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MONTENEGRO QUATERLY MACROECONOMIC ECONOMETRIC MODEL MQMEM-1

This paper presents quarterly econometric model of Montenegro in the following way: after summary, short introduction with country background is given. It is followed by presentation of model which consists of specification, estimation, interpretation of results, ex-post simulation, illustration of model application for monetary policy and concludes with cited literature.

SUMMARY OF RESULTS

Specific features of quarterly econometric model for Montenegro are dealing with the euroization of the economy, de facto separation of Montenegro economy from Serbian economy, relatively important role of stock exchange. The model is specified in Keynesian tradition with final demand as driving force of the economic growth, but, in addition, with some specific detail of supply side economics regarding negative role of government expenditures and taxation on some forms of activity.

Model of Montenegro economy is estimated on quarterly data for period I/2000 to IV/2004 (20 observations). It includes all key segments of economic mechanism, which are present in 10 sectors: activity and final demand, markets of labor and capital (investment), household income and consumption, government receipts and expenditures, international trade of goods and services, prices, stock exchange, banking sector (deposits and credits) and monetary sector (cash and broad money).

All behavioral equations are specified and estimated on differences of logarithms (approximation of growth rates). Key features of the model are: inclusion of relevant real and financial sectors of the economy, estimation of labor and capital market, division of labor market on tradable and non-tradable part, creation of activity variable in addition to industrial production and identifying final demand as driving force of the economy. Special features are connected with peculiarities of Montenegrin economy, which include lack of domestic currency and fiscal restraint following Maastricht criteria. Model enables the analysis of measures of monetary, fiscal and some employment policy.

The quality of model is presented by the ex-post dynamic simulation. Namely, In its first phase, the ultimate goal of building model is to describe functioning of Montenegro economy which needs to be better understand by authorities (Government, Central bank). In next phase, model is intended to help identifying and quantifying appropriate measures of economic policy; their quantification to be consistent with the majot economic goals authorities declared in their yearly economic policy resolutions.

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I. SHORT INTRODUCTION AND BACKGROUND

Montenegro is a small country of 630.000 inhabitants and around 15.000 square kilometers and GDP per capita around 2.500 USD, situated in Balkans, South East Europe. With its famous history of independence Montenegro was one of six republics of former Yugoslavia after World WarII. Presently, it is formally constituent part of Republic Serbia and Montenegro, but de facto it is independent economy.

After disintegration of second Yugoslavia in 1989 Montenegro remained integrated in narrow Yugoslavia, renamed later into Serbia and Montenegro. In 2003 agreement was signed between both constituent parts allowing referendums on independence in three years time. Despite almost half of population in Montenegro being Serbs by nationality, a strong movement for independence of Montenegro is present from late 1990, still times of Milošević's Serbia. Montenegrin political elite wants to go ahead with reforms to get the option to join EU in foreseeable future.

In the economy several formal steps were already made towards independence from 1999 thus enabling treatment of Montenegro as a separate economic entity. In 1999 German Mark (DEM) was introduced officially as parallel and in late 2000 as the only legal tender (type of official dollarization – euroization). Central bank of Montenegro became independent from the Belgrade central bank of Repubic. From 2000 customs were introduced in border with Serbia. Montenegrin Government opted for faster transformation with radical reforms in economic system and economic policy, contrary to Serbia which is lagging behind. Due to lack of political consensus Serbia is not moving ahead in economic reform thus becoming probable the isolated relict in Europe (sometimes pertinent to Albania).

Elements of economic transition of Montenegro are privatization, introduction of market institutions, and modern economic, especially monetary policy. To support the economic policy and monetary policy authorities an econometric model was built. First, in 2002/2003 a yearly model was made by calibration. After that, in 2004/2005 a quarterly econometric model is being built, to be presented in what follows.

Mcroeconomic performances of Montenegro improved significantly since de facto economic separation from Serbia and Euroization of economy in 2000. Stability had priority over growth under circumstances. Inflation rate declined to one digit number, budget deficit is declining from 20% to 3% of GDP, unemployment remained high, close to 30%, however. Bank deposits and loans increased from 100 Million € to 250 Million €, FDI increased from 4 Million $ to over 50 Million $ in 2004.

The estimated econometric model for Montenegro model has very interesting special features based on specific framework of not yet fully independent country: officially Euroized economy, custom borders with Serbia despite the fact that it is formal constituent unit of Serbia and Montengro, relative strong capital market. Other market institutions are in creation. In part, model could be specified as regional model, but borders and separate institutions, by now well established for Montenegro, support the idea of fully fledget country model.

II. THE MODEL SPECIFICATION

General specification characteristics

Model describes 10 segments of the economic mechanism of Montenegro: activity, market for capital and labor, household income and consumption, government receipts and expenditures, final demand, international trade of goods and services, prices, stock exchange, banking sector deposits and credits and monetary sector cash and broad money.

There are 18 behavioral equations and 5 definitions in the model. The behavioral equations are presented in the form of first differences of logarithm which is approximation to rate of growths. It is usual to use them for fast growing economies with significant inflation still existent which Montenegro is. The equations transforming rates of growth into absolute levels (values) of variables are not presented.

