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HOW VULNERABLE IS THE MOLDOVAN ECONOMY TO EXTERNAL ECONOMIC SHOCKS? FORECASTS FOR 2012

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Summary: The purpose of this analysis is to simulate, with the help of a Structural Vector Auto Regressive Model, Moldova's economy dynamic behavior in response to a series of external shocks, such as: a recession in the European Union and Russian Federation, decline in remittances, national currency depreciation, widening of the trade deficit etc. In light of these changes, we make some forecasts on the evolution of Moldovan GDP in 2012. Thus, for this year we forecast a real economic growth of around +2.1%. The recession scenario should not be excluded, in the case of substantial worsening of Eurozone sovereign debt crisis. To the decision makers, the present paper may offer robust evidence for the macroeconomic process planning, as well as for the implementation of macroeconomic stabilization measures. The developed model may be particularly useful for the foundation of Mid-Term Budget Framework 2013-2015 (MTBF), which is now at its first stages; as well as for the State Budget Law and other economic policy decisions.

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FOREWORD

This document is based on a Structural Vector Auto-Regressive (SVAR) Model, developed by the authors for Moldova's economy and used to simulate and analyze response reactions of Moldovan economy to various external shocks. Technical details of the developed model are presented in Annex 1.

The first section shortly presents the regional economic context and explains why the use of such a model is so relevant for the analysis of Moldova's exposure to external shocks.

The second section presents the proper analysis of Moldovan economy's reactions to some shocks that could occur along with the escalation of the external crisis.

The used model could serve as a reliable short-term forecast instrument. The main results of the forecast are laid out in the last section of this paper, which, in addition, enounces the main analytical conclusions.

GENERAL CONTEXT

Slowly, but steadily, the region's economic state is worsening due to the unfolding Eurozone sovereign debt crisis and ineffective or insufficient austerity measures implemented by some governments. Heterogeneity of views and interests at the level of decision makers, and respectively, slow decision making process, in gear with economic and fiscal disparities, have fueled a real bundle of crises in the European Union. Thus, the economic crisis has degenerated into a fiscal one, which has shortly transposed into a political one, and finally, into a crisis of trust towards the Eurozone. Not surprisingly, this multidimensional crisis has fueled a huge degree of uncertainty and negative expectations from the part of consumers and businesses. Therefore, several leading indicators of 2011's end (i.e., which predict economic developments in the near future) for OECD countries in Europe have announced the entrance of the economic cycle into its recession phase. Because this involves cooling demand and straining of the labor market situation in Europe, the Moldovan economy is inevitably exposed to the slowdown of remittances or even to an absolute reduction of their volume, as well to slower growth of exports and to the freezing of investment plans for several companies. In fact, the first symptoms of this emerged in last quarter of 2011[1,2]. Thus, under the circumstances of the Eurozone sovereign debt crisis, the question "How vulnerable is the Moldovan economy to the external economic difficulties, and what should we expect in the near future?" is extremely pertinent.

[1] http://expert-grup.org/index.php?go=biblioteca&n=247.
[2] http://expert-grup.org/index.php?go=biblioteca&n=251.

