

Economic Development Models in Azerbaijan

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Introduction

The principle of Permanent Oil Incomes is reflected in the “strategy of long-term use of oil incomes” adopted by President Ilham Aliyev of the Azerbaijan Republic in 2004. Nevertheless, the socioeconomic modeling based on this principle has not been designed yet. It still remains an issue to rationalize the proportion of oil-gas incomes estimated at 400 billion US dollars for consumption and saving purposes across years. What emerges as a result is that supply and demand do not balance each other. Along with the stable economic development and macro-level stability, there still exists “Twin deficits” problem in Azerbaijan. On the one hand, non-oil foreign trade deficit has been swelling, which means that certain portion of oil incomes are indirectly spent on covering the deficit of non-oil foreign trade deficit and financing foreign goods and services. In its turn, it slows down the competitiveness potential of the domestic economy.

Another major deficit is the share of non-oil sector budget deficit in the non-oil sector and consequently the “effect of spending unearned money” occurs. The non-oil sector that can not satisfy its own needs is financed at the cost of oil and gas incomes and thereby brings about unilateral development of the economy, exacerbates inflation, appreciates national currency and threatens the sustainability of economic development. There is a need to prepare a policy paper that addresses these issues in the current condition of global economic crisis.

There are a number of methodological approaches designed as to how to use this natural resource in oil-producing countries. Oil states that choose the path of the real incomes approach (“bird-in-hand”) convert the incomes from the sale of natural resources in financial assets and only spend the interests that emanate from these financial assets. In doing so, the government spends permanent interests that come out based on a par-

ticular criterion. Having a restrictive nature, this track ensures that oil incomes are kept for the use by future generations. Norway uses only 4 per cent of interests from the oil assets.

Some countries spend a certain percentage of all state assets (net financial assets plus oil wealth). Under such a condition, states with a bigger size of overall assets compared to the financial assets may have an increasing non-oil deficit.

A third approach from the perspective of oil income spending is that the government does not impose any restriction on the use of oil incomes. The risk with such an approach is that the state budget becomes dependant on the oil production and price level. Unlike the other approaches, in this case the level of net assets possessed by the state (which is the precondition for macroeconomic stability) is not considered. This is typical of states which have no access to additional financial sources or lack oil resources.

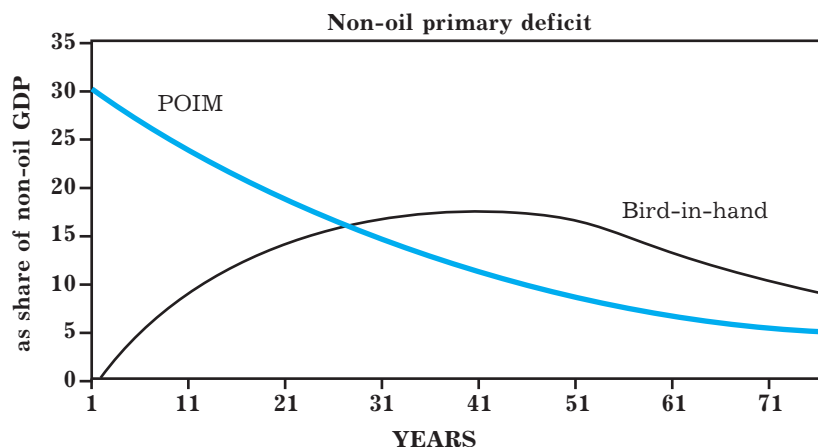
The most prominent approach in currently oil-rich states is the “permanent oil income model (POIM)”, which is based on the unchangeable income theory established by Fridman (1957):

$$G = rW$$

G – Government expenses, r – income-generating level of financial assets (financial assets may also be reviewed in the context of GDP and population growth), W – net oil wealth volume.