Basic structure of the model is the following: first activity is presented in the form of production functions, added by equations for factors of production (labor, capital). Next, receipts of household are estimated followed by the elements of final demand. Later prices and stock exchange is estimated and model concludes with estimation of banking sector deposits and credits and monetary sector creation of cash.
There are 5 definitions in the model: creation of GDP through components of final demand, total employment as addition of its tradable part (behavioral) and non-tradable part (economic policy variable), trade balance, balance of budget (which is restricted to less than 3% GDP deficit, and broad money as addition of cash and deposits.

Special feature: use of Euro as official domestic currency (legal tender)

The use of Euro as legal tender takes away an important monetary policy instrument of central bank. Among usually available instruments of monetary policy only the rate of obligatory reserves remains to be used. There is no primary emission of money by central bank, while secondary emission by business banks is still possible. For that reason open market policy does not function, neither is interest rate policy of central bank possible. The major problem is that the quantity of cash (Euros) present in Montenegro is impossible to define exactly.

There are 16 Dollarized independent countries currently in the world. Montenegro is fifth largest state entity among them. It fulfills preconditions for Euroization well: small size and openness of the economy, history of hyperinflation, small seignorage due to widely spread unofficial Euroization. Only foreign currency reserves are small, but foreign transfers were helping the eoconmy. In the future, balance of trade and current account should be equilibrated.

For Montenegro gains from increased stability (inflation was 3500 Billion % in 1994) and credibility are larger than lossess from loosing independent monetary policy, or at least large part of its instruments.

Specification of economic policy

While use of fiscal policy is in Montenegro the same as in other countries, monetary policy problems are more complex in "Dollarized " region (country) and needs to be tackled separately.

There are six variables in model which can be treated as instruments of economic policy:
- monetary policy: the rate of required bank reserves,
- fiscal policy: effective tax rate, effective customs rate, the burden rate of taxation of wages and government expenditures (with upper limit of government receipts plus 0.03 x GDP),
- employment policy: growth of employment in non-tradable (state) sector

External exogenous variables

The only such variable in the model in present form is REV presenting effective exchange rate for Montenegro of non-€ currency to Euro.

Dummy variables and lags

Variables are presented as fist quarterly differences, which are not de-seasoned.
Dummy variables are not used.
Only simple lags are used (up to 4 quarters in model estimated for observation period 5 years), but not distributed lags in this fist version of model. Short observation period and short lags justify for that.

Model Data description

- Sources: Montenegro statistics, creation in ISSP, international statistics;
- Unit of measurement: rates of growth; basic series are in Euro or in indices, number of employees,
- quarterly series: calculated as sum of monthly series or as division of yearly data into quarters by adequate use of seasonal factors. Series are not de-seasoned.
- in few cases of variables, observations are estimated for the start or the end of observation period

Symbols used in the model presentation:

d = first difference
log = natural logarithm
d log = rate of growth (approximation)
(-i) = the length of lag in series, where –i indicates the number of quarterly lags.
Variable in real terms = " r" after symbol

Symbols for variables in the model:

AKS	Ex	active interest rate	**POTD**	End	household consumption
AKT1	End	Activity	**PRUS**	End	export of services
BDP	End	GDP	**REV**	Ex	exchange rate non€ / €
DOHD	End	household income	**SETO**	End	stock exchange turnover
DUK	End	deposits in banks	**SOR**	ExEP	rate of obligatory reserves
EFCARSTOP	ExP	effective customs rate	**STED**	Ex	household savings
EFPORSTOP	ExP	effective tax rate	**STOPLA**	ExEP	rate of tax burden of wages
GOT	End	Cash	**TRB**	End	balance of trade
GOV	End	government expenditures	**UKPRIM**	End	government receipts
INDP	End	industrial production	**UVRU**	End	import of goods
INV	End	investment in economy	**ZAPNT**	ExEP	employment non-tradable sector
IPC	End	index of producers prices	**ZAPTRA**	End	employment tradable sector
ITZ	End	cost of living index	**ZAPUK**	End	total employment
IZVRU	End	export of goods	**ZARTRA**	End	wages in tradable sector
KFL	Ex	bank consumer credits	**MC**	End	market capitalization
KID	Ex	capital expenditures of government	**UKRAS**	ExEP	total government expenditures
KUK	End	bank credits total	**PKS**	Ex	passive bank interest rate
M	End	broad money: cash + deposits			

Ex=exogeneous variables, End=endogeneous variables; ExEP=economic policy variables.

III. MODEL ESTIMATION

Data

The sources of data are: a) Monstat (Montenegro statistical office), central bank, ministry of finance, statistics of labor and employment, data from Institute for strategic studies and prognoses, surveys from CARA; b) foreign data resources: OECD, data from EIPF, Ljubljana.

Due to specific position of Montenegro in the process of obtaining independence and due to relative under-development of country the collection (and formation) of appropriate statistical series was one of the crucial phases in the project. At least one third of time was devoted exclusively to that task, and even later, during process of specification and estimation, data mining was still in schedule. Thus, over 140 series of data were created, several of them for the first time in Montenegro. The experts from several offices responsible for statistical data were included in this process of data mining. Thus, one of the out comes of project are suggestions and guidelines for imrpovement in data creation and collection in Montenegro and further development of its statistical offices.