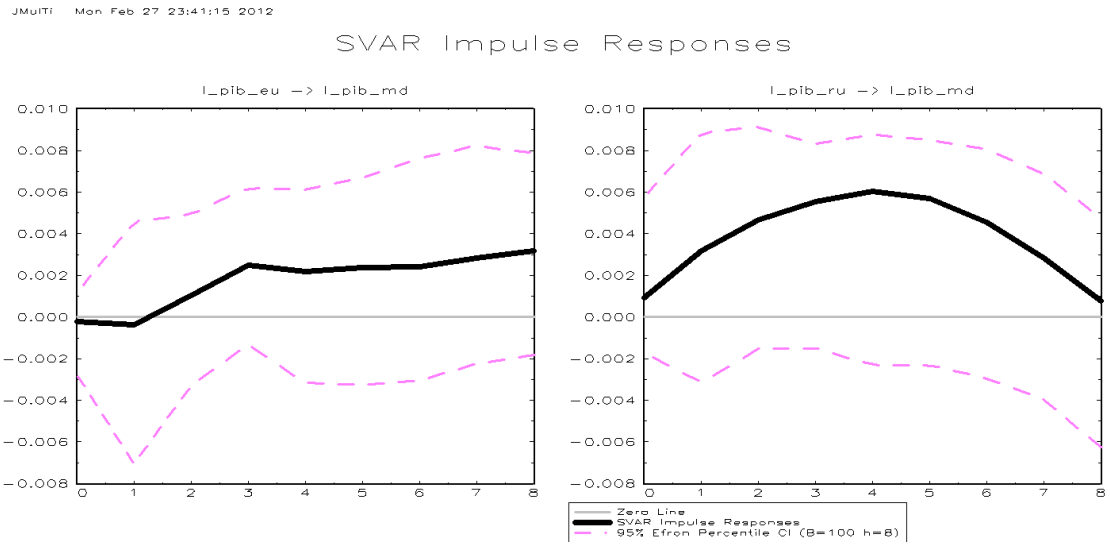
SHOCK MODELING AND IMPACT ESTIMATE

From now on, we will illustrate the graphical representation of the so called "impulse-response functions," estimated based on the Structural Vector Auto-Regressive Model (SVAR) composed of 10 variables. This allows us to understand how various macroeconomic shocks convey over the Moldovan economy. In practice, these measure the impact and duration in time over some variables (e.g.: Moldova's GDP or aggregate consumption) caused by growth of other variables (e.g.: remittances, EU's GDP, etc.). Thus, a stronger elasticity suggests a higher sensitivity in the event that such a shock will occur.

THE IMPACT OF SHOCKS FROM THE PART OF THE EUROPEAN UNION AND RUSSIAN FEDERATION'S ECONOMIES

In Chart 1 we can see that an increase of 1 p.p. of the EU's GDP generates a 0.002 p.p. growth with a two quarters lag, while the same increase of Russia's GDP produces a maximal effect of actually three times larger (+0.006 p.p.), however, with an interval of 4-5 quarters. Accordingly, following a negative shock, Moldova's GDP could shrink by the same rate. Thus, we conclude that the national economy is much more vulnerable to economic changes in Russia. Meanwhile, although the impact of EU's economic changes is more modest, it is more persistent: the shock does not die out even after eight quarters.

Chart 1: Estimate impact of EU's GDP growth (first graph) and of Russia (second graph) over Moldova's GDP growth



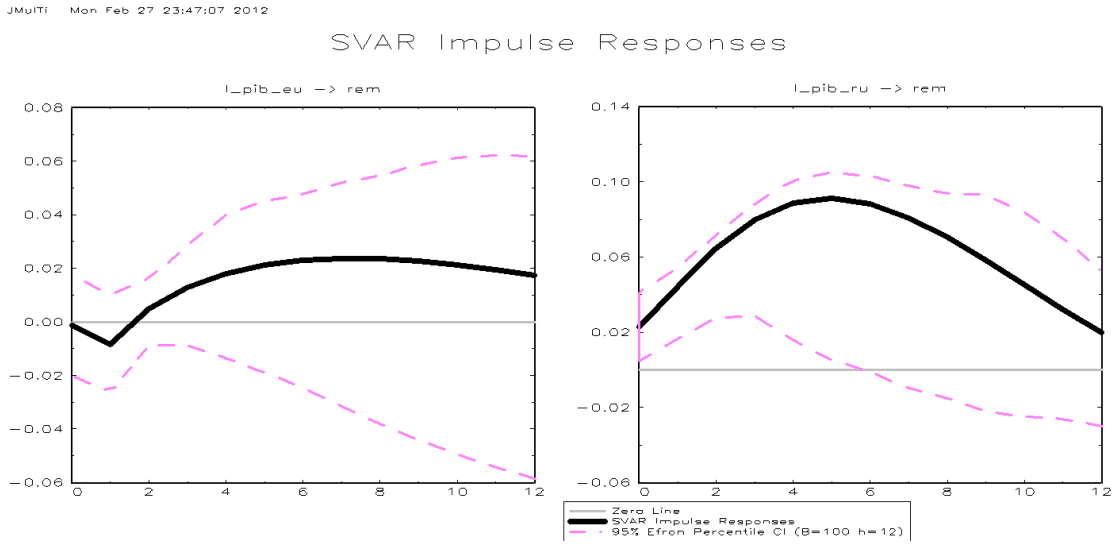
Source: EG computations;

