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## ECONOMETRIC MODELING OF FINAL DEMAND OF UZBEKISTAN

**Abstract:** In this article provides a review of applied macromodels for analyzing and forecasting demand, as well as its constituent segments of the CIS countries, as those closest to Uzbekistan in terms of development level and economic structure. At the same time, a methodology for constructing a macromodel of analysis has been developed and a formula for calculating the projected growth rate of final demand has been formulated. An econometric macromodel of final demand for goods and services has been constructed to analyze and forecast the macroeconomic equilibrium of the country. Also, econometric models of demand were tested for the statistical significance of indicators, assessed on statistical data from Uzbekistan, and an economic interpretation of the equations included in the macromodel of demand was given.

**Key words:** econometric modeling, macroeconomic equilibrium, demand for final goods and services, government expenditures, final consumption of households, expenditures of NPOSH, investments, net exports, assessment, economic interpretation, model testing.

**Language:** English

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### Introduction

The effectiveness of the state policy of ensuring macroeconomic balance is based on scientifically based research, including statistical modeling and forecasting for the adoption of administrative, legal, foreign policy and economic measures. In this regard, building macro models and forecasting demand and supply at any stage of economic development is of paramount importance for determining the level of macroeconomic balance and factors of sustainable development of the country.

It should be emphasized that in the conditions of globalization and instability of the world economy, in order to determine the level of balance of the national economy, it is necessary to develop new approaches to the construction of macro models of macroeconomic balance and to improve forecasting tools taking into account new external challenges and risks.

In addition, this requires the improvement of existing methodological recommendations for building macro models and the development of new alternative approaches to modeling and forecasting macroeconomic indicators

Without diminishing the practical significance of the other approaches, it should be noted that the improvement of modeling and forecasting of the macroeconomic balance of the country on the basis of macro proportions and indicators of the system of national accounts is relevant and becomes important due to the need to implement mathematical and econometric tools in the practical activities of national statistics, which is specified in the National strategies for the development of statistics of the Republic of Uzbekistan for 2020-2025 [16].

In this regard, this study built a macro model of final demand as the main macro indicator of macroeconomic balance, along with the country's final supply.

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**Analysis of literature.** The study of applied econometric models of demand analysis of the CIS countries, selected by us as the closest in terms of the level of development and structure of the economy, showed that there are few studies covered by the modeling of both demand and supply of goods and services at the same time.

Uzbek scientist S.V. Modeling the volume of supply and demand, Chepel included "indicators of industry output and investment (offer from domestic producers), as well as imports (offer from the world economy), and demand factors - income of the population and indicators of external demand (exports, GDP of Kazakhstan, money transfers from Russia to Uzbekistan)" [18].

Scientists from Belarus led by M.K. Kravtsov in the article "The econometric macro model for the analysis and forecasting of the most important indicators of the Belarusian economy modeled the volume of demand (gross domestic product) and presented how the factors influencing its final consumption of households and non-governmental organizations, state administration, gross accumulation and net export of goods and services" [8].

Russian science led by M.E. Mamonov. predicted as the resulting indicator the volume of the gross domestic product (demand), and as a result of the factors affecting it, state and private expenditures on the education system of all levels and each level (primary, secondary and higher education) separately (% of GDP), the number of teachers in the calculation on the number of pupils, students, coverage of the population by primary, secondary and higher education (% of the population), the average number of years of education of the population aged 25-64 and 15-64, the share of graduates of technical and mathematical specialties, as well as graduates of pedagogical and medical universities in the total number of graduates of the higher education system, demographic indicators (life expectancy at birth and at the age of 20, 40 years, the overall mortality rate, various indicators of "quality of education", "quality of the workforce", cost indicators of human capital and indices of human capital [13].

Applied econometric models of analysis and forecasting of demand and its constituent segments are presented in Table 2.

