Savings-Investments Relationship in an Open Economy

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*A*bstract. *This paper reviews the conceptual-theoretical framework related to the analysis of the savings-investments relationship in an open economy and reveals the main trends of the respective relationship in the consolidated market economies and emerging countries during the second part of the 20-th century and first decade of the 21-st century. In this context, the author proposes some improvements in the savings-investments relationship analysis methodology, emphasizing the role of the foreign trade balance stock on the values of discrepancy between the savings and investments and of the Feldstein-Horioka econometric model estimated parameters. The respective methodological improvements are applied in the case of Romania for the period 1990-2007. At the end of the paper some guidelines for the savings-investments relationship modeling are presented in order to avoid recession and assure the premises for a sustainable economic growth.*

Key Words: state budget deficit, external trade balance stock, Grubel-Lloyd Index generalized form, Feldstein-Horioka model, error-correction model.

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Introduction

Sustainability of economic growth is conditioned, among other factors, by ensuring of the funds needed for the investments processes support. As the

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economy complexity increases and the production apparatus modernization is more and more correlated with the social life dynamics, the ensuring of the financial resources for fixed and working capital cannot be obtained just as consumption "postponement". It is important to bear in mind that the respective process is intermediated by the role assumed by public authorities in economic and social activities modeling, technological changes support, on one hand, and degree of openness of the economy to external flows of goods, services and production factors, on the other hand. For these reasons, the study of the savings- investments relationship has an ongoing basis, because it represents an important pillar both for the elaboration of long-run development strategies and of the policy mix intended to avoid major economic and social disequilibria in the short run.

1. Conceptual-theoretical framework for the analysis of the savings-investments relationship in an open economy

In both classical and first wave of neo-classical economists' conception there is a perfect equality between savings and investments. It took into account the hypothesis that savings represent the part of the income that is not allocated for consumption. The transformation of saved amounts into investments takes place in a very short period of time. The level of the interest rate especially models the relationship between investments and savings in an economy with a relatively low degree of complexity and of openness to foreign trade. It admitts a high flexibility of prices of goods, services and production factors related to supply and demand variations, obtained as a result of a "tatonament" process, described in Leon Walras' works. As a consequence, there is an equilibrium level of interest rate able to ensure an optimum ratio between consumption, savings and afterwards investments[72].

The theory related to savings and investments relationship in a market economy was sensibly revised during the 1920's and 1930's. J. M. Keynes provided the most known redefinition of the theoretical framework related to the savings-

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[72] *Consumption or savings propensity is determinated, under the conditions of "homo economicus" existence, by the level of interest rate that is as interest rate increase, the savings process is stimulated. The investment processes are inversely correlated with interest rate. In other words, a high interest rate acts as a braking factor for the amounts that entrepreneurs are ready to allocate for investment process support.*

investments relationship[73]. The Keynesian conception, published for the first time in 1936, postulated the fact that savings represent the difference between income and consumption registered during a period of time. Therefore, the investments are defined as expenditures made during the respective period of time for other purposes than the procurement of consumption goods.

Although this definition has initially created confusions (A. Learner, 1938-1939), this innovation indicates especially the fact that the saving process is seen as being mainly linked with the income level and only secondary with interest rate level. Savings are not automatically transformed into investments, because the factor that models the investors' behaviour is the marginal efficiency of capital. As a consequence, maintaining a high level of aggregate demand represents a premise for the investments processes stability. In aggregate demand are comprised private consumption, gouvernamental expenditures and exports.

Initially implemented in economies dominated by technologies designed under mechanics paradigm and where constraints related to access to natural and financial resources were soft, the policies inspired by the Keynesian conception led to a remarkable economic growth. But, as the respective resources tended to be exhausted more and more difficulties for a sustainable economic growth occurred. Also, the increasing involvement of public authorities in economic and social processes and the greater openness of the economy to foreign trade had notable implications for the key-variables of macroeconomic strategies and policies.

Among macroeconomic key-variables, the savings-investments relationship is an important one. The respective relationship may be highlighted by comparing the aggregate demand and its financing sources.

Aggregate demand (Y) may be expressed as: $Y=C+I+G+X$, where:

C = private consumption,   I = private investments,

G = state budget expenditures,   X = exports

Aggregate demand financing sources may be written: $Y= C+S+T+M$,[74] where:

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[73] *Even if the changes proposed by Keynes for the interdependencies between savings and investments are the most known to public opinion, one may not ignore the contributions brought by the Swedish economic school, its main representatives being Wicksell, Myrdal and Lindahl (B. Ohlin, 1937).*

[74] *In some papers it is considered that amount of private consumption, savings made by households and private firms and state budget incomes represent the level of gross*

C = private consumption,   S = savings made by households and private firms,

T = state budget incomes,   M= imports

From the above-mentioned formulae it can be concluded that in the context of state budget and foreign trade balance disequilibria, the savings are not automatically equal to the investments. The discrepancy between savings and investments (S-I) may be written:

$$S - I = (X - M) - (T - G)$$, where:

X-M = foreign trade (current account) balance stock.