Method

Behavioral equations (18) are estimated in the form of quarterly rates of growth of variables with simple OLS method (e-views) for series of 20 observations, which are not de-seasoned. In the form of growth rates all included variables were successfully tested for stationarity zero-sum integration, therefore OLS suffices. In estimation of equations special attention was paid to their statistical significance and interpretative rational (satisfaction).

a) Statistical significance

The following tests were used:
- stationary series: Dickey-Fuller's unit root test,
- causality: between specified independent and dependent variables: Granger test,
- autocorrelation in estimated equations: Durbin Watson test;
- multi-collinearity between explanatory variables: correlation analysis.

b) Interpretative adequacy of equations (substance):

Foundations were:
- economic theory,
- experience with specifications in other models: yearly model of Montenegro, quarterly model of Slovenia, quarterly model of Netherlands.
- peculiarities of the Montenegro economy.

Estimation process

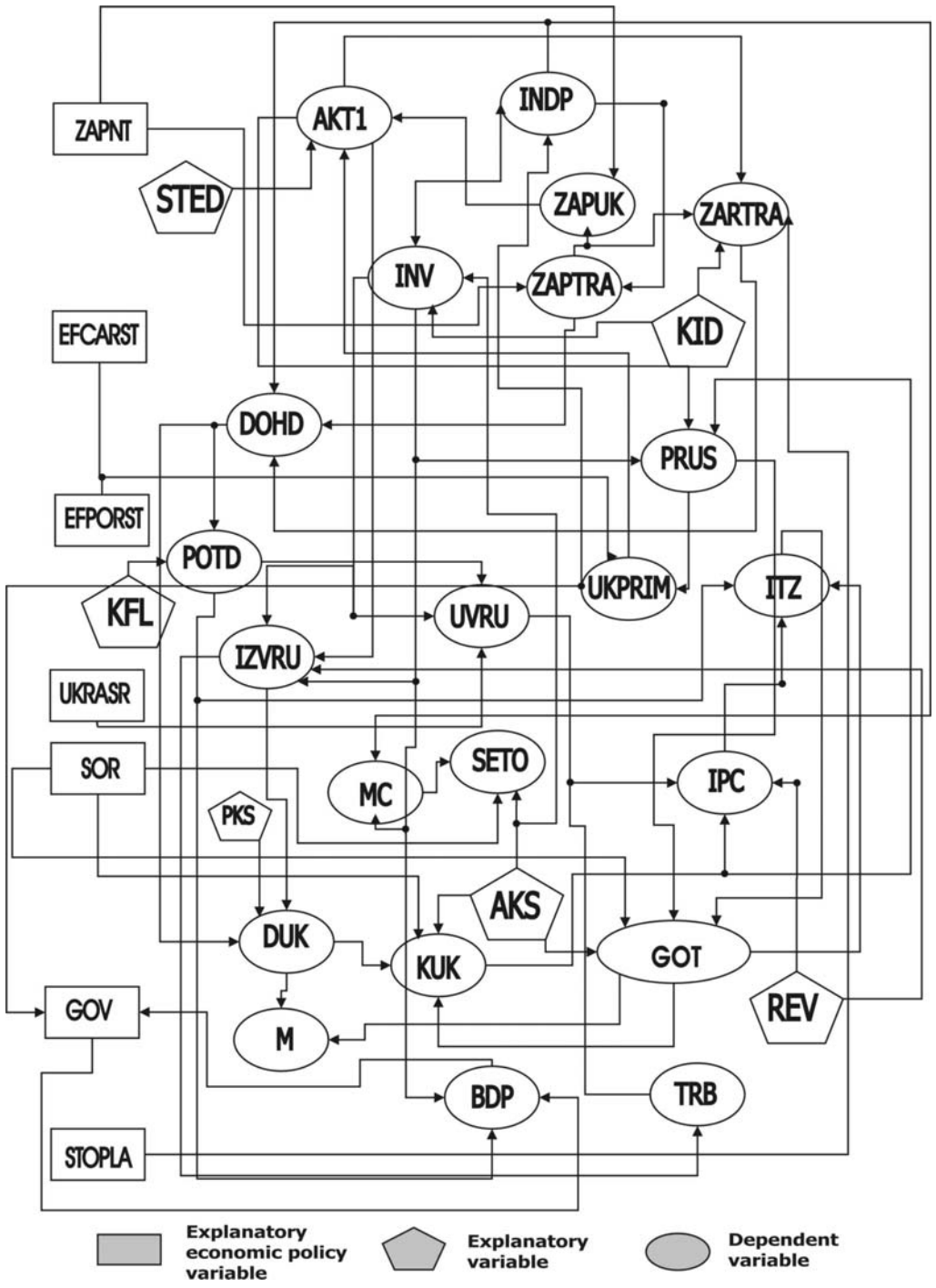
Some variables are estimated as nominal, other are deflated with adequate price indices (cost of living index, index of producer prices or combination of both). Although use of Euro determines all nominal series in Euros, inflation was still present in observation period, mostly in one digit numbers, however.

All estimated equations are in rates of growths of variables (only in one case first difference is used). Model is presented in equation form, with graph and picture next. Equations include t-values of below each regression coefficient, determination coefficient R2, Durbin Watson statistic DW and F-statistic.

The estimations indicate satisfactory degree of determination for rates of growths of variables, which is only in couple of equations below 50%; auto-correlation is almost absent (few non-determined cases), F-statistic is highly significant for all equations. Thus, the quality of estimated equations is satisfactory by statistical criteria.