**Table 1. Applied econometric models of analysis and forecasting of demand and segments of its components**

Resulting indicator	Factor	Research
Volume of demand (Gross domestic product)	- final consumption of households and NKOODH; - final consumption of state administration; - gross accumulation; - net export of goods and services.	Kravtsov M.K., Burdyko N.M., Gaspadarets O.I., Shynkevich N.N., Kartun A.M. (2008), [8]
Volume of demand	- salary (minimum salary rates are real, i.e. excluding inflation); - export; - retail turnover; - GDP of Kazakhstan; - money transfers from Russia to Uzbekistan (real rates excluding inflation); - devaluation amount.	Chepel S.V. (2019), [18]
GDP volume	- state and private expenditures on the education system at all levels and each level (primary, secondary, and higher education) separately (% of GDP); - the number of teachers based on the number of students [42]. - coverage of the population by primary, secondary and higher education (% of the population); the average number of years of education of the population aged 25-64 and 15-64; - shares of graduates of technical and mathematical specialties, as well as graduates of pedagogical and medical universities in the total number of graduates of the higher education system; - demographic indicators (expected life expectancy at birth and at the age of 20, 40 years; - general mortality rate; etc.) - various indicators of "quality of education", "quality of labor force"; - cost indicators of human capital; - indices of human capital.	Mamonov M.E., Pestova A.A., Sabelnikova E.M., Apokin A.Yu. (2015), [13]
GDP volume	- final consumption expenses; - gross fixed capital formation; - changes in inventories of working capital.	Zenkova, L.P., Novikov M.M. Page 91. (2019), [6]
GDP growth rate	- expenses of the expanded budget; - expenditures of the expanded budget for national defense and security; - spending of the extended budget on social policy; - expenditures of the extended budget on the national economy; - expenditures of the extended budget on health care; - expenses of the expanded budget for education; - the price of Urals oil (\$/barrel on average per hour).	Balaev A.I. (2018), [1]

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GDP growth rate	- expenditures on national defense; - expenditures on national security and law enforcement activities; - expenses for education; - spending on health care and sports; - expenses for road infrastructure and transport.	Kudrin A., Knobel A. (2017), [10].
Economic growth	- state sector; - non-state sector.	U.A. Madrakhimov (2018), [12].
Final consumption of households and NKOODH	- monetary income of the population; - labor productivity; - tariff rate of the first category; - the average number of employed workers; - accumulation of savings in deposits, securities, balance of purchase and sale of foreign currency.	Kravtsov M.K., Burdyko N.M., Gaspadarets O.I., Shynkevich N.N., Kartun A.M. (2008), [8].
Household final consumption	- average per capita monetary income of the population (rub. / person); - average per capita monetary expenditure of the population (rub. / person); - average monthly nominal accrued wages of employees of organizations (rub.); - the average size of assigned pensions (rub.); - the specific weight of the household expenses for the payment of housing and communal services (%); - number of economically active population (number); - the number of enterprises and organizations (quantity); - the cost of a fixed set of consumer goods and services (rub.); - the total area of residential premises on average per 1 inhabitant m2.	Govryakova M.A. (2020) [4].
Consumer spending of households on food products on average per person (rubles) per hour	- the number of economically active population (thousands of people); - households with a personal computer and access to the Internet (as a percentage of the total number of households); - turnover of retail trade per capita (rubles); - average monthly nominal accrued salary (rubles); - volume of household services per capita (rubles); - volume of paid services per capita (rubles); - volume of housing and communal services per capita (rubles).	Maslyukova E.V., Pironko E.V. (2015), [14].
Final consumption of state administration	-tax revenue to the budget; - number of people employed in the public sector of the economy; -expenses of the consolidated budget; - tariff rate; - changes in prices for natural gas and crude oil imported from Russia for government final consumption.	Kravtsov M.K., Burdyko N.M., Gaspadarets O.I., Shynkevich N.N., Kartun A.M. (2008), [8].
The volume of state expenditures	- gross domestic product.	Kochikin I.V. (2019), [7].
Gross accumulation	GDP with lag (-1). To forecast the gross accumulation, it is proposed to use the model of the flexible accelerator of the investment process, the essence of which is the dependence of the gross accumulation on GDP with a lag (-1).	Kravtsov M.K., Burdyko N.M., Gaspadarets O.I., Shynkevich N.N., Kartun A.M. (2008), [8]
Investments	today's and tomorrow's consumption; - net profit (constant); - rate of dividend payments from profit; - net investments; - rate of return on investments (constant); - volume of attracted loans; - interest on loans.	Mytsek S.A., Mytsek E.B. (2009), [15].
Investments in fixed assets	- the logarithm of budget funds, at the expense of which investments are financed; - the logarithm of loans directed to investments in fixed assets, in constant prices of 2008; - profit of organizations in constant prices; - profit tax paid by organizations at constant prices; - the real interest rate on loans issued to non-financial organizations for a period of more than 1 year.	Bukina I.S., Manevich V.E. (2014), [3].
Volume of FDI	market size of the host country; - transport opportunities; - information infrastructure; - level of inflation; - level of education; - tariff rate; - cost of labor resources.	Chukavina K.V., Zhukov A.N., Reshetova Y.M. (2016), [19].
Investments in fixed capital, growth rate %	- the number of insurance organizations per 1,000 people; - insurance premiums per 1,000 rubles of household income, %; - specific weight of unprofitable organizations, %; - volume of deposits of legal entities per 100 rubles of household income, growth rate %; - amount of bank assets for 100 thousand человек, тем роста %; - financial result, growth rate %; X7 - population income, growth rate %.	Krapyvyna T. A. (2016), [9].
Growth rate of the physical volume of GRP	- the growth rate of the average annual number of people employed in the economy; - rate of growth of the physical volume (further — FD) of agricultural production;	Kukarskaya, L. I. (2013), [11].