T-G = state budget stock.

It results that that factors leading to a surplus of savings related to investments are the surplus foreign trade (current account) balance, and the deficit of state budget.

The surplus of savings related to investments has to be carefully analyzed. For this purpose the previous formula may be re-written:

$$S + (G - T) = I + (X - M)$$

On this basis it can be concluded that savings obtained at national economy level, respectively the sum of private and public savings, equals the sum of private investments and net exports (E. Akbostank, G.I.Tunc, 2002). Also, it can be emphasized that the state budget deficit acts as a factor reducing the private investments (the crowding out effect)[75]. Also, it may be observed that a positive

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domestic product on the supply-side, taking into account that the sum of private consumption, private investments, state budget expenditures and net exports constitute the gross domestic product on the demand-side.

But such approach leads to methodological confusions. In fact, state budget incomes represent not only an outcome of productive capacity (supply) of a national economy, but also the degree of fiscality practiced during analyzed period. Savings of the private sector depend both on total factor productivity and on consumption characteristic features. Imports level is link not only with national productive capacity and competitiveness, but also with consumers' preferences. Therefore, we appreciate that, for an increase of analysis accuracy, the equation Y=C+S+T+M represents the financing sources of the whole aggregate demand (domestic and foreign).

[75] *The crowding out effect was especially emphasized by monetarist economists. In their works they insisted on fact that if public expenditures surpass the state budget incomes, the private initiative is hampered, because of a tendency to increase fiscality and to drain resources from the private sector to the public sector of the national economy. It is considered that efficiency of resource utilization is greater in the private sector in*

stock of external trade balance represents a factor that intensifies in the long run the saving process and afterwards the capital accumulation.

In fact, the discrepancy between savings and investments is strongly conditioned by the correlation that takes place between state budget and foreign trade balance stock. Theoretically, there are two main points of view related to this topic.

A first approach is that of the coexistence of the deficits of state budget and foreign trade balance (twin deficits). The respective correlation is derived from the Keynesian view related to incomes and expenditures, implemented in the Mundell-Fleming model. The hypothesis is adopted that an increase of state budget deficit determines a domestic demand growth that contributes in the short run to a deterioration of foreign trade balance. As the state budget deficit increases, not only the domestic demand grows but also the interest rate at national level. A higher interest rate leads to an increased influx of foreign capital and implicitly to a re-evaluation of the national currency. The respective currency rate change stimulates imports and discourages exports, contributing to foreign trade balance deficit deepening.

The second approach is the Ricardian Equivalence Hypothesis postulating that there is no correlation between the state budget and foreign trade balance deficits. It is shown that foreign trade balance stock, interest rate, investments and consumption are not influenced by the evolution of the state budget stock. Under the conditions of consumers' incomes life cycle, a change in the state budget deficit level does not induce variations in consumers' wealth. If economic agents may borrow with a constant interest rate, the savings level will adjust in correlation with the state budget deficit changes and therefore for the whole economy the level of effective savings equals the expected one.

In our opinion, for the analysis of the savings- investments discrepancy it is necessary to firstly have in view the foreign trade balance stock. Depending on the external (dis) equilibria nature, the financing way of investment processes can be revealed in the short run and their perspective in the middle run.

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comparison with the public sector. This hypothesis has to be regarded and tested in concrete conditions of economic activity in the analyzed period.

Generally speaking, the efficiency of resource utilization is greater in the private sector in comparison with the public sector if economic activity steadily grows. But if the economy is in recession, and therefore the private enterprise appears to be blocked, an increased implication of public authorities in aggregate demand management and consequently a higher level of state budget deficit may be admitted.

Therefore, savings-investments discrepancy (S-I) may be written:

$$S - I = (X - M) * (1 + \alpha_{STB,SSB}) * IG_{STB,SSB}$$

where: $\alpha_{STB,SSB} = \dfrac{T - G}{X - M}$ $IG_{STB,SSB} = \dfrac{1 - \alpha_{STB,SSB}}{1 + \alpha_{STB,SSB}}$

$IG_{STB,SSB}$= Grubel-Lloyd Index generalised form of foreign trade balance and state budget stocks.

It can be observed that factor $\alpha_{STB,SSB}$ is positive and underunitary if the state budget stock has the same sign as the stock of foreign trade balance, but is smaller in absolute value. The above-mentioned factor values greater than unit indicate that the stocks of state budget and foreign trade balance have the same sign, but related to gross domestic product the discrepancy between the incomes and expenditures of the state budget is greater than the discrepancy between exports and imports.