For the current and future generations to have the same social welfare indicators, the government regulates the use of net assets (oil wealth plus net pure financial assets. In the mid-term this model builds on the sustainability benchmark to run a fiscal policy. Such a policy has been a sustainable path for the non-oil primary deficit and is important from the perspective of judging the fiscal policy through sustainability benchmark and creating alternative simulation. The figure below shows that “Permanent income principle” is accompanied by a much larger non-oil deficit in the short and mid term, whereas the deficit declines over the long term.

Figure 1. Relationship between non-oil deficit and “unchangeable income principle”



Source: IMF Working Paper: A Primer on Fiscal Analysis in Oil-Producing Countries, Paulo Medas and Daria Zakharova

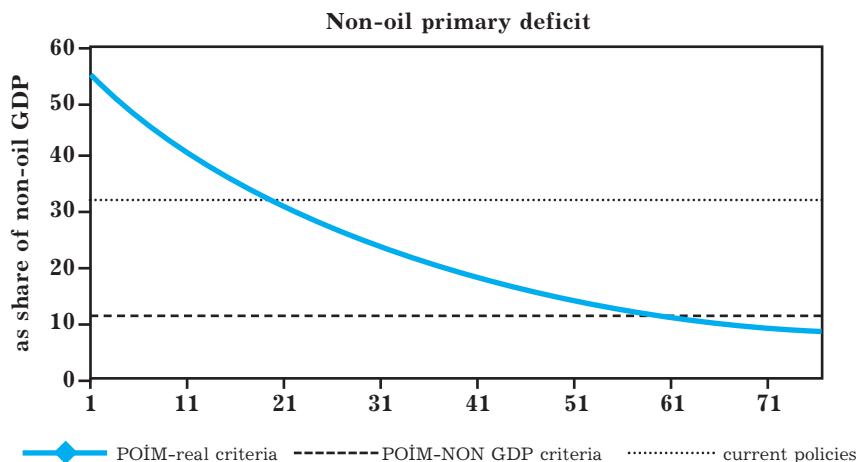
The identification of sustainability benchmark on the basis of unchangeable oil income entails the consideration of specificities of individual countries. The mid-term benchmark may define the fiscal framework, meanwhile social welfare indicators and relevant expectations in this regard should be taken into account. Below are the major considerations taken on board while distributing the overall assets across generations:

- Benchmark taken in a certain portion of non-oil sector – here the sum of government expenditures should equal to the profitability of all assets including the development of non-oil sector. This is to ensure that that non-oil deficit will remain stable; nevertheless it enables richer future generation to generate more income from oil wealth (because the non-oil sector itself is developing).
- Sustainable distribution of oil income in real use. The core aim is to keep stable the purchasing power of the wealth

(actual government spending and deflator included) distributed into each year. Even with the consideration of non-oil sector development, this approach shows that the government expenditures will remain stable in relation to the non-oil sector and hence expenditures at the cost of annual oil income will drop from year to year.

Another alternative builds upon the combination of these two embracing the population growth too, which is introduced as an acceptable option in the current policy paper. In any case, would-be economic shocks require the reconsideration of stable costs. The most important issue is that oil income should be directed toward the development of human capital and infrastructure and thereby underpin fast-growing non-oil sector.

Figure 2. Scenarios of Fiscal indicators



Source: IMF Working Paper: A Primer on Fiscal Analysis in Oil-Producing Countries, Paulo Medas and Daria Zakharova

There are three essential conditions that must be satisfied so as to efficiently use the oil-gas income in Azerbaijan:

- 1. The ratio of consumption and saving (including investments) of oil-gas incomes should be set by years according to the Permanent income principle;*
- 2. Priority domains of economy must be identified to rationalize the structure of oil-gas income spending and increase its effectiveness.*
- 3. Management and transparency must be assured for the saving side of oil-gas incomes.*

