1.46	111.6	19.390	2 408
2007	0.00	116.6	22.360	9 421
2008	4.30	122.3	31.790	–3 063
2009	47.92	112.3	34.570	–13 726
2010	1.85	109.1	26.500	5 031
2011	0.40	104.6	34.580	–2 455
2012	0.29	99.8	31.800	–4 175
2013	0.02	100.5	24.546	2 023
2014	48.71	124.9	20.415	–13 307
2015	83.77	143.3	7.500	849

Source: own processing data in Statistics.

Annex 3

Table 3.1. Adequate level of interdependence currency regulation instruments (Autocorrelation Function)

Lag	Auto-Corr.	Std. Err.	Box & Ljung Q	p
1	0,273273	0,222566	1,50756	0,219520
2	–0,194309	0,215499	2,32057	0,313410
3	–0,110848	0,208192	2,60406	0,456791
4	–0,0582240	0,200618	2,68833	0,611263
5	–0,236243	0,192748	4,19057	0,522329
6	–0,164178	0,184542	4,98205	0,546128
7	0,087455	0,175954	5,22909	0,632031
8	0,173439	0,166924	6,30867	0,612702
9	–0,030565	0,157378	6,34639	0,704805
10	0,103366	0,147214	6,83940	0,740503
11	0,196512	0,136293	8,91828	0,629434
12	–0,038293	0,124418	9,01301	0,701807

Source: own processing data in Statistics.

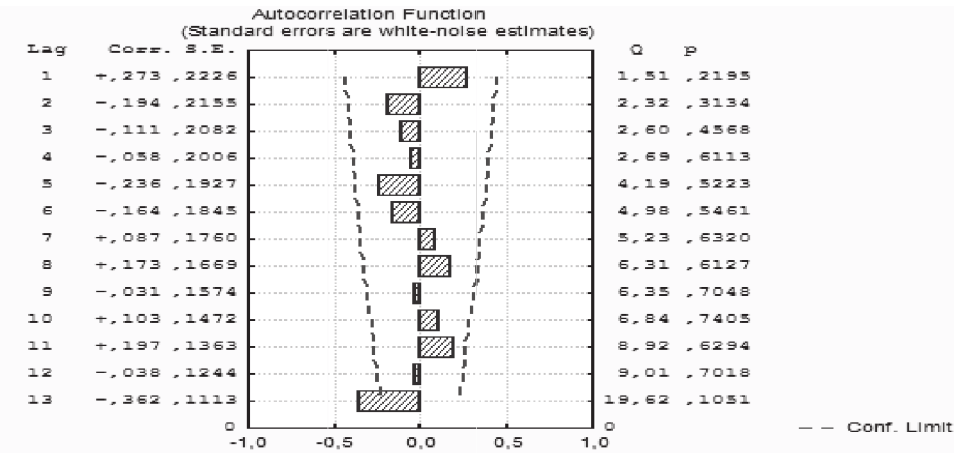

Figure 3.1. Standard errors

Source: own processing data in Statistics.

Annex 4

Table 4.1. Adequate level of interdependence currency regulation instruments

Lag	Auto-Corr.	Std. Err.	Box & Ljung Q	p
1	0,179925	0,222566	0,65353	0,418859
2	0,262469	0,215499	2,13696	0,343542
3	0,273906	0,208191	3,86788	0,276108
4	–0,200231	0,200618	4,86402	0,301560
5	0,132504	0,192748	5,33661	0,376217
6	–0,203355	0,184542	6,55089	0,364409
7	–0,327825	0,175954	10,02214	0,187366
8	–0,208741	0,166924	11,58592	0,170707
9	–0,275422	0,157378	14,64865	0,101103
10	–0,090164	0,147214	15,02377	0,131258
11	–0,064246	0,136293	15,24597	0,171576
12	–0,031309	0,124418	15,30929	0,225022

Source: own processing data in Statistics.