By economic substance and statistical significance better results are obtained for real sectors and their variables, a little worse for financial sectors and nominal variables. Among the latter, weaker are export-import equations (only recently gained independence from Serbia), baking sector, fiscal sector and monetary sector (cash can not be fully controlled and measured). Taking into account the status of Montenegro economy and its statistics, such conclusion is not surprising.

GRAPHIC PRESENTATION OF FUNCTIONAL RELATIONS II.



Estimated model:

No.	EQUATION (DEPENDENT VARIABLE)	C	COEFFICIENT*EXPLANATORY VARIABLE (T-STAT)				R^2	DW	F^2
1.	**ACTIVITY (AKT1)**	0.103 (1,95)	+0.197*dlog(ZAPUK(-3)) (+3,04)	+0.221*dlog(STEDr(-3)) (+2,19)	-0.026* dlog (UKPRIMr(-1)) (-1,71)		0.65	1.70	7.27
2.	**INDUSTRIAL PRODUCTION (INDP)**	0.024 (1,31)	-0.246* dlog (UKPRIM(-2)) (-4,58)	+0.201* dlog (INVr(-2)) (+4,74)			0.66	1.66	14.3
3.	**INVESTMENT (INV)**	-0.054 (0,71)	-0.613* dlog (AKS(-1))	+1.117*dlog(INDP)	+0.482*dlog(KID)		0.62	2.44	7.54
4.	**EMPLOYMENT –TRADABLE (ZAPTRA)**	-0.006 (1,40)	+0.0622*dlog(INDP(-3)) (+1,86)	-0.4886*dlog(ZAPNT) (-4,88)			0.66	1.75	12.5
5.	**WAGES-TRADABLE (ZARTRAR)**	0.0119 (0,69)	-1.701*dlog(STOPLA) (-2,82)	+0.074*dlog(AKT1(-2)) (+1,14)	-1.006* dlog (ZAPTRA(-2)) (-1,29)	+0.069*dlog(KID) (+2,14)	0.56	2.14	3.86
6.	**HOUSEHOLD INCOME (DOHDR)**	-0.002 (0,10)	+6.404* dlog(ZAPTRA) (+7,39)	+0.219* dlog(INDP(-3)) (+1,34)	+0.644* dlog(ZARTRA(-2)) (+2,47)		0.84	2.43	20.5
7.	**HOUSEHOLD CONSUM (POTDR)**	-0.0089 (0,47)	+0.7167*dlog(DOHDr) (+8,61)	+0.077*dlog(KFLr(-1)) (+1,92)			0.86	2.18	47.4
8.	**BUDGET RECEIPTS (UKPRIM)**	-0.00534 (0,09)	+0.11*dlog(EFCARSTOP(-1)) (+1,58)	+0.379*dlog(EFPORSTOP(-3)) (+2,22)	+0.284*dlog(PRUS(-1)) (+4,42)		0.66	2.40	7.91
9.	**EXPORT OF GOODS (IZVRUR)**	0.122 (1,57)	+0.378*dlog(AKT1(-2)) (+1.39)	-2.33*dlog(REV(-3)) (-3.07)	+0.309*dlog(INVr(-4)) (+1.60)		0.45	2.12	3.25
10.	**EXPORT OF SERVICES (PRUSR)**	-0.168 (0,97)	+3.229*dlog(AKT1(-1)) (+5,44)	+0.6863* dlog (INVr(-3)) (+2,09)	+1.563* dlog(KUK(-1)) (+1,69)		0.75	2.32	12.8
11.	**IMPORT OF GOODS (UVRUR)**	0.0012 (0,02)	+0.42*dlog(INV(-4)) (+2,89)	+0.95*dlog(POTD) (+2,35)	+0.452* dlog(UKRASr(-1)) (+1,82)		0.49	1.57	3.92
12.	**COST OF LIVING INDEX (ITZ)**	0.0108 (2,71)	+0.1371*dlog(IPC(-1)) (4,20)	+0.0374*dlog(POTD(-1)) (1,87)	+0.0492*dlog(GOT) (4,65)		0.74	2.18	14.1

13.	**PRODUCERS PRICES INDEX (IPC)**	0.0125 (1,06)	-0.0634*dlog(UVRU(-1)) (-1,77)	+0.0696*dlog(KUK(-3)) (+1,18)	+0.2345*dlog(REV(-3)) (+4,97)		0.72	1.71	10.9
14.	**MARKET CAPITALISATION (MC)**	-6.485 (1,58)	+0.6012* dlog(INV) (+3,02)	+1.467* dlog (INDP) (+1,65)			0.44	1.69	6.16
15.	**TURNOVER STOCK EXCHANGE (SETO)**	0.240 (1,33)	+0.7067* dlog (MC) (+2,29)	-1.0533* dlog(AKS(-1)) (-2,29)	+1.273*dlog(SOR(-2)) (+1,56)		0.55	2.04	5.21
16.	**BANK DEPOSITS (DUKR)**	0.00331 (0,16)	+ 0.0311*dlog(PKS(-2)) (+1,56)	+ 0.3599*dlog(DOHD(-1)) (+3,22)	+ 0.1989*dlog(IZVRU) (+3,28)		0.61	2.23	6.75
17.	**BANK CREDITS (KUKR)**	0.00272 (0,16)	- 0.0063*d(SOR(-1)) (-1,27)	+0.981*dlog(DUKr(-1)) (+2,94)	- 0.23*dlog(AKS(-1)) (-1,81)	-0.316*dlog(GOT) (-2,26)	0.51	2.66	3.37
18.	**CASH (GOT)**	-0.1399 (-2,13)	-0.561*dlog(AKS(-2)) (-4,50)	-0.01285*d(SOR) (-2,53)	+0.09*dlog(PRUS(-2)) (+2,02)	+6.332* dlog(ITZ(-1)) (+3,28)	0.78	2.13	10.4
19.	**TOTAL EMPLOYMENT**	**ZAPUK** = ZAPTRA + ZAPNT							
20.	**GDP**	**BDP** = POTD + INV + GOV							
21.	**GOVERNMENT EXPENDITURES**	**GOV** = UKPRIM + 0.03 * BDP							
22.	**BROAD MONEY**	**M** = GOT + DUK							
23.	**TRADE BALANCE**	**TRB** = IZVRU – UVRU							