This phenomenon has at least two explanations. The first regards the more diversified level of EU oriented exports, so that positive growth is more uniformly absorbed by Moldova's economic sectors, and the positive impact lasts longer. Therefore, in the case of EU's GDP shrinking, the more diversified level of Moldovan exports will mitigate the negative impact, but this will be felt by a number of sectors, with longer time repercussions. In the case of a negative shock of Russia's GDP, the higher concentration level will cause a more

pronounced adverse effect, but due to resource reallocation towards other sectors/markets, the impact will last for a more limited period.

The second explanation regards the impact of EU and Russia's economic shocks over the inflow of remittances. During 2011, $600 million were transferred from Russia, this representing 57% of the total remittances entering Moldovan economy. Accordingly, Russia's economic variations have had a more pronounced effect on the remittances growth, which, subsequently, influence the Moldovan economy's situation. Chart 2 confirms: 1 p.p. increase of the EU's GDP generates a remittances' growth that reaches the maximal magnitude of 0.02 p.p. after about eight quarters, while the effects of similar growth in Russia is about four times stronger, and the maxim impact is reached with a lag of 4-5 months.

Chart 2: Estimate impact of EU's GDP growth (first graph) and of Russia (second graph) over Moldova's remittances growth



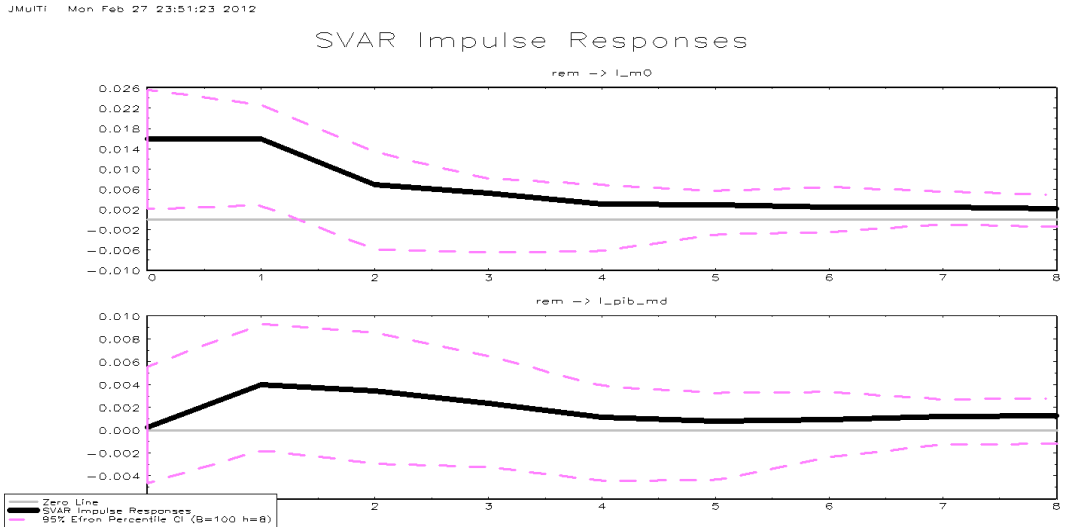
Source: EG computations;