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	- the rate of increase in the FD production of industrial production; - rate of growth of retail trade turnover; - rate of growth of FD of paid services of the population; - growth rate of FD investments in fixed capital.	
Pure export of goods and services	- export of goods; - import of goods; - changes in crude oil and natural gas import prices; - export of services; - import of services - monetary income of the population; - the nominal exchange rate of the Belarusian ruble against the US dollar; - ruble money supply (M2); - energy intensity of GDP; - level of prices; - real income; - indicator of profitability from various assets, alternative to cash.	Kravtsov M.K., Burdyko N.M., Gaspadarets O.I., Shynkevich N.N., Kartun A.M. (2008), [8].
Net exports of goods	- commercial freight turnover of transport (billion ton-km); - unemployment rate at the age of 15-72 years (%); - average producer prices for crude oil (rubles per ton); - average producer prices for coal (rubles per ton).	Shirmaeva S.Yu. (2021), [17].
Export value of goods	- the ratio of domestic and export prices; - gross output of export-oriented industries (sum of products of the fuel, metallurgical, chemical, forestry, woodworking and pulp and paper industries);	Emelyanov S.S. (2007), [5].
Volume of exports of goods and services	- logarithm of the volume of gross domestic product. - logarithm of the volume of cash expenditures of the population on final consumption. - logarithm of the volume of gross fixed capital formation. - logarithm of US Brent oil price. - logarithm of the real exchange rate.	Belova T.A. (2016), [2].
Cost of importing goods	- the ratio of domestic and import prices for consumer and investment goods;- - volume of gross domestic product (GDP) used.	Emelyanov S.S. (2007), [5].
Volume of imports of goods and services	- logarithm of the volume of gross domestic product; - logarithm of the volume of cash expenditures of the population on final consumption; - logarithm of the volume of gross fixed capital formation; - logarithm of the US Brent oil price; - logarithm of the real exchange rate.	Belova T.A. (2016), [2].

Source: compiled by the authors.

**Research methodology.** In the methodological aspect, building an econometric macro model for analyzing and forecasting the final demand of the country requires their development sequentially in the following order:

- modeling of individual segments (factors influencing it) of final demand;
- formation of an econometric model of final demand;
- evaluating models using statistical data from Uzbekistan.