Negative underunitary values of factor $\alpha_{STB,SSB}$ signify contrary signs of the state budget and foreign trade balance stocks. Also, in absolute value the foreign trade balance stock is greater than the state budget stock. Negative overunitary values of factor $\alpha_{STB,SSB}$ signify contrary signs of the state budget and foreign trade balance stocks. Also, in absolute value the foreign trade balance stock is smaller than the state budget stock.

Because in this analysis model the Grubel-Lloyd Index generalized form is used, its values may be very different, comprised on the whole scale of real numbers, and not just between –1 and 1, like in the case of the classical form[76]. It may also be observed that the respective indicator tends to decrease its value as the factor $\alpha_{STB,SSB}$ size increases.

A special situation occurs if $\alpha_{STB,SSB} = -1$ and signifies that the foreign trade balance and the state budget have stocks of contrary signs, but equal in absolute values. Appearently, from the statistical point of view there is a

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[76] *In its "classical form", Grubel-Lloyd Index is used in foreign trade features analysis (H. G. Grubel, P. J. Lloyd, 1975). In this case, factor α defines the ratio of the imports to exports values. For these reasons, α has positive values and Gruber Index is comprised between –1 and 1. If the respective index has positive values a surplus of foreign trade balance is registered, while, if negative values occur, the analyzed country faces a foreign trade balance deficit.*

"compensation" between domestic budgetary and foreign trade disequilibria. In this case, the Grubel-Lloyd Index generalized form admits a vertical asymptote and consequently a greater instability of its values. As a consequence, for the savings-investments discrepancy computation it is necessary to take into account all determining factors. Therefore it can be concluded that in this situation savings-investments discrepancy is equal to double foreign trade balance stock.

Another interesting case is when the state budget stock is equal to the foreign trade balance stock. As a consequence Grubel-Lloyd Index value is zero and savings are equal to investments.

In economic literature dedicated to the savings and investments correlation, a linear regression between the two variables mentioned above is widely used. The model proposed by Feldstein and Horioka (1980). The respective model is expressed as:

$$(I/Y)_t = a + b * (S/Y)_t,$$

where:

$(I/Y)_t$ = investments (gross capital formation) share in gross domestic product in year t;

$(S/Y)_t$ = savings share in gross domestic product in year t;

b= savings retention degree in investments;

a= residual factor of linear regression.

In authors' view the coefficient b values would show the impact of a national economy openness degree to the capital external flows on the correlation between savings and investments. Taking into account perfect capital mobility it could be anticipated that savings of a country would migrate to areas where invetment efficiency is the highest. Consequently, at national level the share of savings in gross domestic product would not be strongly correlated with investment share.

2. International trends in the correlation between savings and investments

The parameter estimation of the Feldstein-Horioka model for a series of OECD members leads only partially to the expected results. Therefore, for the 1960's and early 1970's, computations emphasized a strong correlation between

savings and investments share in the gross domestic product. This allows drawing the conclusion that although the institutional framework favours mobility, practically there is a transnational immobility of capital.

The analysis extension to longer historical periods found smaller values for parameter b for time intervals before the first world war, and higher for the period between the two World Wars (A. Taylor, 1996). On this basis it is concluded that the international capital mobility is linked with the institutional framework related to capital account opening. Therefore, it can be argued that smaller values of parameter b were a consequence of a very high openness degree of national economies to the capital external flows before the first World War, while the higher values registered during the period between the two World Wars are an effect of the extension at large scale of protectionist commercial policies and of the limitations of the capital external flows.

The use of the Feldstein-Horioka model was not limited to time-series, but was spatially extended through cross-country regressions. Also, in this case the results that were obtained generated a series of debates and controversies. Therefore, it was underlined that a simple unifactorial cross-country regression cannot lead to feasible estimations for the degree of international capital mobility. In order to achieve the respective objective it is necessary to group the analyzed countries depending on their national economy size and influence on world economy (H. Tsung-wu, 1996).

Of course, the features of the institutional framework have a considerable impact on the savings-investments correlation nature. But, in the case of unifactorial regression investments and savings, we consider that in estimations it is important to take into account that if the OLS method is used, the estimated value of parameter b from equation $(I/Y)_t = a + b*(S/Y)_t$, can be written as:

$b = 1 + b_{SSB} - b_{STB}$, where parameters b_{SSB} şi b_{STB} represent the influence of the state budget and foreign trade balance stocks on the retentention degree of savings in investments.

Parameters b_{SSB} şi b_{STB} are obtained from the regressions:

$((T-G)/Y)_t = a_{SSB} + b_{SSB}*(S/Y)_t$ and $((X-M)/Y)_t = a_{STB} + b_{STB}*(S/Y)_t$

Therefore, the impact of domestic budgetary and foreign trade balance disequilibria on the features of the savings-investments relationship can be emphasized. It is important to observe that under the conditions of a foreign trade balance surplus and a state budget deficit the parameter b (degree of

retention of savings in investments) is smaller than 1. The methodological innovation we propose has the advantage that it allows for the identification of factors determining the parameter b deviation from unitary value.