V. INTERPRETATION OF ESTIMATED EQUATIONS IN THE MODEL

ACTIVITY

First two estimated equations are production functions in Cobb-Douglas form. Growth of activity (equation 1) which consists of 53% of GDP, is determined by growth of labor (coefficient 0.19) and savings representing net capital growth (coefficient 0.22) with the lag of 3 quarters. Both coefficients add up to 0.41, which indicated decreasing returns. Specific to Montenegro is negative impact of government receipts on activity (coefficient –0.26) which indicates existence of supply side effects in the economy. Significant constant indicates presence of technical progress and/or some other factors of production. determination is 64.5%, DW indicates no autocorrelation, F-statistics is 7.26 .

Industrial production (equation 2) counts for 20% of GDP. It is estimated in the form of Cobb Douglas production function introducing only factor capital (as Domar model), but with coefficient 0.20 only, while government receipts with the lag of 2 quarters again decrease growth of industrial production. Constant is not strongly significant. Determination is again 64.5%, DW 2.04 and F13.85 are satisfactory.

FACTORS OF PRODUCTION

Growth of investment (equation 3) depends negatively on active interest rate, positively on growth of industrial production and positively on growth of state capital investments. All variables are significant; determination is 61.7%, DW is 2.44 and F-statistic7.5. It is typical specification for investment function.

Growth of employment in tradable sector (equation 4) depends positively on growth of industrial production lagged by 3 quarters and negatively by growth of employment in non-tradable public sector. There is apparently substitution in employment in both sectors, not complementarity. Determination is 65.4%, DW is 1.75, F is12.5.

Total employment is defined as sum of employment in tradable and employment in non-tradable sector (equation 19).

HOUSEHOLD SECTOR

Growth of wages in tradable sector (equation 5) is under negative influence of the growth in tax burden on wages, positive but insignificant influence of lagged growth of activity negative (insignificant) influence of growth in employment (wages and employment as substitutive factors) and positive influence of capital expenditures of government (which are improperly used for wage financing). Determination of equation is 56.3%, DW is 2.13, F-statistics is 3.86.

Growth in household total income (equation 6) positively depends on employment in tradable sector, lagged industrial production and lagged wages in tradable sector. Determination of equation is 83.7%, DW is 3.42; F is 20.5.

Regarding consumption function, growth in household consumption (equation 7) depends on growth in household income (coefficient 0.71, which means 0.29 for growth in savings) and on growth in consumer loans (coefficient 0.07, meaning that most of the loans are not used for current consumption. Determination is 85.6%, DW is 2.16, F 47.8.

GOVERNMENT

Growth in state receipts (equation 8) is determined in selected equation positively by tax in the form of growth of effective custom rate lagged for 1 quarter and growth of effective tax rate lagged by 3 quarters (delay in collection of receipts). At the same time, export of services in the form of tourism lagged by 1 quarter also increases government receipts. Determination is 66.4%, DW is 2.40, F is 7.9.

Government expenditures (equation 21) are economic policy instrument by their structure and up to the amount which does not exceeds 0.03% of GDP of Montenegro. They are determined by definition. Namely, country tries to fulfill Maastricht's fiscal criteria in the quest for EU membership.

GDP is defined as a sum of 3 elements of final demand: investment, consumer expenditures and government expenditures (equation 20).

EXTERNAL SECTOR

Export equation: growth in export of goods (equation 9) is determined positively by activity lagged by 2 quarters and investment lagged by 4 quarters, and negatively by effective exchange rate of non-€/€. Increase in variable REV namely indicates appreciation of "domestic currency" which is Euro for Montenegro. Determination is relatively low 44.8%, DW is 2.12 and F is 3.3 .

Growth in export of service, which includes predominantly tourism as very important activity in Montenegro (equation 10) depends on factors of supply as quantity and quality of capacities are limiting factor, not demand for tourism in Montenegro. Determinants with positive impact are growth of activity lagged by 1 quarter, growth of investment lagged by 3 quarters and growth of bank loans lagged by 1 quarter. Determination R2 is 74.7%, DW is 2.32 and F is 12.8.

Import equation: growth in import of goods (equation 11) depends on growth of investment lagged by 4 quarters and government expenditures (induced import) and on growth of consumer expenditures (autonomous import). Determination is 49.5%, DW is 1.57 and F is 3.9 .

Trade balance is given in definition (equation 23).