The macro model of final demand will be based on the well-known SNA equation, according to which GDP (final demand) is calculated by the final use method.

Thus, the growth rate of final demand will be determined by adding the multiplied growth rate of factors and their shares in final demand, excluding the contribution of imports, and will take the following form of a mathematical formula:

$$AD\_gr(GDPd) = HCONS\_gr * Hcons\_d + GOV\_CONS\_gr * Gov\_cons\_d + INV\_grFC * Inv\_d + EXP\_gr * Exp\_d - IMP\_gr * Imp\_d \quad (1)$$

Where,  
 AD\_gr (GDPd) - growth rate of final demand;  
 HCONS\_gr - growth rate of household expenditures;  
 Hcons\_d is the share of household expenditures in GDP (calculated using the expenditure method);  
 GOV\_CONS\_gr - growth rate of government expenditures;  
 Gov\_cons\_d - share of government expenditures in GDP;  
 INV\_grFC - growth rate of investments in fixed assets;

Inv\_d - share of investment in fixed capital in GDP;  
 EXP\_gr - growth rate of exports of goods and services;  
 Exp\_d - share of exports of goods and services in GDP;  
 IMP\_gr - growth rate of imports of goods and services;  
 Imp\_d is the share of imports of goods and services in GDP.

**Results of simulation.** Based on theoretical and applied approaches, construction of an econometric

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model of final demand as factors of the growth rate of household expenditures (HCONS\_2) (gross output growth rate (OUTPUT), inflation growth rate (DEF\_GDP), growth rate of total income per capita (GREV\_PC), rate of change exchange rate of the national currency (USD per sum) (EXCH\_R), rate of change in the average refinancing rate of the Central Bank of Uzbekistan (INT\_R), growth rate of government expenditures (GOV\_CONS) (growth rate of gross output (OUTPUT), producer price index of industrial goods (PPI) ), inflation growth rate (DEF\_GDP), growth rate of exports of goods and services (EXP), gold price change rate (GOLD\_P), gas price change rate (NG\_P)), investment growth rate (INV\_grFC) (gross output growth rate ( OUTPUT), rate of change in the average refinancing rate of the Central Bank of Uzbekistan (INT\_R\*), inflation growth rate (GDP deflator) (DEF\_GDP), industrial producer price index (PPI)), growth rate of exports of goods and services (EXP), consumer price index (CPI) ), import of goods and services (IMP), rate of change in the national currency exchange rate (USD). US per sum) (EXCH\_R), rate of change in gold prices (GOLD\_P), rate of change in gas prices (NG\_P),

growth rate of Russian GDP (RUS\_GDP\_G), growth rate of China's GDP (CHN\_GDP\_G), growth rate of imports of goods and services (IMP) (gross output growth rate (OUTPUT), export growth rate (EXP), rate of change in the average refinancing rate of the Central Bank of Uzbekistan (INT\_R\*), inflation growth rate (GDP deflator) (DEF\_GDP), industrial producer price index (PPI)) were included several dozen indicators and optimal variants of models were identified in segments with a denser relationship with the resulting values.

When testing econometric models of demand, in particular, the model of the growth rate of household expenditures (Annex 1.), the growth rate of government expenditures (Annex 2.), the growth rate of investment (Annex 3.), the growth rate of exports of goods and services (Annex 4 .), the growth rate of imports of goods and services (Annex 5.) estimated on the statistical data of Uzbekistan had statistically significant indicators.

Econometric models of demand analyzed using statistical data from Uzbekistan and assessed as “satisfactory” are presented in Table 2.