Macroeconomic equilibrium model

It is necessary to assess the balance of goods and money markets on the macroeconomic ground while the long-term oil income strategy is identified in Azerbaijan. We have constructed IS-LM model for the balanced relationship of goods and money markets. IS-LM (Investment saving, liquidity and money supply) is such a balancing tool that reveals economic factors defining the functions of the aggregate demand. The model has two axes. The horizontal axis labeled Y represents GDP while the vertical axis labeled R represents the nominal interest rate. The model yields a unique combination of interest rates and real GDP so that it leads to equilibrium in product markets and money markets. The initial IS is equilibrium in goods market; the lower the interest rate, the higher GDP is. GDP grows as a result of enhanced government expenditures or lowered taxes. The initial LM is equilibrium in money markets; the more GDP grows, the higher the interest rate will be. GDP grows as a consequence of greater money supply or declining prices. The equilibrium point happens at the intersection of IS and LM curves.

Table 1. GDP growth scenarios through the simulation of government expenditures based on IS-LM model in Azerbaijan

	GDP in market prices (AZN million)	
	2009	2010
Scenario I (less government expenditures by 1,3 billion AZN)	42 304	43 132
Official forecast	43 635	44 847

Source: prepared as a model by the author on E-views using the macroeconomic forecasts released by the Ministry of Economic Development in 2007.

IS-LM (Investment-Saving and Liquidity preference of Money Supply) equilibrium model has been worked out by

means of E-views to assess the macroeconomic equilibrium for Azerbaijan. This model presents personal consumption, investment, interest rate and GDP as exogenous factors from 1995 to 2007. The following equations came out of the modeling:

Personal consumption

$$CN = 1072.4 + 0.2*Y + 0.6*CN(-1)$$

Investment

$$I = -6525 - 0.12*(Y(-1)-Y(-2)) + 0.28*Y + 468.62*R(-4)$$

Interest rate

$$R = 7.72 - 0.0007*Y - 0.00015*(Y-Y(-1)) + 0.007*(M-M(-1))+ \\ + 0.31*(R(-1)+R(-2))$$

Here *CN* is personal consumption, *Y* - GDP, *I* - investment, *R* - interest rate, *M* – money supply.

The importance of model is that it enables to identify the strategic view and tendencies with regard to adjusting government spending and money supply (fiscal and monetary respectively) in the event of global economic crisis. For instance, through the model, it is possible to see that government spending cannot be sharply reduced since it may in its turn result in the declining GDP. The model demonstrates that not only the government spending, but also the reduced money supply may slow down the economic growth. Hence, stimulating aggregate demand, supporting economic initiatives and protecting domestic market should be priorities of the state macroeconomic strategy over the coming few years.

It is necessary to apply econometric models to evaluate the efficiency of investments in the spending of oil income, find correlation between capital investments and economic growths and more importantly, to assess the equilibrium point of economy. For the supply/demand model of the capital, it is also important to explore the mutual influence of parameters involved in it and identify mutual dependence of many other relevant factors.

National currency balance and stability of prices in the context of intersectoral balance

From the standpoint of “Dutch disease”, one of the major macroeconomic factors to be considered upon the use of oil incomes is the real exchange rate of manat. The fact that as of 2005 the real exchange rate of manat has been on the rise and manat is appreciating in relation to national currencies of countries, especially Ukraine, Russia, Kazakhstan and Georgia where our country exports non-oil products remains as a concern. Given the likelihood that increasing real exchange rate of manat will adversely affect the international competitiveness of non-oil products in the mid term, it is required that measures be taken to raise the profitability in non-oil sector. Yet, above all, an equilibrium point should be found for the real exchange rate of manat. For such a point, economic growth potential should be exploited to the maximum, inflation should be brought below the targeted level and equilibrium be achieved in the current operations balance.