Therefore, as in case of the impact on the GDP discussed above (Chart 1), the EU's economic growth has a more modest effect on Moldova's inflows of remittances, but the impact is more persistent compared to the effects of Russia's economic growth. The explanation lies, perhaps, in the diverse structure of the economic sectors in which the Moldovan emigrants activate: in the EU a large part are employed in services sector, particularly in the social services sector, which is less sensitive to economic cycles; in Russia, our compatriots are largely employed in the construction sector, which, on the contrary, is much more volatile. This explains why the maximal impact of an economic shock in Russia is significantly higher on the remittances. But why is this consumed more quickly, while a possible shock in the EU, although it has a more modest effect is more persistent in time? The explanation could lie in the fact that Moldovan emigrants, because of linguistics and legal barriers, are entering the EU labor market with more difficulty, compared with Russia's market. However, once incorporated, these tend to stay employed in the EU for longer, so that in case of negative shocks, they would remain in those positions for a longer time than in Russia. Thus, we conclude that EU's economic difficulties will have a very persistent impact on the remittances growth; however, the intensity of the impact will be more modest compared with that of a possible negative shock in Russia's economy.

THE IMPACT OF SHOCKS ON REMITTANCES

Chart 3 shows the immediate impact generated by remittances growth over the aggregate consumption, measured based on the volume of money in circulation, (M0 monetary aggregate), respectively, over Moldovan economy's growth. The model suggests that 1 p.p. increase/decrease of the remittances causes a demand increase/decrease (by about 0.015 p.p.) and of GDP (by about 0.005 p.p.) which peaks in the next quarter, thereafter the shock is rapidly self-consumed. This underlines the remittances' importance as one of the main engines of Moldova's economic growth. Thus, potential reduction of remittances, steaming from EU labor market's tensions implies an immediate adverse effect on consumption and on economic growth.

Chart 3: Estimate impact of 1 p.p. remittances growth over the amount of money in circulation (first graph) and over Moldova's GDP

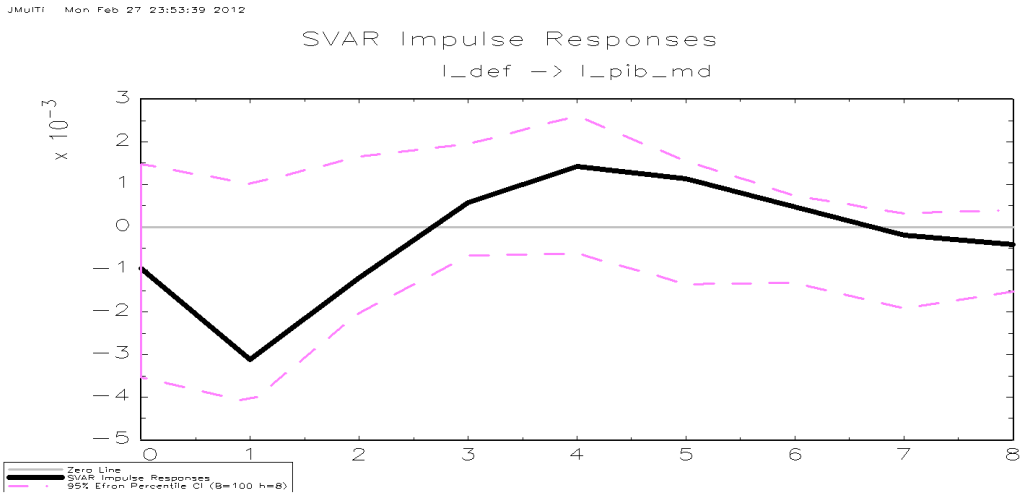


Source: EG computations;

THE IMPACT OF TRADE DEFICIT'S INCREASE

The worsening of external economic situation and, respectively, cooling demand for Moldovan exports may lead to the trade deficit's increase, provided a slower adjustment of imports. Chart 4 shows a strong and immediate impact of such a shock over Moldovan economy. However, we can note that after a 3-4 quarters period, an increase in the trade deficit is associated with economic growth, taking into account the huge dependence of economic growth led by consumption which is covered by imports.