**Table 2. A system of econometric demand models assessed using statistical data from Uzbekistan**

Econometric models	Variables indicators
<b>Household Expenditure Growth Rate</b>	
$\text{HCONS\_gr} = -0,392 + 1,307 * \text{OUTPUT} - 0,191 * \text{DEF\_GDP} + 0,236 * \text{GREV\_PC}$ <p style="text-align: center;">(0,0026)                      (0,000)</p>	HCONS_gr - growth rate of household expenditures; OUTPUT – growth rate of gross output; GREV_PC_2YL - growth rate of total income per capita, with a two-year lag; DEF_GDP – inflation growth rate (GDP deflator).
<b>Government Expenditure Growth Rate</b>	
$\text{GOV\_CONS\_gr} = (-0,252) + 0,723 * \text{OUTPUT} + 0,134 * \text{DEF\_GDP} + (-0,143) * \text{PPI} + 0,414 * \text{GDP\_PC\_gr\_2YM} + 0,104 * \text{SAV\_2YM}$ <p style="text-align: center;">(0,0690)                      (0,0057)</p> <p style="text-align: center;">(0,0224)                      (0,0964)                      (0,0737)</p>	GOV_CONS - growth rate of government expenditures; OUTPUT – growth rate of gross output; DEF_GDP – inflation growth rate (GDP deflator); PPI – producer price index for industrial goods; GDP_PC_gr_2YM - growth rate of GDP per capita, smoothing two annual values; SAV_2YM - GFCF growth rate, smoothing two annual values.
<b>Investment growth rate</b>	
$\text{INV\_grFC} = -1,148 + 2,144 * \text{IND\_VA\_gr} + 0,246 * \text{INT\_R} + 0,255 * \text{GREV\_PC\_2YL} - 0,509 * \text{EXP\_1YL}$ <p style="text-align: center;">(0,0001)                      (0,0016)</p> <p style="text-align: center;">(0,0044)                      (0,0001)</p>	INV_grFC - growth rate of investments in fixed assets; IND_VA_gr - growth rate of industry GVA; INT_R* - rate of change in the average refinancing rate of the Central Bank of Uzbekistan. EXP_1YL - export of goods and services, with a one-year lag; GREV_PC_2YL is the growth rate of total income per capita, with a two-year lag.
<b>Growth rate of exports of goods and services</b>	
$\text{EXP\_gr} = (-0,342) + 0,786 * \text{RUS\_GDP\_gr} + 0,489 * \text{IMP} + 0,274 * \text{DEF\_GDP} - 0,209 * \text{GREV\_PC}$ <p style="text-align: center;">(0,0083)                      (0,0002)</p> <p style="text-align: center;">(0,0001)                      (0,0049)</p>	EXP_gr - growth rate of exports of goods and services; RUS_GDP_gr - Russian GDP growth rate; IMP is the growth rate of imports of goods and services; DEF_GDP – GDP deflator growth rate; GREV_PC is the growth rate of total income per capita.
<b>Growth rate of imports of goods and services</b>	
$\text{IMP\_gr} = 0,074 + 0,586 * \text{EXP\_3YM} + 0,319 * \text{INT\_R\_3YM}$	IMP_gr - growth rate of imports of goods and services;



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(0,0001)	(0,0008)	EXP_3YM - export of goods and services, smoothing three annual values; PPI_1YL – producer price index for industrial goods, with a one-year lag; INT_R_3YM - rate of change in the average Central Bank refinancing rate, smoothing three annual values. CPL_3YM – consumer price index (CPI), smoothing three annual values.
+ 0,317*CPL_3YM - 0,230 * PPI_1YL (0,0179)	(0,0476)	
Source: compiled by the authors.		

The economic interpretation of the above equations included in the macro model of demand is as follows:

- The growth rate of household expenditure is largely determined by the gross volume of national output, the elasticity coefficient for the growth rate of gross output (OUTPUT) is 1.307. An increase in inflation (according to the GDP deflator) by 1% causes a decrease in final household consumption by 0.191%, and the growth rate of total per capita income (GREV\_PC) increases consumer spending by 0.236%.

- The growth rate of government expenditures (GOV\_CONS) is directly related to the growth of gross output, which in the model (in the equation) is reflected in the elasticity coefficient of the growth rate of gross output, which is equal to 0.723. An increase in producer prices of industrial goods (PPI) by 1% causes a decrease in the growth rate of government spending by 0.143%, and the growth rate of GDP per capita (GDP\_PC\_gr), gross fixed capital formation (SAV), GDP deflator (DEF\_GDP) by 1% increases government spending by 0.414, 0.104 and 0.134%, respectively.