Balassa-Samuelson method and calculations through the purchasing power parity and cointegration method demonstrate that the real exchange rate index of manat is below the equilibrium price. The 2008 IMF report on Azerbaijan also reports that the real exchange rate index of manat is 15 per cent below the equilibrium. The computations show that one US dollar should be equal to 0.70 manat in the case of equilibrium, but it is 0.81 manat at the moment. The fact that manat has nominal value which is cheaper than the equilibrium price shows that but for the National Bank intervention before the crisis, the national currency would have appreciated by 15 per cent, while on the other hand if the mechanical depreciation of manat took place, national currency the difference between equilibrium price and

its nominal value would enlarge, which may bring about economic ruins. Nevertheless, appreciating real exchange rate index of manat will negatively affect the country economy, in particular the competitiveness of non-oil sector. Synergy of monetary with fiscal policy should be of expansion nature. There is no need to impose a restriction on the money supply in the circulation and government spending. Even in the event of such restrictions, they should be compensated by increasing the efficiency of spending.

Along with Manat being a commodity currency, it has also been appreciating over the recent years as in line with the level of incoming oil revenues of Azerbaijan. The flow of capital and the regulation of manat through the National Bank intervention should be related with the trade balance of Azerbaijan. Meanwhile, trade balance functionally depends on the real exchange rate index of manat and oil prices. Econometric studies reveal that oil prices need to go up by 5-6 per cent annually to maintain stability of trade balance and real exchange rate of manat. The dependence of real exchange rate on oil prices brings about an interesting picture, namely when oil gets expensive, the real exchange rate of manat immediately goes up whereas when it gets cheap, the devaluation of manat does not occur with the same pace.

To minimize the impact of global financial crisis starting from 2008 on the economy of Azerbaijan, especially real sector, it is required to design a mechanism to bring a certain part of State Oil Fund funds into Azerbaijan and use them properly.

The granting of “oil funds” to banks calls for the development of bonds market in Azerbaijan. The emission of bonds with favorable conditions can regulate increasing money supply in circulation and finance the expected deficit in the 2009 year state budget. More importantly, it can help to develop financial market

in Azerbaijan (for instance, banks can be demanded to hold state bonds in the amount of 5 per cent of their reserves. 25 per cent of French banks' reserves are state bonds.). In this case, in order to beat the potential inflation threat, state-regulated prices need to be brought down. Calculations based on Intersectoral balance model demonstrate that reduced state-regulated prices by 25 per cent can control inflation rate down by 2 per cent.

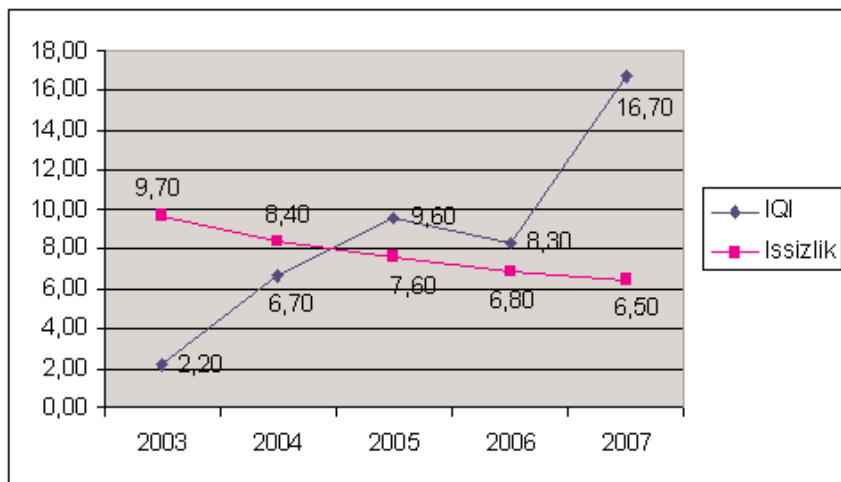
The decline in inflation rate and anticipated one-digit inflation rate in April-May of 2009 should be evaluated from the perspective of non-oil sector. The deflation process evident as of late 2008 affects economic parameters such as economic activity, employment and incomes in non-oil sector. "New Keynesian-Philippe's" model has been constructed on the basis of data from 2000 to 2007 to exhibit the relationship between inflation and employment. The model assumes that inflation is a function of expected future inflation and one lag back unemployment rate. The model was constructed on E-views package and used generalized Method of Moments finally producing the following output:

$$INF = 16.9 + 0.5*INF(1) - 1.6*UNRATE(-1)$$

Here, *INF* is inflation, *UNRATE* is unemployment.