Also, new proofs can be brought in favour of the idea that the above-mentioned parameter represents mainly an expression of "solvability constraint", imposed to a national economy during a period (F. Pelgrin, S. Schich, 2004) and to a lesser extent an indicator of international capital mobility. Even if a national economy adopted an opening of capital account, the creation of premises for a sustainable growth impose a strong correlation between the savings obtained at national level and investments flows received by the respective country.

Afterwards, as the time-series analysis refines, extensions of the initial model were proposed. Therefore, the error-correction mechanism was taken into account (W.J. Jansen, 1996). In this situation, the form of the regression model is:

$$(I/Y)_t = a + b*(S/Y)_t + c*(I/Y)_{t-1} + d*(S/Y)_{t-1}, \,]$$

where:

$(I/Y)_t$ = investments (gross capital formation) share in gross domestic product in year t;

$(S/Y)_{t-1}$ = savings share in gross domestic product in year t;

$(I/Y)_{t-1}$ = investments (gross capital formation) share in gross domestic product in year t-1;

$(S/Y)_{t-1}$ = savings share in gross domestic product in year t-1.

Also, depending on analysis necessities, equivalent forms were used:

$$\Delta(I/Y) = a + b*\Delta(S/Y) + (c-1)*(I/Y)_{t-1} + (d-b)*(S/Y)_{t-1} \text{ or:}$$

$$\Delta(I/Y) = a + b*\Delta(S/Y) + (1-c)*((S/Y)_{t-1} - (I/Y)_{t-1}) + ((d-b)-(1-c))*(S/Y)_{t-1}$$

Theoretically, it is considered that the parameter b measures the impact of a temporary shock of the savings on the investments. The parameter (1-c) shows the speed at which savings-investments relationship converges in the long run to equilibrium and sustainability of foreign trade balance and state budget disequilibria. Parameter ((d-b)-(1-c)) provides information regarding the savings-investments relationship nature in the long run.

When applied to countries with consolidated market economy, the respective econometric model leads to feasible results and allows the assumption that it was a correct specification for the study of the savings-investments-relationship (W.J. Jansen, G.G. Schultz, 1996). But when the estimations were extended to developing countries, the results were contradictory (F. Rocha, 2006). Therefore, the conclusion that can be drawn is that the degree of development and the structure of different national economies condition the stability of savings-investments relationship.

The savings-investments discrepancy is dependent to a considerable extent on the savings share in gross domestic product. It may not be ignored that the beginning of industrial development process was supported not only by the implementation and assimilation of new technologies, but also by a considerable growth in the savings rate.

Even under the conditions of transition to post-industrial society, the ratio savings / gross domestic product has to be maintained at high values. During the period comprised between the end of World War Two and the first oil shock the saving rate may be considered as being high for countries with a consolidated market economy. Disturbances induced by oil shocks determined not only sensible changes in the productive apparatus, but also decreases in the saving rate. Strong pressures exercised by the restructuring process of the economy on the state budget expenditures brought about the main contribution to this evolution. As a consequence, state budget deficits tend to become chronic.

Even if different methods and techniques for stimulating savings were practically tried and theorized by the "supply-side" economics, as of the beginnings of the 1980's, the private sector savings growth could not compensate for the state budget deficits increase. Under these conditions, many of the Ricardian Equivalence Hypothesis premises were invalidated, and a lot of countries have to face the twin deficits of state budget and foreign trade balance.

Apart from the industrialized countries from Europe, North America and Japan, where the saving and investment rates maintained at low levels, in Asian emerging economies and in oil-producing countries, the savings registered notable growth absolutely and relatively. In this context, the rapid growth of savings in China at the beginning of the 2000's (IMF, 2005) should be mentioned. Also, in Latin America the savings increased, stimulated by the public sector.

A strong correlation between savings and investments could be yet detected in the early 2000's for the industrialized countries, even if the respective correlation tends to diminish to a certain extent.

The differentiated dynamics of domestic savings and of foreign trade balance stock had important consequences on the savings-investments relationship nature. Therefore, developed countries, like the United States, became net importers of capital, while new-industrialized countries from Asia have shifted to the position of net exporters of capital.

3. Savings-investments correlation in Romania during the transformation of the economy and preparedness for integration into European Union

In Romania, during the last decade of the 20-th century, due to the transformation of the economic process, the deficit of the state budget coexisted with the deficit of foreign trade balance. This was the result of a radical change of the external economic environment, mainly the loss of some traditional external markets, on one hand, and the big volume of public expenditures needed by industrial restructuring and social protection for persons laid-off from firms that resized their productive capacities and rationalized the production factor consumption, on the other hand.