Chart 4: Estimate impact of 1 p.p trade deficit growth over Moldova's GDP

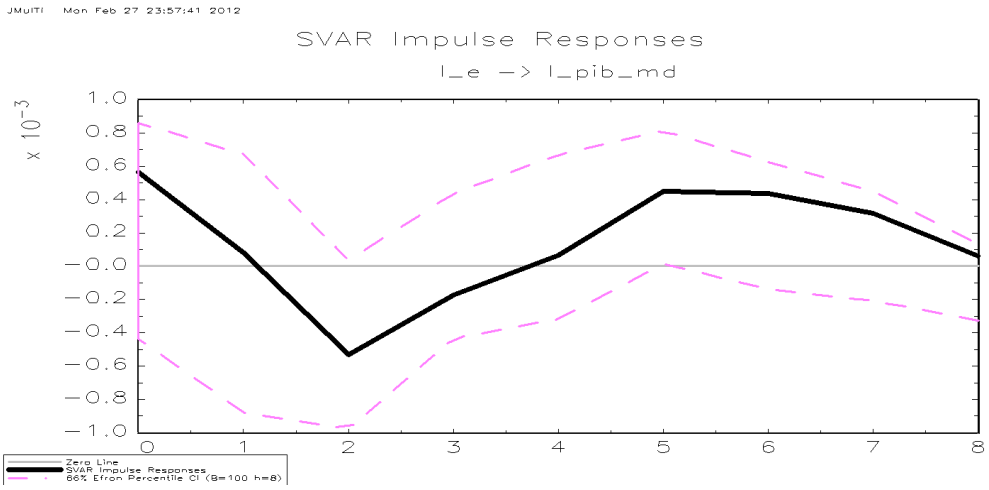


Source: EG computations;

THE IMPACT OF NATIONAL CURRENCY DEPRECIATION

Due to Moldova's economy dependence on currency inflows coming mainly from remittances, exports and, to a lesser extent, from investments and foreign grants, their reduction or slower growth would create some pressure over the national currency. From the very beginning, we exclude any apocalyptical scenarios in this respect, but it is necessary to take into account some depreciation of national currency, caused by reduction of foreign currency supply. Our model indicates an equivocal effect of such a shock over the Moldovan economy. Thus, MDL's depreciation generates an immediate adverse effect caused, most likely, by more expensive imports and, respectively, by the inflationary effect. At the same time, this effect is counterbalanced by a positive one after 5-6 quarters, due to price competitiveness enhancement of Moldovan exports and, respectively, to the positive effects on employment, wages and investment.

Chart 5: Estimate impact of 1 p.p. national currency depreciation over Moldova's GDP