As is seen in the model, 1.6 per cent declined unemployment in 2000-2007 increased inflation by 0.5 per cent, which indicates that declining inflation pace may negatively influence employment and economic activity. We are of the view that in this case it should include state investments and subsidy measures in the agrarian field and application of guarantee prices. This way, additional product of villagers at the cost of state support can find its own way into market and therefore wide reproduction may take place in agriculture.

Figure 3. Inflation and unemployment patterns in Azerbaijan (by percent)



Source: designed by the author on the basis of data of State Statistical Committee.

The state should choose the policy of bringing down state-regulated prices to minimize the impact of 2008 global economic crisis and reinforce the competitiveness of agrarian and industrial products by lowering their cost. Below are the three matrices that have been built at the end of studies on intersectoral balance designed by the State Statistical Committee for 2006:

- Direct material cost matrix;
- Full material cost matrix;
- Indirect costs matrix

The calculations on the basis of these matrices show that if state regulated prices – oil products, electricity, gas, water and utility tariffs – were cut down by 25 per cent, the overall inflation rate would go down by 2 per cent. The argument about the possibility of reduced state revenue from the fiscal perspective seems unjustified. That is, the enhancement of the competitiveness of national economy ultimately results in en-

largement of tax base, which paves the way for the increase in state revenues over the future perspective. Laffer curve entails an increase in state revenues at the cost of lower tax rates and enhancement of tax base. This way, it is possible that agrarian and industrial products will be more competitive in relation to their foreign prototypes. As of late 2008, the national currencies of Russia, Ukraine and Kazakhstan devaluated faster than that of Azerbaijan and along with the devaluation, the price falls in energy carriers of our trade partners which import oil products weakens the competitiveness of domestic goods and services in the country.

Sustainable and balanced development of non-oil sector

The non-oil sector of Azerbaijan consists of tradeables (essentially agriculture, non-oil industry etc.) and non-tradeables (communication, tourism, transportation, social infrastructure etc.). The non-oil sector basically develops thanks to non-tradeable section. Patently, the development of non-tradeable section results mainly from oil incomes. Hence, this section cannot be self-financing in the post-oil period. The sustainable development efforts should therefore focus on the non-tradeable sector. The thing is that the growth of labor productivity lags behind the increase in per capita income, which means a drop in economic efficiency and finally invisible compensation of the deficit in the non-tradeable sector at the cost of oil incomes.

According to our computations, one percent growth in agriculture, the main segment of non-oil sector, increases agrarian GDP by 0.22 per cent and one per cent growth in labor increases 0.78 per cent in agrarian GDP by 0.78 per cent:

$$Y = -2,23 K^{0,22} \cdot L^{0,78}$$

Here α and β are the elasticity coefficients of K and L respectively, whereas a is the constant.

That a , the constant, equals to -2,23 shows that, the application of technological innovation in agriculture is not at the desirable level and if the capital and labor remain stable in the agrarian sector, the production rate will shrink. Econometric analyses demonstrate that the state should consider the efficiency as a more important factor upon regulating agrarian market relations.

Preservation of agrarian market in the country and food problem are two sides of the same coin and remain as the tra-

ditional concerns both for developed and developing countries. Growing production opportunities for the domestic agriculture do not presently satisfy people's demand for food. As a result of it, currency expenditures are expanding for importing food from year to year. For instance, food products in the total amount of 310.1 million US dollars were imported to the country in 2003, whereas this figure has enlarged thrice as much up to 907.4 million US dollars in 2007. For the period of 2003-2007, a total amount of 2 billion 628 million US dollars were spent on imported food products, which is 6.4 times bigger than the investments in the total amount of 412.4 million US dollars into agrarian field for the same period. The increasing demand as a result of growing incomes of people has reinforced the import of food into the country. Even in 2007 the import of food increased a lot more than previous years. For the period of 2003-2007 years the dependence of food import on people's income growth rate was calculated in the form of regression through R^2 :