During the period 1990-2007, on which statistical data are available, the greatest foreign trade balance deficits (over 8%) were registered in the years 1990, 1992, 1996, 2004, 2005, 2006 and 2007 (Table 1). It can be observed that the foreign trade balance deficit took on high values not only during the first transformational recession (1990-1992), but also in years when the economic growth sped up, due to the fact that domestic demand expanded rapidly, while national production of good and services had a much slower evolution.

Table 1

Determining factors of savings-investments discrepancy in Romania during the period 1990-2007

%

Year	X-M	T-G	$\alpha_{SSB, STB}$	IG	S-I
1990	-9.5	-0.4	4.2	91.9	-9.1
1991	-3.9	-1.9	48.7	34.5	-2,0
1992	-8.4	-4.4	52.4	31.3	-4,0
1993	-5,0	-2.6	52.0	31.6	-2.4
1994	-2.1	-4.2	200.0	-33.3	2.1
1995	-5.6	-4.1	73.2	15.5	-1.5

1996	-8.4	-4.9	58.3	26.3	-3.5
1997	-7.1	-3.6	50.7	32.7	-3.5
1998	-8,0	-5,0	62.5	23.1	-3,0
1999	-4.9	-5.4	110.2	-4.9	0.5
2000	-5.5	-4.3	78.2	12.2	-1.2
2001	-7.5	-3.7	49.3	33.9	-3.8
2002	-5.5	-2,0	36.4	46.7	-3.5
2003	-7.5	-1.6	21.3	64.8	-5.9
2004	-9.1	-1.5	16.5	71.7	-7.6
2005	-10.3	-1.3	12.6	77.6	-9.0
2006	-12.1	-1.8	14.9	74.1	-10.3
2007	-14.0	-3.7	26.4	58.2	-10.3

N.B. (X-M), (T-G), $\alpha_{SSB,STB}$, IG have the meaning previously presented in the text.

Calculated after NBR - Annual Report 1997, Bucharest 1998, and NBR - Financial National Accounts 1998-2006, Bucharest 2007, Statistical Yearbook of Romania, 2008.

The state budget deficit had smaller values in comparison with the deficit of the foreign trade balance, ranging between –0.4% of the gross domestic product in 1990 and –5.4% in 1999. During the two transformational recessions (1990-1992 and 1997-1999) the state budget deficit tends to increase. During the periods when the gross domestic product increased, a clear trend of state budget deficit evolution cannot be detected. Therefore, during 1993-1996, the state budget deficit registered an increase from –2.6% to –4.9% of the gross domestic product, while between 1999 and 2005, the state budget deficit diminished from –5.4% to –1.3%. From 2006 it can be noted a trend of state budget deficit increase.

The state budget deficit/foreign trade balance deficit ratio was as a rule underunitary, the exceptions being registered in 1994 and 1999. The respective years were different regarding the economic situation. Therefore, 1994 was the first year of the 1990's when economic growth was really based on exports. In 1999 a domestic demand sharp contraction took place in the context of an important stage of the restructuring process and this situation determined a sensible decrease of the foreign trade balance deficit and a deterioration of the state budget stock, mainly as result of the real income decrease.

Under these conditions the Grubel-Lloyd index of the state budget and foreign trade balance stocks had, as a rule, positive values, exceptions being registered in 1994 and 1999. The values of the respective index are positive, but smaller than 33.3%, in seven of the eleven years of the period 1990-2000. Beginning in

2001, the calculated values are bigger than 33.3%, due to the fact that the state budget deficit represented less than 50% of the foreign trade balance deficit.

As a result of the state budget and foreign trade balance twin deficits, the Grubel-Lloyd Index sign is the identical to the sign of savings-investments discrepancy. Therefore, the respective discrepancy was negative, as a rule, with the exception of the years 1994 and 1999, its highest absolute values (over 7.5%) being registered in 1990, 2004, 2005 and 2006.

The continuous dependency of the investment processes in Romania in external financing sources is emphasized by the evolution of the gross capital formation and conventional savings[77] shares in the gross domestic product. Therefore, the gross capital formation share in the gross domestic product oscillated between 28.0% and 31.4% during 1990 and 1993, between 24.3% and 25.9% during 1994 and 1996, between 16.1% and 20.5% during 1997 and 2000, between 21.7% and 24.2% during 2001 and 2006 (Table 2). In 2007, the respective indicator is greater than 31%, as a consequence of the rapid development of activities related to real estate and constructions.

It is important to observe that the share of gross capital formation in the gross domestic product is in fact overestimated, due to foreign trade balance extensive deficit. Theoretically, the size of the above-mentioned share is expected to provide information about the nature of the correlation between capital accumulation and consumption. But the respective correlation is related to domestic demand (F. M. Pavelescu, 2008). As a consequence, under the conditions of a notable volatility of the foreign trade balance stock, the relevance of the gross capital formation share in the gross domestic product for the propensity to invest is blurred.