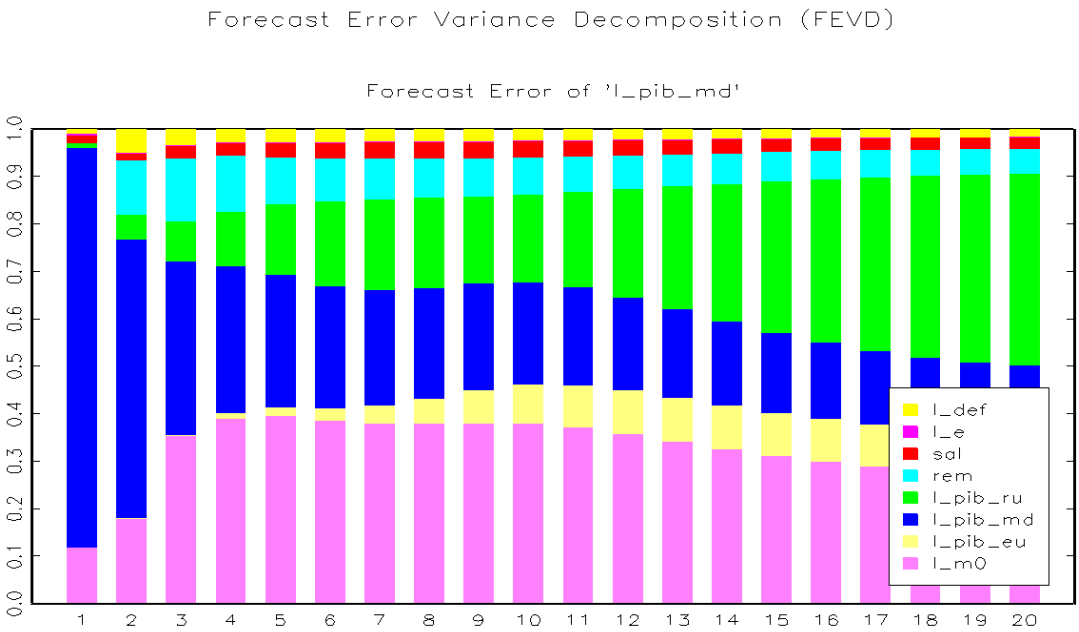


Source: EG computations;

STRUCTURAL ANALYSIS OF SHOCKS ON MOLDOVA'S ECONOMY

Previous charts have proved the vulnerability of Moldovan economy to various external shocks. But which of these factors has a larger or smaller influence, and how the structure of these shocks changes over time? In Chart 6 we note that in the first three quarters Moldova GDP's change is predominantly guided by its previous values, this being explained by the relatively low volatility of this indicator compared to other macroeconomic variables (e.g.: exchange rate, the volume of money in circulation etc.). However, starting with the quarter 4^{th} to 14^{th} consumption (proxied by the volume of money in circulation) is one the main contributors to the GDP's variations. In fact, this confirms once again that the economic growth model is based on consumption, which, according to Chart 3, is strongly fueled by remittances.

Chart 5: The changes in the structure of shocks which alter Moldova's economy, based on SVAR model



Source: EG computations;

We would like to draw attention to the increasing influence of Russia's economic growth impact over the Moldovan economy. We observe a steady increase of its role in the structure of shocks; and after 15 quarters this has the strongest influence over Moldova's GDP. At the same time, even though the EU's economic variations play an important role, they have a much more modest impact. Therefore, Moldovan economy is more sensitive to any shocks emanating from Russia's economy, which is explained by the occupational structure of Moldovan emigrants in this country, as well as by the poorly diversified structure of products exported to Russia.

CONCLUSIONS AND FORECASTS FOR 2012

EXPOSURE AND VULNERABILITY OF MOLDOVAN ECONOMY

Econometric estimates based on the SVAR model have revealed Moldova's economy strong dependence on the region's economic situation. Its openness, coupled with a growth model based on consumption largely financed from remittances, exposes the Moldovan economy to a number of risks. These are mainly generated by the straining of the European region's labor market and by the diminishing external demands. Thus, our main conclusions are:

- The consequences of Eurozone sovereign debt crisis are already visible in Moldova, through the slowdown of economic activity and cooling consumption.
- Moldova's economy is quite vulnerable to potential shocks from abroad. In particular, Russia's fluctuations have a harsher impact on the Moldovan economy, while the EU ones have a more lasting impact. Therefore, the repercussions of Eurozone sovereign debt crisis can be less severe compared to a similar crisis in Russia. However we notice that the economic variations in the EU tend to produce more lasting impacts over Moldova.
- A similar effect caused by potential economic shocks from the EU and Russia is produced over incomes rendered from abroad. In Russia's case the effect is more pronounced, but in the event of a shock in the EU, the effect lasts much longer.
- The impact of a slowdown in remittances inflow or even reduction would reflect almost immediately on the domestic demand and, respectively, on the Moldovan economy's growth; this currently can be seen in the statistic data for the end of 2011.
- Potential pressures over the national currency as a result of decreasing remittances inflow should not be dramatized, and the impact of the MDL depreciation is not unequivocal. In the short term it may have some adverse effects, however these will be counterbalanced by other positive effects for Moldovan exporters, which subsequently will impact wages, employment and investment.
- Given the repercussions of the Eurozone sovereign debt crisis, as well as of Russia's dependence on EU's demand, Moldova's decision makers should consider the possible worsening economic situation of virtually all major trading partners of our country. The government, along with the NBM, should not delay the implementation of macroeconomic stabilization policies, oriented mainly towards the removal of redundant constraints of entrepreneurial activity, elimination of non-tariff barriers for Moldovan exports by converging the national standards to European ones, by diversifying foreign outlets, improving competition framework etc. The development of an action package for macroeconomic stabilization is not one of this study's goals,

but a more detailed list of actions can be found in the last edition of MEGA nr. 5 prepared by Expert-Grup[3].