PRICES

Growth in cost of living (equation 12) is determined positively by growth in producer prices lagged by 1 quarter, growth of consumer expenditures lagged by 1 quarter and growth of cash (Euros, obtained through external economic relations or based on secondary emission of money through banking system). Determination is 73.9%, DW is 2.16, F is 14.2.

Growth in producer prices (equation 13) is determined negatively by growth import of goods (increasing supply) and positively by the growth of bank loans and effective exchange rate non-€ / €. Growth of latter means appreciation of domestic currency. Determination is 71.7%, DW is 1.71, F is 11.0 .

STOCK EXCHANGE – CAPITAL MARKET

Growth of market capitalization (equation 14) depends positively on growth of investment and growth of industrial production with negative constant slightly significant in the equation. Determination is low: 36.4%, DW is 1.69, F statistic is 6.16.

Growth of turnover in stock exchange (equation 15) depends positively on market capitalization and rate of obligatory bank reserves lagged by 2 quarters, and negatively on active bank interest rate lagged by 1 quarter. Determination is 54.5%, DW is 2.03, F statistic is 5.2 .

BANKING SECTOR

Growth of bank deposits (equation 16) depends positively on passive bank interest rate lagged by 2 quarters, household income lagged by 1 quarter and export of goods as source of Euros. determination is 60.9%, DW is 2.23, F statistic is 6.7 .

Growth of bank credits (equation 17) depends negatively on rate of obligatory reserves, growth of active bank interest rate lagged by 1 quarter, growth of cash (more cash less deposits, smaller credit potential of banks) and positively on growth of deposits in banks lagged by 1 quarter (deposit base for credit expansion). Determination is 50.9%, DW is a little too high, namely 2.65, F-statistic is 3.37.

MONETARY SECTOR

Growth of cash in the economy (equation 18) is determined negatively by growth of active bank interest rate lagged by 2 quarters and growth of obligatory reserves (both decrease credit potential of banks which is one source of cash creation through secondary emission),. It is determined positively by export of services lagged by 2 quarters (external source of inflow of Euros) and growth in cost of living (increased money demand for transaction purposes). Determination is 77.6%, DW is 2.12, F is 10.4.

Broad money is defined as sum of cash and total bank deposits (equation 22).

VI. SIMULATION OF THE MODEL

Ex-post dynamic and deterministic simulation within observation period I/2000 – IV/2004 is made. Results are satisfactory, although better coverage of actual data with estimated series will be obtained by improvement of data quality as well as with extension of observation period with lapse of time.

Next, simulation results are presented in the form of graphs for each dependent variable in actual and model generated form.