Conventional savings were, in comparison with gross domestic product, between 21.0% and 27.4% during 1990 and 1993, between 22.4% and 26.9% during 1994 and 1996, between 14.8% and 18.3% during 1997 and 2000, between 13.7% and 20.8% during 2001 and 2007.

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[77] *Having in view the avaible statistical data, we considered that the gross capital formation approximate the investments realized at the economy level. The level of savings was determined in correlation with gross capital formation, and deficits of state budget and foreign trade balance. As a result we obtained an indicator that we called conventional savings, because we adopted the hypothesis that the state budget deficit is generated by expenditures designated to finance social consumption and social protection and not to increase the size of public-owned fixed capital.*

It should be noticed that the conventional savings/gross capital formation ratio renged as a rule between 83% and 94%. Values under 73% were registered in 1990 and during period 2003-2007.

Table 2

Gross capital formation and conventional savings shares in gross capital product in Romania during period 1990-2007

%

Year	Gross capital formation share in gross domestic product	Conventional savings share in gross domestic product	Ratio conventional savings / gross capital formation
1990	30.1	21.0	69.8
1991	28.0	26.0	92.9
1992	31.4	27.4	87.3
1993	28.9	26.5	91.7
1994	24.8	26.9	108.5
1995	24.3	22.8	93.8
1996	25.9	22.4	86.5
1997	20.6	17.1	83.0
1998	17.8	14.8	83.1
1999	16.1	16.6	103.1
2000	19.5	18.3	93.8
2001	22.6	18.8	83.2
2002	21.7	18.2	83.9
2003	21.8	15.9	72.9
2004	22.3	14.7	65.9
2005	22.7	13.7	60.4
2006	24.2	13.9	57.4
2007	31.1	20.8	66.8

Calculated according to Table 1, *** - National Accounts of Romania 1990-2006, and Statistical Yearbook of Romania, 2008.

Based on the above-mentioned statistical data, the estimation of the Feldstein-Horioka econometric model in case of Romania for the period 1990-2007 leads to the following result:

$(I/Y)_t=11.2372+0.6507*(S/Y)_t$ $R=0.6829$ $R^2=0.4663$
     (3.1843) (3.7388)

N.B. *In brackets are presented the Student test calculated values, and R şi R^2 represent the coefficient of correlation between explanatory and resultative variables, respectively the coefficient of determination of linear regression.*

It may be observed that the parameter b value is underunitary (0.6507), although in almost all years of the analysed period, the gross capital formation value was greater than the conventional savings value. Also, the coefficient of correlation between the two variables mentioned-above was of medium size (0.6829). This is a consequence of the fact that the economy disequilibria influenced strongly the relationship between the investments dynamics and their financing sources.

The computation of the unifactorial linear regressions between shares in gross domestic product of the state budget and the foreign trade balance stock, as resultative variables and the share of conventional savings in gross domestic product as explanatory varaible leads to the following results:

$((X-M)/Y)_t = -13.0136 + 0.2807*(S/Y)_t$ $R= 0.4464$ $R^2=0.1992$
      (-4.5622) (1.9952)

$((T-G)/Y)_t = -1.7764 - 0.0686*(S/Y)_t$ $R=-0.2134$ $R^2=0.0456$
      (-1.1150) (-0.8739)

On the one hand, the estimated values confirm theoretical assumptions reffering to factors conditionning the deviation from the unitary value of the parameter b[78]. Also, it can be observed that the deviation from unitary value is mainly generated by the foreign trade balance deficit. On the other hand, the crowding-out effect, determined by the state budget deficit appear to be secondary for the discrepancy between the conventional savings and gross capital formation.

In order to test the posibilities to estimate an error-correction model reffering to the shares in gross domestic product of gross capital formation and conventional savings during 1990 and 2007, we computed a series of unifactorial linear regressions, respectively :

$(I/Y)_t = 5.8617 + 0.7549*(I/Y)_{t-1}$ $R= 0.7378$ $R^2=0.5443$
      (1.3675) (4.2331)

$(I/Y)_t = 11.3040 + 0,6318*(S/Y)_t$ $R= 0.7029$ $R^2=0.4941$
      (3.3862) (3.8276)

$(I/Y)_t = 16.2413 + 0,3807*(S/Y)_{t-1}$ $R= 0.4239$ $R^2=0.1797$
      (3.8199) (1.8128)

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[78] *It can be noticed that the calculated value of parameter b, respectively 0.6507 is equal to : 1+(-0.0686)-0.2807.*

It is important to observe that in all three regressions the correlation between the resultative and explanatory variables has a medium intensity. Also, the regression parameters are underunitary.