$$PI = 0,57 \cdot AG - 97,7$$

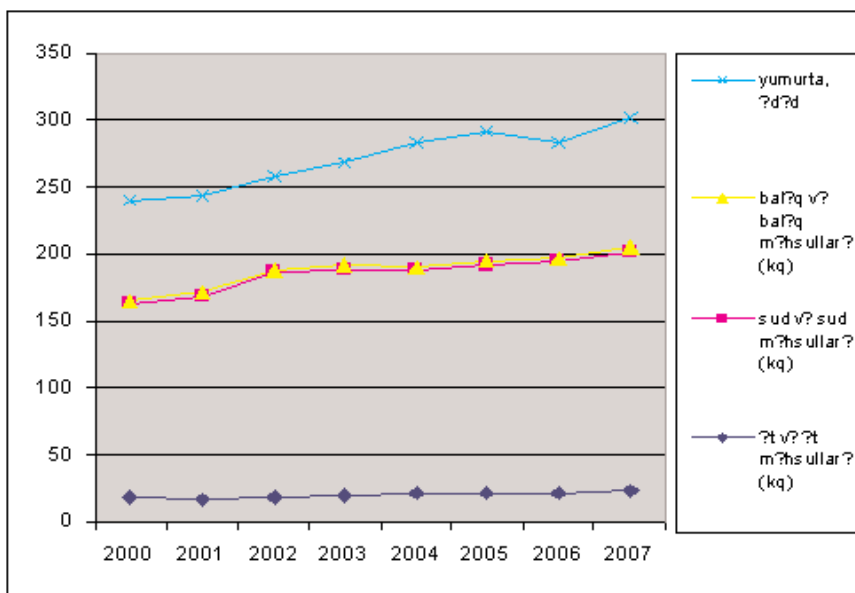
$$R^2=0,97 \quad DW=2,3$$

Here PI is food import and AG is per capital income.

As is seen from the equation the food import increases by 0.57 units as a result of each additional unit in people's incomes. The state should bear this nuance in mind and invest more into the development of agrarian and industrial complex so that currency spending on food import will stay in the country.

The state policy on food security should, on the one hand, supply food to the people within scientifically justified norms while, on the other hand, it should preserve the food consumption level in accordance with medical norms. So the state should regulate the best possible amount and rational structure of both food supply and demand. In doing so, the amount of potential physical food that people need should be identified a priori in order to eventually accomplish food security.

Figure 4. Consumption of major foodstuff



Source: designed by the author on the basis of data from the State Statistical Committee.

The econometric calculations for 2000-2007 show that one-manat increase in people's incomes decreased household food expenditures by 0.7 per cent. So the state can enhance demand for food by somehow regulating incomes and their redistribution. It can be proved through our *IS-LM* model based estimation of the impact of lesser individual consumption on the economic growth. The current income increase indicates that such a regulation effort will be effective

Equilibrium - in the context of foreign economic relations

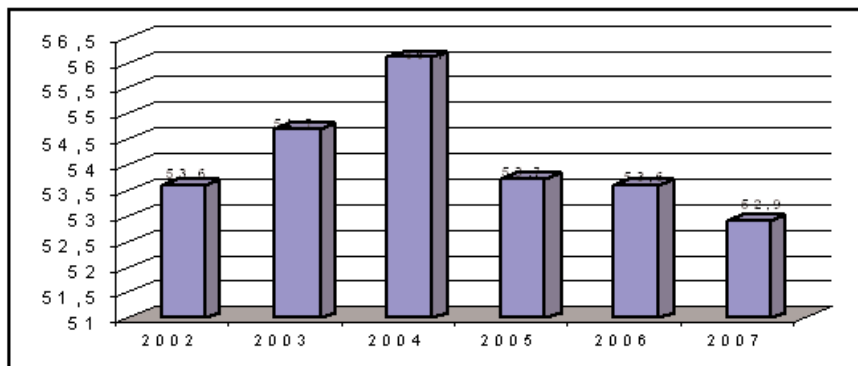
Since the economy is open, the state should regulate the import-export along with the stimulation of aggregate demand. This is our proposal that upon such a regulation effort, foreign trade condition, real exchange rate, optimal geography of foreign trade and currency structure should be the major considerations.