FORECASTS FOR 2012

While the domestic and foreign outlook is uncertain, one thing is absolutely obvious: the 2012 will be one the most troubled years following the recent global economic crisis. In such circumstances making sound forecast becomes more difficult, while the margin of error is much higher. Nevertheless, the trends started in the last quarter of the previous year and which continue up to present day do not bode well for the domestic economic situation. For example, in December 2011 the index of industrial production has already been on decline with a -3.7% annual rate; during the same period the goods transportation services on Moldova's territory have decreased by 7.7%, a trend that has gathered steam in January 2012 (-14.8%); growth rates for exports, imports, remittances and respectively, consumption have slowed down considerably, and commercial banks are gradually increasing their risk premiums included in interest on loans. These indicators usually cause subsequent variations of the economic cycles, suggesting the presence of outstanding recession risks for the Moldovan economy. Taking into consideration the country's huge reliance on remittance inflows and the poorly diversified foreign outlets, the reification of these risks will directly depend on the region's economic situation.

Thus, our 2012 forecast takes into account the change in remittances, consumption, exchange rate and weather conditions, and the EU and Russian Federation's economies, as well as the interest rates in these countries, which measure the economic agents' expectations. Depending on these variables, we estimate that ***the economic growth started to visibly slowdown in the last quarter of 2011; for 2012 we forecast a +2.1% annual real growth.*** It is a more pessimist forecast compared to the Ministry of Economy, NBM and international organizations, nevertheless, we consider it to be quite realistic in the foreign and domestic economic circumstance. Moreover, the recession scenario for the Moldovan economy should not be ruled out; obviously, under worsening Eurozone sovereign debt crisis and fueling negative macroeconomic expectations.

[3] http://expert-grup.org/?go=biblioteca&n=249

ANNEX: STRUCTURAL VECTOR AUTOREGRESSIVE MODEL (SVAR)

Classical VAR models represent systems of several equations, in which every endogenous variable is regressed with the other endogenous variables for current and lagged periods, and with other exogenous variables, depending on specific restrictions. To get a better specification we have used the Structural Vector autoregressive Model (SVAR) which, unlike the ordinary VAR model with Cholesky restrictions, is a non-recursive one, with specific restrictions applied to current and lagged periods. The decision on the application of these restrictions derives from the economic theories and peculiarities of Moldovan economy.

The model includes 10 variables, with quarterly frequency, for 2000:1 – 2011:3 period.

l_m0 – the volume of money in circulation (M0 monetary aggregate), seasonally adjusted, natural logarithms.
l_eu_gdp – European Union's GDP, constant prices (2000 = 100%), natural logarithms.
l_md_gdp – Moldova's GDP, constant prices (2000 = 100%), natural logarithms.
l_ru_gdp – Russia's GDP, constant prices (2000 = 100%), natural logarithms.
rem – amount of transfers from abroad to individuals, seasonally adjusted, natural logarithms.
sal – average monthly wage of an employee, MDL, natural logarithms.
l_e – The average nominal exchange rate of the MDL towards Euro and USD, weighted by the structure of Moldova's foreign trade, natural logarithms.
l_def – Moldova's trade deficit, natural logarithms.
mm – average amount of rainfall, seasonally adjusted, natural logarithms (used as a variable that approximates the weather conditions).
i_w – average interbank rates in the EU and Russia, weighted by the size of GDPs.