In the estimation of trifactorial regression, specific to the error-correction model, the following result is obtained:

$$(I/Y)_t = 6.4353 + 0.6550*(I/Y)_{t-1} + 0.6597*(S/Y)_t - 0.5683*(S/Y)_{t-1} \quad R^2=0.720$$
$$\quad\quad (1.7803) \quad (2.7506) \quad\quad (2.6551) \quad\quad (-2.4166)$$

By comparing the estimated parameter values obtained in the case of trifactorial linear regression with those obtained in the case of unifactorial regressions the conclusion may be that for the explanatory variable $(S/Y)_{t-1}$ a sign change occurs. This means that a critical threshold of collinearity from which the result of regression becomes unfeasible is exceeded[79]. Under these conditions, a clear error-correction mechanism between savings and investments is difficult to identify.

As a consequence, we tried to test the feasibility of bifactorial linear regressions, which imposes a series of restrictions in the error-correction model referring to the shares of gross capital formation and conventional savings in gross domestic product.

The three bifactorial linear regressions lead to the following results:

$$(I/Y)_t = 12.7354 + 0.9452*(S/Y)_t - 0.3859*(S/Y)_{t-1} \quad R^2=0.5571$$
$$\quad\quad (3.7575) \quad (3.4539) \quad\quad (-1.4112)$$

$$(I/Y)_t = 5.9162 + 0.9190*(I/Y)_{t-1} - 0.2000*(S/Y)_{t-1} \quad R^2=0.5682$$
$$\quad\quad (1.3696) \quad (3.5493) \quad\quad (-0.8801)$$

$$(I/Y)_t = 6.0557 + 0.4927*(I/Y)_{t-1} + 0.3056*(S/Y)_t \quad R^2=0.5943$$
$$\quad\quad (1.4455) \quad (1.8592) \quad\quad (1.3127)$$

It may be observed that two of the regression equations are confronted with the exceeding of critical threshold of collinearity that is when among explanatory variables the savings rate in previous year is considered.

The results may be considered as being feasible if the explanatory variables are only the savings share in the current year and gross capital formation share in

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[79] Reasons for which it can be considered that changes in sign of a multifactorial linear regression estimated parameters in comparison with unifactorial linear regressions represent an overstep of a critical threshold of collinearity from which the estimation results become unfeasible are shown in F. M. Pavelescu, 2005.

gross domestic product in the previous year. Also, it may be noticed that $(I/Y)_{t-1}$ acts as the main explanatory variable and $(S/Y)_t$ as the secondary one[80] in the investment behaviour. In other words, under conditions of persistent external disequilibria the propensity to invest is relatively more influenced by the investment process inertia than the changes operated in the propensity to save of the private persons within the national framework.

4. Directions of action for modeling the savings-investments relationship in order to avoid recession and assure premises for sustainable economic growth

The analysis we made above reveals the fact that both at national and international levels the savings-investments relationship is a very important one for achieving macroeconomic stability and for creating premises for a sustainable economic growth and social development. In the context of international liberalization of goods, services and production factors flows of newly-industrialized countries and of states with old industrial tradition efforts to keep their positions in world economy, at the same time with the hardening of constraints related to access to energy and raw materials sources, savings-investments increases its degree of complexity.

The need for productive apparatus restructuring, scientific research and social modernization processes support determines the occurrence of contradictory trends that have to reconciliate through the macroeconomic policy mix. Therefore, in order to implement new tehnologies within economic activities, it appears necessary to increase and afterwards maintain a high share of savings in the gross domestic product. Experiences gathered up to date show that, even in a post-industrial society, economic dynamism in the long run is generated by time constancy of investments flows. This way, conditions are assured for an efficient utilization of production factors both in the short and long run.

At the same time, special attention should to be paid to the evolution of the branch structure of investment flows, so that a technological compatibility between economic agents is ensured. Also, under the conditions of a post-

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[80] *In F. M. Pavelescu (1986), it is argued that in the context of a linear regression with two explanatory variables, the explanatory variable which is relatively stronger correlated with the resultative variable may be defined as the main explanatory variable. As a consequence, the other explanatory variable is seen as the secondary one.*

industrial society and for a better evaluation of the savings-investments relationship, an extension of the two notions is recommended. Hence, in the definition of the savings we should bear in mind only the idea of a "postponed consumption". Also, it is important to take into account the increase of an asset value, as the time pass. The extension of the notion of "investments" has to lead to the inclusion of the public and private expenditures allocated for education, health and knowledge progress in the respective indicator (P. Depta, F. Ravalli, D. Harding, 1994).

From a theoretical point of view, the most plausible hypothesis is that economic growth sustainability is conditioned by achieving equilibrium between the incomes and expenditures of the state budget and between exports and imports. Under these conditions, savings are practically equal to investments. Therefore, it is possible to avoid the negative consequences of rhe crowding-out effect, on the one hand, and of an uncontrollable dependence of the economic activity on the external economic environment, on the other hand.