- The growth rate of investment in fixed capital (INV\_grFC) is determined by the growth rate of industry GVA (IND\_VA\_gr), total income per capita (GREV\_PC) and the change in the average refinancing rate of the Central Bank of Uzbekistan (INT\_R\*), which is reflected in the elasticity coefficients in the equation equal to 2.144, 0.255 and 0.246 respectively. At the same time, a 1% increase in exports of goods and services causes a 0.509% decrease in the growth rate of investment in fixed capital (INV\_grFC), which is a very significant indicator.

- An increase of 1% in the growth rate of Russia's GDP (RUS\_GDP\_gr) and import of goods and services (IMP) as exogenous values, the growth rate of the GDP deflator as an endogenous factor, leads to an increase in exports of goods and services (EXP) by 0.786%, 0.489% and 0.274 % respectively. At the

same time, a 1% increase in total per capita income (GREV\_PC) will lead to a 0.209% decrease in the growth rate of exports of goods and services (EXP\_gr).

- The growth rate of exports of goods and services (EXP), the rate of change in the average refinancing rate of the Central Bank of Uzbekistan (INT\_R\_), the rate of change in the consumer price index (CPI) by 1% leads to an increase in imports of goods and services by 0.586%, 0.319% and 0.317% , respectively, and a 1% increase in the industrial goods producer price index (PPI) leads to its decrease by 0.230%.

**Conclusion.** Summarizing the results of the above research, it is necessary to note the following conclusions.

First, the regression statistical characteristic (expressed in terms of multiple R, R - square, normalized R - square, SER - standard error of regression, F - statistics, p - value of F - statistics and others) of econometric models of household expenditures and public administration , investments, exports and imports of goods and services assessed on statistical data of Uzbekistan from 1995 to 2022, indicate the statistical significance of model indicators, which allow us to confidently say that they can be used to predict the values of the country's macroeconomic equilibrium.

Secondly, modeling the growth rate of household and government expenditures, investments, exports and imports of goods and services is based on a study of theoretical and applied indicators, covering the largest amount of metadata generated in national statistics, by expanding the range of indicators of the regression equation through the prism of logical thinking about the influence of segments on the economic process indicates the scientific validity of the structure of the econometric model of final demand, which allows its use in an analytical study of the dynamics of development of demand factors and drawing up programs for the socio-economic development of the Republic of Uzbekistan.

### Annex 1. Regression statistical characteristics of the econometric model of household expenditures

#### CONCLUSION OF RESULTS

##### Regression statistics

Multiple R	0,894
R-squared	0,800

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	<b>GIF (Australia) = 0.564</b>	<b>ESJI (KZ) = 8.771</b>	<b>IBI (India) = 4.260</b>
	<b>JIF = 1.500</b>	<b>SJIF (Morocco) = 7.184</b>	<b>OAJI (USA) = 0.350</b>

Normalized R-squared	0,774
Standard error	0,034
Observations	27

**Analysis of variance**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance F	
Regression	3	0,108	0,036	30,687	0,000	
Balance	23	0,027	0,001			
Total	26	0,135				

  

	Coefficients	Standard Error	t-statistic	P-Value	Lower 95%	Upper 95%
Y-HCONS	-0,392	0,429	-0,914	0,370	-1,279	0,495
X 1-OUTPUT	1,307	0,388	3,370	0,003	0,505	2,109
X 2-DEF_GDP	- 0,191	0,028	-6,723	0,000	-0,249	-0,132
X 3-GREV_PC	0,236	0,044	5,369	0,000	0,145	0,327

**Annex 2. Regression statistical characteristics of the econometric model of government expenditures**

**CONCLUSION OF RESULTS**

**Regression statistics**

Multiple R	0,789
R-squared	0,623
Normalized R-squared	0,538
Standard error	0,027
Observations	28