Figure no.1: AKT1, INDP, INV, ZAPTRA

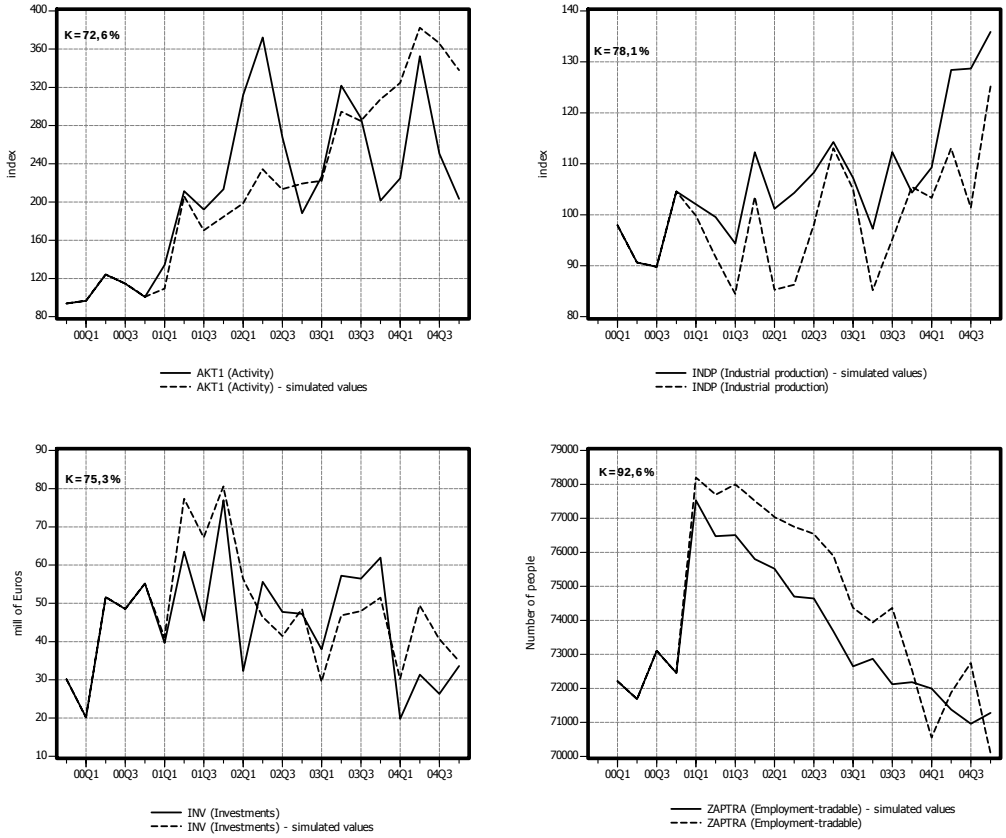


Figure no.2: ZARTRA, DOHD, POTD, UKPRIM

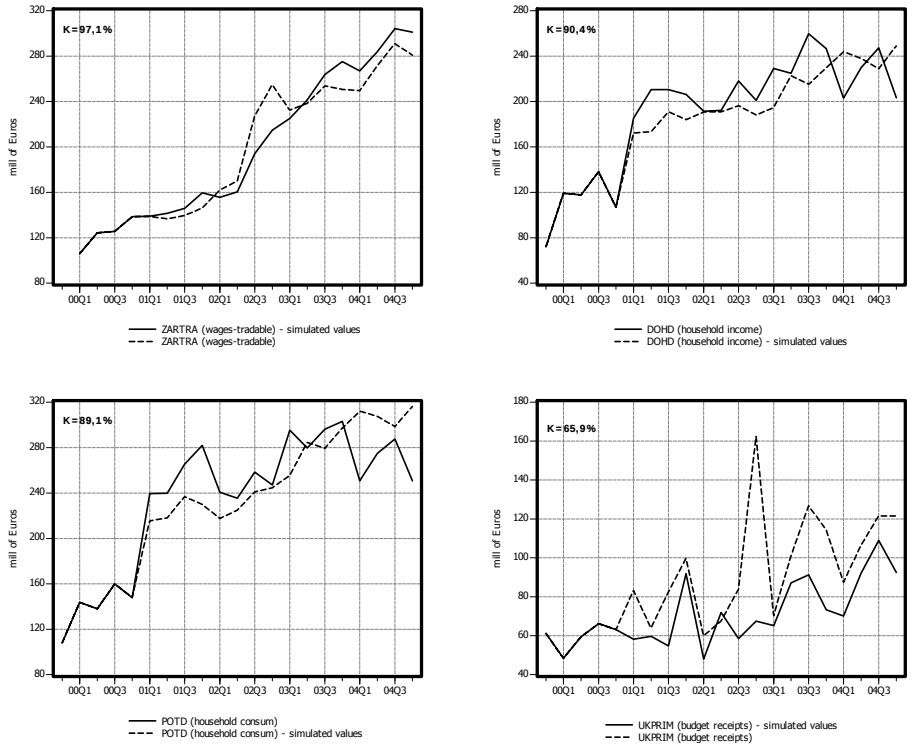


Figure no.3: IZVRU, PRUS, UVRU, ITZ

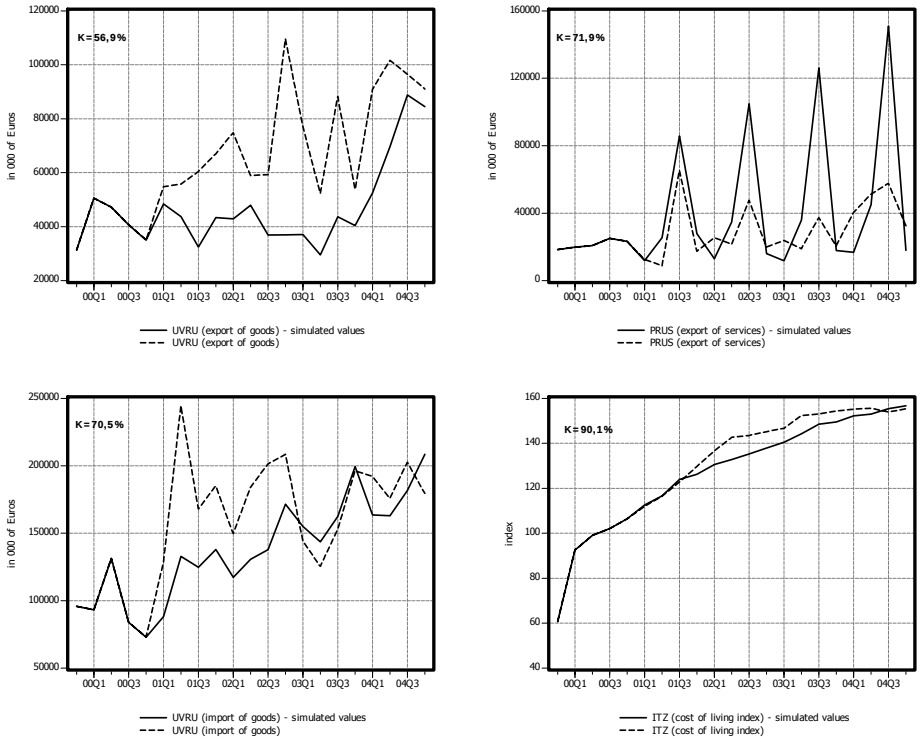


Figure no.4: IPC, MC, SETO, DUK

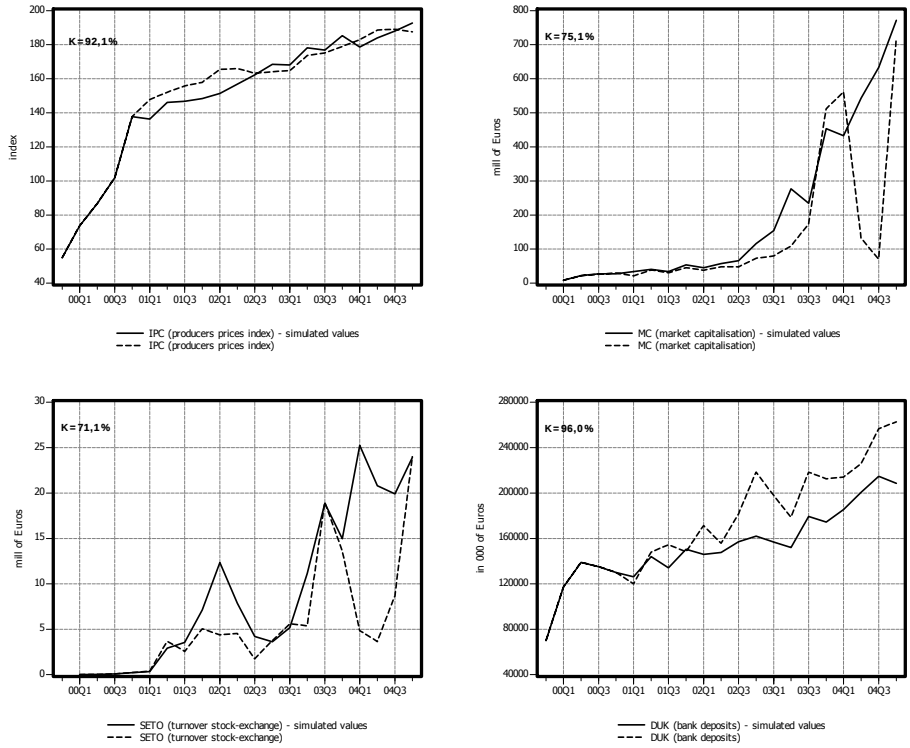
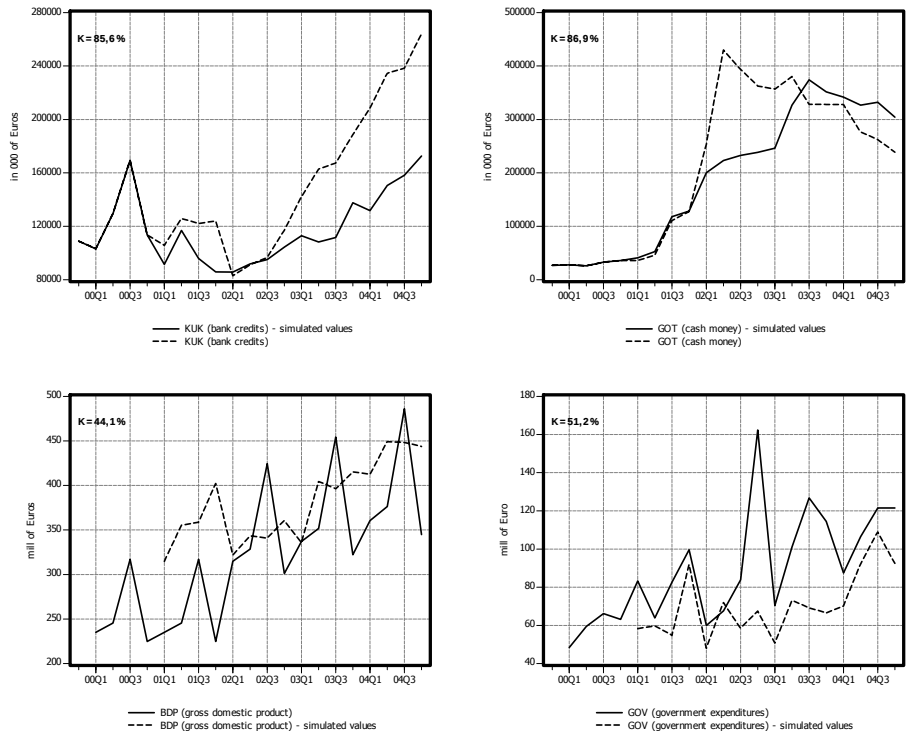


Figure no.5: KUK, GOT, BDP,



VII. IMPLICATION OF RESULTS – ILLUSTRATION FOR THE ROLE OF MONETARY SECTOR AND MONETARY POLICY IN MONTENEGRO

Monetary authorities require answer to specific policy questions. As illustration, some results of estimated model can be used to preduce answer to these questions:

1. What is the size of cash (Euros) circulating in Montenegro ? Answer: It is not possible to determine exact amount of cash in circulation. Estimations were made based on two sources of net inflow of currency: foreign trade and secondary emmission of money by banks.
2. Which is the appropriate policy value for rate of required reserves ? If the amount of cash is determined and planned growth of broad money given by monetary authorities (determined by 5% if GDP growth is planned at 5% for instance), than growth of bank deposits, as second element of broad money is given. According to the model, decrease of rate of required reserves by 1 percentage points increases bank credits by 0.24 percentage points and growth of deposits by 0.144 percentage points (empirical estimation of the share of bank credits which retun as deposits is 60%.
3. Which other instruments of monetary policy are available ? Besides qualitative instruments (selection of structure of loans by secotr, region etc.) there is only the rate of required reserves. In addition, in cooperation with the fiscus the uinterest rfate on Government securities can be determined as indicative discount rate (25% of these securities are according to present arrangement in use for banks' required reserves).
4. How should monetary authorities manage public (government) debt ? Repayment of foreign debt effects monetary policy. The way to neutralize its effect is: by refinancing old debt with new foreign loans, or selling of foreign debt with discount, or swap of foreign debt with domestic debt through emission of securities on domestic market to domestic economic subjects.

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