Two periods SVAR model was selected Based on Akaike information criterion. Restrictions and model specification are presented in table 1 and 2:

Table 1: Model's structure with current periods' regressions

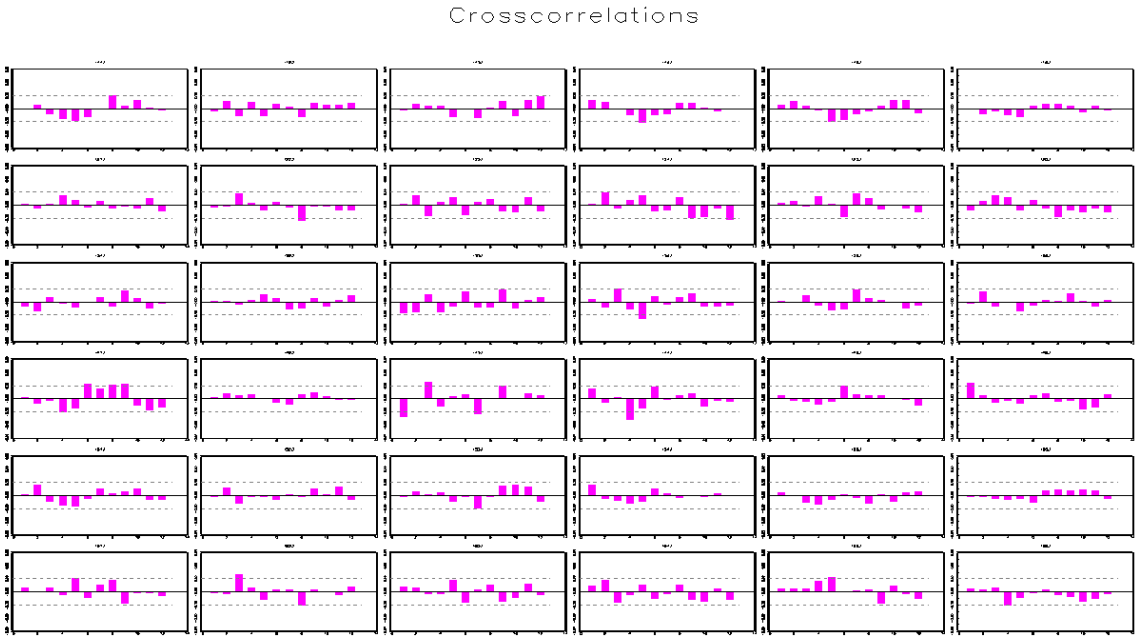
	l_m0	l_eu_gdp	l_md_gdp	l_ru_gdp	Rem	wag	l_e	l_def
l_m0	*	0	0	0	*	*	0	0
l_eu_gdp	0	*	0	0	0	0	0	0
l_md_gdp	*	0	*	0	*	0	0	*
l_ru_gdp	0	0	0	*	0	0	0	0
Rem	0	*	0	*	*	0	0	0
Wag	0	0	0	0	0	*	0	0
l_e	*	*	*	*	*	*	*	*
l_def	*	*	0	*	*	0	*	*

Table 2: Model's structure with previous periods' regressions

	l_m0	l_eu_gdp	l_md_gdp	l_ru_gdp	rem	wag	l_e	l_def	mm	i_w
l_m0	*	0	*	0	*	*	0	0	0	0
l_eu_gdp	0	*	0	0	0	0	0	0	0	*
l_md_gdp	*	*	*	*	*	0	*	*	*	0
l_ru_gdp	0	*	0	*	0	0	0	0	0	*
Rem	0	*	0	*	*	0	0	0	0	0
Wag	*	*	*	*	*	*	*	0	0	0
l_e	*	*	*	*	*	*	*	*	0	0
l_def	*	*	*	*	*	*	*	*	*	0

The plausibility of current specification is confirmed by the lack of significant dependencies among the error terms derived from the model (chart 7):

Chart 7: Correlation among error terms



Therewith, the stability of the model is confirmed by CUSUM test (chart 8):

Chart 8: CUSUM Stability Test, 95% confidence interval