Problemy Zarządzania – Management Issues, vol. 16, no. 3(75) part 1: 55–71
ISSN 1644-9584, © Wydział Zarządzania UW
DOI 10.7172/1644-9584.75.3

Sustainable Development as Equilibrium Between Investments and Savings – An Attempt Towards a New Conception

Submitted: 06.03.18 | Accepted: 25.04.18

Józefa Famielec*

Sustainable development economics is treated as an autonomous category, which can be ascribed to basically any process or phenomenon. However, in current research there is a lack of studies pertaining to fiscal issues of sustainable development. The main aim of this article is an attempt to determine the financial aspect of sustainable development. The main thesis of the article is an assumption that the balancing of the development is subjected to the income-expenditure identity, in particular the investment--saving identity (IS). Sustainable development has been described by a system of financial flows based on the macroeconomic model of market economy. The article is of theoretical nature and comprises the author's analysis of financial flows, which is the result of a long-term scientific experience of the author. The issues presented in this paper are original, even controversial for some readers, and have not been discussed in domestic or international literature.

Keywords: sustainable development, financial flows, macroeconomic model of market economy.

Rozwój zrównoważony jako równowaga inwestycji i oszczędności – próba koncepcji

Nadesłany: 06.03.18 | Zaakceptowany do druku: 25.04.18

Ekonomia rozwoju zrównoważonego traktuje tę kategorię jako autonomiczną, którą przypisuje się już niemal każdemu zjawisku i procesowi. Brakuje jednak finansowej – pieniężnej treści kategorii rozwoju zrównoważonego. Celem artykułu jest próba określenia finansowego wymiaru zrównoważonego rozwoju. Tezą opracowania jest założenie, że równoważenie rozwoju daje się podporządkować tożsamości dochodowo-wydatkowej, a w szczególności tożsamości inwestycji i oszczędności (IS – Investment – Saving). Rozwój zrównoważony opisano przepływami finansowymi z makroekonomicznego modelu gospodarki rynkowej. Artykuł ma charakter teoretyczny i zawiera autorską analizę przepływów finansowych. Jest rezultatem wieloletniego dorobku naukowo-badawczego autorki. Rozważania są oryginalne, być może i kontrowersyjne, nie mają wzorców w literaturze krajowej ani zagranicznej.

Słowa kluczowe: rozwój zrównoważony, przepływy finansowe, makroekonomiczny model gospodarki rynkowej.

JEL: G02, Q01, O16

* **Józefa Famielec** – prof. dr hab., Department of Industrial Policy and Ecology, Cracow University of Economics.

Correspondence address: Cracow University of Economics, ul. Rakowicka 27, 31-510 Kraków; e-mail: famielej@uek.krakow.pl.

Ministry of Science and Higher Education
Republic of Poland

The creation of the English-language version of these publications is financed in the framework of contract No. 607/P-DUN/2018 by the Ministry of Science and Higher Education committed to activities aimed at the promotion of education.

1. Introduction

Finance finds its development in the economy, in the financial policy of economic operators and in the financial policy of the state. It forms the financial system of the economy, which consists of a set of components that are appropriately selected and linked to pursue the basic objective, i.e. the macroeconomic equilibrium. The primary function of the financial system should be to convert household savings into investments. The purpose of the paper is to determine the financial aspect of sustainable development. The thesis of the paper assumes that the equilibrating of the development can be described by means of the macroeconomic model of market balance, in particular the income-expenditure identity. The identity of investments and savings as well as money liquidity were recognised. as the financial criterion of balancing the development of the economy in the long run. In *ex ante* development modelling, it was proposed to estimate demand for cash – means of payment necessary to support development activities – as demand for money, and to equilibrate this demand with supply. The main possibilities of gaining such resources (supply) were identified in the institutional and instrumental perspectives. The role of the state in balancing development is to be reduced to the creation of legal and organisational conditions for the efficient operation of the financial system of the economy.

2. Sustainable Development as a Holistic Category

Economic science and practice are seeking a model of socio-economic development. One of its new aspects concerns the stability (constancy) of the growth rate, which is equivalent to its evenness. It requires fulfilling many conditions, with the most important being the equilibrium and the resulting sustainability construed in the dynamics of real (economic) processes as a growth at a constant rate of the GDP and its factors (Woźniak, 2008, p. 49).