The foreign trade condition (terms of trade) of a good or the pure barter is calculated as follows:

$$FTC = P^{EX}/P^{IM}$$

Here, FTC is foreign trade condition, P^{EX} is the value of exported goods, and P^{IM} is the value of the imported goods.

Figure 5. Special share of food in the total consumption expenditures of people for 2002-2007 years, by percent



Source: plotted by the author on the basis of data from the State Statistical Committee

The foreign trade condition reflects the amount of export of the same-name goods. Table 3 outlines foreign trade conditions for the same goods exported from and imported into Azerbaijan and the real exchange rate of manat by imported goods. The foreign trade condition for the goods exported from and imported into Azerbaijan and real exchange rate of manat vis-a-vis various goods are not reflected for the same goods.

Table 3 shows that as compared to 2003, the foreign trade condition index for wheat increased by 67.5% in 2007. This increase is due to an increase in the price of exported wheat from Azerbaijan in comparison with that of imported wheat. Nevertheless, as compared to 2004, the foreign trade condition for the wheat worsened in 2005, namely while 0.96 ton of wheat was imported into Azerbaijan versus one ton of wheat exported from Azerbaijan in 2004, this figure was 0.62 ton in 2005. Yet, the foreign trade condition index for tea and fresh vegetables have been growing up steadily.

The foreign trade condition index for potatoes fluctuated during 2003-2007 years.

The real exchange rate of manat is negatively correlated with the foreign trade condition:

$$RMM=(1/FTC)\cdot NM$$

Here *RMM* is the real exchange rate of manat and *NM* is the nominal exchange rate..

As the foreign trade conditions of most of agricultural products improve, the real exchange rate of manat expressed in US dollars will rise. For instance, the real exchange rate of dollar in relation to manat was 1.064 manat in 2003 and 0.507 in 2007 as a result of export-import of tea. So the real exchange rate of dollar in relation to manat went down by 47.6% (for tea).

As is seen from Table 3 the real exchange rate of US dollar in relation to manat for all products has decreased. The end re-

Table 3. Foreign trade conditions (terms of trade) of the same goods exported from other countries and imported into Azerbaijan

Goods	YEARS				
	2003	2004	2005	2006	2007
Wheat flour (US thousand dollars/ton)					
Export price	8 ^{0,16}	0,284	0,208	0,235	0,430
Import price	1 ^{0,23}	0,295	0,338	0,273	0,353
Foreign Trade Condition	7 ^{0,72}	0,963	0,615	0,861	1,218
Nominal rate (AZN/US Dollars)	4 ^{0,98}	0,980	0,918	0,871	0,845
Real exchange rate	3 ^{1,35}	1,018	1,492	1,012	0,694
Tea (US thousand dollars/ton)					
Export price	4 ^{2,12}	2,753	2,704	2,802	3,072
Import price	7 ^{2,29}	1,930	1,893	1,885	1,843
Foreign Trade Condition	5 ^{0,92}	1,426	1,428	1,486	1,667
Nominal rate (AZN/US Dollars)	4 ^{0,98}	0,980	0,918	0,871	0,845
Real exchange rate	4 ^{1,06}	0,687	0,643	0,586	0,507
Fresh vegetables (US thousand dollars/ton)					
Export price	7 ^{0,27}	0,288	0,494	0,466	0,418
Import price	8 ^{0,11}	0,185	0,155	0,109	0,122
Foreign Trade Condition	7 ^{2,34}	1,557	3,187	4,275	3,426
Nominal rate (AZN/US Dollars)	4 ^{0,98}	0,980	0,918	0,871	0,845
Real exchange rate	9 ^{0,41}	0,630	0,288	0,204	0,247
Potatoes (US thousand dollars/ton)					
Export price	1 ^{0,19}	0,174	0,240	0,271	0,269
Import price	7 ^{0,10}	0,152	0,123	0,128	0,151
Foreign Trade Condition	5 ^{1,78}	1,145	1,951	2,117	1,781
Nominal rate (AZN/US Dollars)	4 ^{0,98}	0,980	0,918	0,871	0,845
Real exchange rate	1 ^{0,55}	0,856	0,470	0,412	0,474