Practically, ensuring the equilibrium between savings and investments compatible with sustainable economic growth proves to be a target very difficult to achieve, especially when a country, like Romania, faces with twin deficits of state budget and foreign trade balance. The imperative of a rapid modernization and convergence with EU developed countries constitutes a strong incentive for a profound re-thinking of macroeconomic policy design and for setting priorities related to investment financing sources. The need for a sensible recalibration of the economic policy mix is generated also by the worsening of the economic situation as a result of the present financial crisis.

An important aspect refers to an efficient management of state budget incomes and expenditures in the context of big economic and social pressures. Hence, on one hand, the need for a rapid modernization of infrastructure and scientific research and innovation development implies a sensible increase of state budget expenditures. Also, when the economy enters recession, the implementation of infrastructure development programs can act as a factor that curbs the economic activity contraction and creates new jobs, but only under the conditions of coherent projects and normal (correct) prices (M.Tănăsescu, 2008).

But the European Union membership and the perspective to adopt EURO as currency require maintaining the state budget deficit in narrow limits (at most 3% of the gross domestic product). As a consequence, it is important to undertake actions in order to determine that state budget expenditures are of adequate size and to establish clear and coherent criteria for their allocation. This is a very

important constraint that has to be fulfilled, because in the last two years (2007-2008), the state budget deficit was bigger than 3% of the gross domestic product. On the other hand, it is necessary to increase to income collection degree, at the same time with the adoption of a taxation system fit to stimulate quantitative and qualitative improvement of labour supply and efficient use of production factors.

The greatest challenge for the economic growth on short and medium terms in Romania is represented by the high level deficit of the foreign trade balance. It has to be noticed that the continuous high rate economic growth for 9 years (2000-2008) was an absorptive one. Consumption limitation and considerable decrease of the capital stock as a result of industrial restructuring, during the second transformational recession (1997-1999), made economic growth recovery dependent on the foreign capital inflows. The initial impetus for economic recovery was given by private consumption and governmental expenditures. But the national supply of good and services did not react in correlation with aggregate demand dynamics and qualitative changes in consumers' preferences.

The reasons for which the economic growth in Romania, during the first decade of the 21-st century, was mainly based on consumption are also determined by expectations linked to the process of integration into European Union. The strengthened relations with European Union member countries stimulated the occurrence of the demonstration effect in consumption. The respective evolution was favoured by government fiscal policy which tended to be neutral and by the commercial banks' orientation to stimulate firstly the consumption credit expansion and to a lesser extent to contribute to an increasing savings propensity of households.

The above-mentioned behaviour was not specific only to Romania, but also to almost all Central and Eastern European countries which became members of the European Union in the period 2004-2007 and is contrary to trends in states with consolidated market economies.

In the latter states, during a boom period the saving rate tends to grow because people see the respective income increase as being transitory. Consequently, based on a longer experience, a part of the income surplus is saved, having in view that after a boom, a recession will come. Therefore, the saved money from the boom period is consumed during recession when the income level decreases.

In Central and Eastern European countries the growth of the income level for the last ten years was seen as long lasting, being strongly associated with the convergence process and closer integration into the European Union (R.C. Shelbourne, 2008).

At the same time a distortion factor in savings-investments relationship was the impressive development of real estate activities. This was a consequence of the income differential increase and of the extension of credits for house-building. On the short run, the illusion of an investments boom was created, but in fact this evolution discouraged the healthy savings and limited the investments in productive activities.

It is important to notice that the foreign trade balance deficit is generated not only by excessive imports of consumption goods and services, but also by the necessary imports of investments, goods and raw materials (C. Dascălu, 2008). Hence, the foreign balance deficit cannot be reduced rapidly in the short run only with a higher taxation of luxury consumtion goods. A strong and undifferentiated discouragement of imports may lead to the contraction of all economic activity.

As a consequence, in Romania, economic growth sustainability is strongly conditioned by the improvement of indigenous firms' competitiveness and their capacity to make investments in new activities characterized by high scientifical-tehnological intensity and value added. Also, important pillars of sustainable economic growth could be: a) attracting foreign investors who have high financial and technological potential and intend to make important technological transfers; and b) quality of linkages that will be created between transnational companies' affiliates and indigenous firms (F. M. Pavelescu, 2006).

Together with foreign capital inflows, investment' processes stability will be, to a significant extent, dependent on the way in which the savings of the private sector will be made and will be used. Therefore, it appears as necessary to identify the factors that stimulate savings and their action intensity. Among factors that srengthen respective processes could be mentioned: a) avoiding that the Romanian economy enters recession; b) fiscal consolidation, a process that triggers positive effects for savings in the public sector; c) establishing interest rates that stimulate private saving process, on one hand, and create premises for an efficient transformation of the respective savings into profitable investments, on the other hand; d) improvement of the terms of trade (IMF World Economic Outlook, 2005); e) implementing coherent structural reforms in activities or industries that have favourable conditions for development or spill-over effects,

like agriculture, energy, telecommunications, or transportations; f) improving the business environment and banking system operation.

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