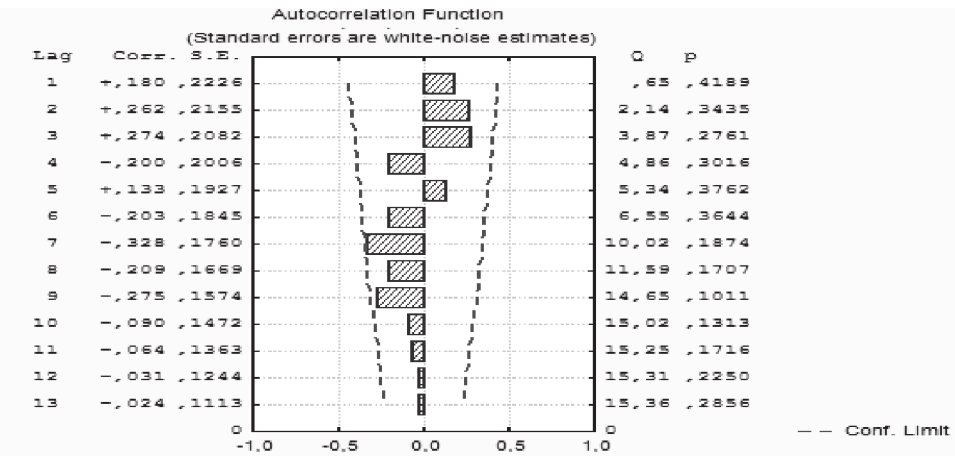

Figure 4.1. Standard errors

Source: own processing data in Statistics.

Annex 5

Table 5.1. Adequate level of interdependence currency regulation instruments

Lag	Auto-Corr.	Std. Err.	Box & Ljung Q	p
1	–0,539334	0,222566	5,87217	0,015388
2	–0,018735	0,215499	5,87973	0,052887
3	0,317718	0,208191	8,20867	0,041908
4	–0,534125	0,200618	15,29701	0,004129
5	0,399468	0,192748	19,59224	0,001493
6	0,038677	0,184542	19,63616	0,003220
7	–0,255822	0,175954	21,75003	0,002811
8	0,189702	0,166924	23,04155	0,003319
9	–0,191236	0,157378	24,51811	0,003562
10	0,079624	0,142714	24,81065	0,005729
11	0,007135	0,136293	24,81339	0,009728
12	0,008096	0,124418	24,81763	0,015740

Source: own processing data in Statistics.

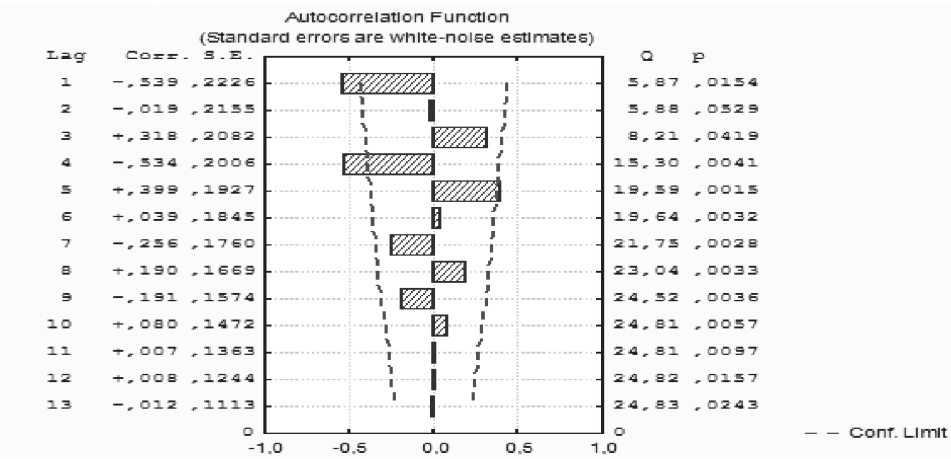

Figure 5.1. Standard errors

Source: own processing data in Statistics.

Zmiany w systemie kształtowania kursów walut w kontekście niestabilności gospodarki

Streszczenie. *Globalny kryzys finansowy stawia pytania tak o cele regulacji finansowych, jak i o najlepsze sposoby ich osiągania. Kamieniem węgielnym regulacji bankowych zawsze były wymagania kapitałowe. W kategoriach stabilności ekonomicznej najważniejszym zadaniem każdego rządu jest z jednej strony regulowanie podstawowych wskaźników makroekonomicznych, z drugiej zaś wykorzystywanie instrumentów rynkowych dla stymulowania gospodarczego wzrostu. Jednocześnie zauważyć wypada, że podczas kryzysów finansowych stosowane są inne instrumenty regulacyjne niż te wykorzystywane podczas okresów stabilności, przy czym skutki ich wprowadzenia mogą być nie tylko trudne do przewidzenia, ale wręcz mieć negatywny wpływ na sytuację na rynku finansowym. Artykuł prezentuje krytyczną analizę zmian w systemie kształtowania kursów walut w kontekście niestabilności gospodarki.*

Słowa kluczowe: *wyzwania gospodarcze, niestabilność gospodarki, wskaźniki makroekonomiczne, kształtowanie kursów walut, niestabilność finansowa, rynek finansowy*