Source: prepared by the author on the basis of data from State Statistical Committee and National Bank.

sult of the analysis is that the competitiveness of products under consideration relatively falls down, that is, the real value of manat in relation to US dollar is rising. That is why it is important to examine the real exchange rate of manat in relation to currencies of other states.

The time-series analysis of foreign trade condition index may be a basis for decision-making on export/import strategy of the state.

According to the production factors theory by Swiss neo-classic economists, Eli Hekhser and Bertil Olin, the country would be comparatively privileged in goods that require more of the production factors in which the country is rich, namely, the country would produce these goods cheaper and specialize in their production. The natural resources of Azerbaijan create a favorable condition for the development of such sectors as agrarian-industrial complex, tourism and communication. Let's justify the development in one sector. For instance, according to Hekhsher-Olin model, Azerbaijan must specialize in the production of agrarian-industrial products using the natural and labor resources in which Azerbaijan is rich. In view of the fast-increasing food prices as compared to the non-food prices in the global market over the recent years, then in accordance with Stolper-Samuelson theorem, the prices of factors used rather intensively in the production of goods, which rise in price as a consequence of international trade, go up as well. Therefore, the prices of labor and other resources used in the production of agrarian-industrial products will rise in price too and labor resources will be used more efficiently. Azerbaijan can make the cost of production of agrarian and industrial products more competitive by directing a certain portion of its highly qualified labor resources and oil incomes towards agrarian-industrial sector. According to the American economist B. Minchas who proposed the reverse concept of production factors, the same product can be labor-intensive in labor-abundant

countries and capital-intensive in capital-abundant states: this happens in the case of elasticity of mutual substitution of production factors. For instance, agrarian products will be capital-intensive in capital-intensive US because they are produced with the application of advanced technologies, whereas agrarian products in Azerbaijan will be labor-intensive. Hence, it is theoretically proved that agrarian products of Azerbaijan will endure competitiveness in the world market. Calculations over Cobb-Douglas production function equation show that a one percentage point increase in the capital will lead to a 0.43 per cent increase in real GDP and a one percentage point increase in the number of employed people will bring about a 0.57 per cent increase in real GDP. As a consequence of the application of technological innovation and information technologies in the economy create annual 7.4-percent additional growth in real GDP. The studies of production factors in the context of other countries show that as the economy develops the share of labor force in each unit of production increases and the share of physical capital decreases. That is why the elasticity coefficient of labor force in developed countries is usually greater than 0.75 per cent. That happens especially happens with the development of human capital armed with drudgery. In Azerbaijan the focus should be concentrated on the use of qualified labor force in the agrarian-industrial production. Azerbaijan should gradually avoid the export of agrarian products in the form of raw products and switch to their sale as end-products to the extent possible.

Final principles...

The following principles should be abided by upon using oil and gas incomes to rescue from the “resource curse” and accomplish a sustainable economic development in the post-oil period:

- The major concentration in the division of resources (labor and capital) should be transferred from non-tradeable sector to the tradeable;
- The rational ratio between investments and savings should be regulated;
- The development of sectors with obvious, comparative benefits should be prioritized;
- An equilibrium should be ensured between products and money markets;
- Intergenerational distribution of Oil and gas incomes should be carried out on the basis of unchangeable income principle;
- Softening of social inequality upon using oil incomes should be adopted as a principle.