**Analysis of variance**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance F	
Regression	5	0,027	0,005	7,277	0,000	
Balance	22	0,016	0,001			
Total	27	0,043				

  

	Coefficients	Standard Error	t-statistic	P-Value	Lower 95%	Upper 95%
Y-GOV_CONS	-0,252	0,356	-0,709	0,486	-0,990	0,486
X 1-OUTPUT	0,723	0,378	1,912	0,069	-0,061	1,507
X 2-DEF_GDP	0,134	0,044	3,063	0,006	0,043	0,224
X 3-PPI	-0,143	0,058	-2,456	0,022	-0,264	-0,022
X 4-GDP PC_gr_2YM	0,414	0,238	1,737	0,096	-0,080	0,908
X 5-SAV_2YM	0,104	0,055	1,878	0,074	-0,011	0,218

**Annex 3. Regression statistical characteristics of the econometric investment model**

**CONCLUSION OF RESULTS**

**Regression statistics**

Multiple R	0,880
R-squared	0,775
Normalized R-squared	0,732
Standard error	0,057
Observations	26

**Analysis of variance**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance F	
Regression	4	0,231	0,058	18,042	0,000	
Balance	21	0,067	0,003			
Total	25	0,299				

  

	Coefficients	Standard Error	t-statistic	P-Value	Lower 95%	Upper 95%
Y-INV_grFC	-1,148	0,571	-2,010	0,057	-2,335	0,040

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	<b>JIF = 1.500</b>	<b>SJIF (Morocco) = 7.184</b>	<b>OAJI (USA) = 0.350</b>

X 1 - IND_Vagr	2,144	0,446	4,808	0,000	1,217	3,071
X 2 - INT_R	0,246	0,068	3,617	0,002	0,104	0,387
X 2 - GREV_PC_2YL	0,255	0,080	3,186	0,004	0,088	0,421
X 4 - EXP_1YL	-0,509	0,112	-4,545	0,000	-0,742	-0,276

#### Annex 4. Regression statistical characteristics of the econometric model of exports of goods and services

##### CONCLUSION OF RESULTS

###### Regression statistics

Multiple R	0,902
R-squared	0,813
Normalized R-squared	0,777
Standard error	0,038
Observations	26

###### Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance F	
Regression	4	0,130	0,032	22,839	0,000	
Balance	21	0,030	0,001			
Total	25	0,160				

  

	Coefficients	Standard Error	t-statistic	P-Value	Lower 95%	Upper 95%
Y-EXP_3YM	-0,342	0,272	-1,256	0,223	-0,907	0,224
X 1-RUS_GDP_3YM	0,786	0,270	2,915	0,008	0,225	1,346
X 2-IMP_3YM	0,489	0,107	4,580	0,000	0,267	0,711
X 3-DEF_GDP_3YM	0,274	0,055	4,952	0,000	0,159	0,390
X 4-GREV_PC	-0,209	0,066	-3,146	0,005	-0,347	-0,071

#### Annex 5. Regression statistical characteristics of the econometric model of import of goods and services

##### CONCLUSION OF RESULTS

###### Regression statistics

Multiple R	0,866
R-squared	0,751
Normalized R-squared	0,705
Standard error	0,044
Observations	27

###### Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance F	
Regression	4	0,127	0,032	16,568	0,000	
Balance	22	0,042	0,002			
Total	26	0,170				

  

	Coefficients	Standard Error	t-statistic	P-Value	Lower 95%	Upper 95%
Y-Imp_3YM	0,074	0,159	0,465	0,646	-0,256	0,404
X1_PPI_1YL	-0,230	0,110	-2,098	0,048	-0,458	-0,003
X2_EXP_3YM	0,586	0,123	4,776	0,000	0,332	0,841
X3_INT_R_3YM	0,319	0,082	3,906	0,001	0,149	0,488
X4_CPI_3YM	0,317	0,124	2,559	0,018	0,060	0,573



## Impact Factor:

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