Development as an equilibrating process should be treated holistically. It is worth agreeing with Sadowski (2004, p. 9) that the concept of durable development (often equated with the category of sustainable development) means "the idea of striving to provide the world with such calm forms of management that would bring about a real, gradual improvement of the conditions and quality of life around the world." Coined years ago, this term is now taking on special significance because it makes us realise that it is about an idea, behaviour, observance of the principles of civilisation development of society in the actions of governments, consumers, producers (and it is not only about the subject, condition, matter or well-being), ensuring peace in management (not chaos, crises, turbulence), aiming at an actual (real) improvement in the quality of life and – quite importantly – all

 DOI 10.7172/1644-9584.75.3

over the world. The efforts made (or forced) to balance social, economic and environmental orders in certain regions, only by richer countries, in the pursuit of ill-conceived efficiency and competitiveness as well as wicked profits, turn out to counter these ideas.

The current phase of the world's development entails the clashing of two tendencies (sometimes treated as contradictory): the self-destructive one – the concept of Meadows, and the self-regulatory one – the concept of Kahn (Sadowski, 2004, p. 11). Self-destruction is the accumulation of threats that began with the industrial expansion, excessive consumption, wastage of natural resources, rapidly growing population in less developed countries, irrational land use (desertification), cutting down tropical forests, etc. The self-regulatory tendency involves launching an effective market mechanism, including the use of pricing competition in the market, investments in substitutes, new technologies, recycling processes, the use of knowledge in the development of the economy. Yet, two differing ways of reasoning are confronted here too. One way of thinking assumes that the ability of the market economy to self-adjustments will grow, that the rate of natural increase will go down with the rise in affluence, and thus the pressure on the growth in the consumption of natural resources will ease. Consequently, over the long term, nothing should limit the developmental expansion of the human race, and the durable development will continue on its own. The second thesis implies that civilisation threats, including an uncontrolled population growth and the loss of the environment's ability to cater for the production and consumption of essential ecosystem services, are a fact and there is no indication that they will be lifted in the near future.

Furthermore, the unprecedented development of financial markets in the global economy is considered a special factor in the intensification of self-destructive civilisation threats[1]. The turnover on financial markets is many times higher than the value of assets – real factors of production (GDP growth). Real processes lose the chance to multiply capitals, which can be increased much faster on the financial markets with the help of toxic financial engineering instruments.

Not unexpectedly, there is a prevailing conviction among scientists and politicians that adaptation processes are needed to limit the self-destructive tendencies, where the theory of finance, especially its stabilisation function, can be used (Ziółkowska, 2014). Self-regulatory tendencies are delayed in their operation because scientific and technical progress works better in a slowly growing economy. Meanwhile, the race for the highest rate of the GDP growth is underway – in every socio-economic system, at the expense of often poor countries, their resources and landscape which is being turned into a waste bin.

Definitions of sustainable development are based on the so-called UN standard of sustainable development society from 1975. The sustainable development society was defined as a "society that accepts the primacy

of ecological requirements which may not be disturbed by civilizational progress or a cultural and economic growth, a society capable of controlling its own development in order to maintain homeostasis and symbiosis with nature, that is to say, a society which respects economical production and consumption as well as the use of waste, a society which thinks about future consequences of undertaken actions, thus taking care of the needs and health of future generations."

According to the Brundtland Commission, "sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). A strong and a weak concept of sustainability are distinguished, i.e., on the one hand, the preservation of the volume of natural, economic and social capitals and, on the other hand, allowing for substitution – replacing one capital with others (Burchard-Dziubińska, 2015, pp. 338–339).

Sustainable development is usually translated into Polish as *rozwój zrównoważony*, and *sustainability* is the equivalent of *trwałość rozwoju*[2]. Some economists recommend using *rozwój trwały* (durable development) instead of *rozwój zrównoważony* (sustainable development), and even consider it more appropriate than the first term. From the methodological point of view, *zrównoważenie* (sustainability) and *trwałość* (durability) are complementary but different from each other.

Theoretical works on ecological economics (Rogall, 2010) emphasise an interesting principle and feature of development – justice, which goes beyond the solely environmental references to sustainability.

Sustainable development and durable development require a measure of well-being now and in the future. This measure is most frequently reduced to a combination of the GDP per capita, taking into account the Gini coefficient of income inequality. The report of the international Commission on the Measurement of Economic Performance and Social Progress (CMEPSP) formulated the following conclusion from studies to evaluate the relevance of the GDP in measuring well-being, including sustainable development: "Since the Brundtland Report, the notion of sustainable development has expanded to become an all-encompassing concept that absorbs every dimension of present and future economic, social and environmental well-being" (Stiglitz, Sen, & Fitoussi, 2013, p. 115). One of the most important areas of the Commission's work was durability in sustainable development. The authors of the report describe durability as follows: "assuming we have been able to assess what is the current level of well-being, the question is whether the continuation of present trends does or does not allow it to be maintained" (Stiglitz, Sen, & Fitoussi, 2013, p. 115). The GDP allows for determining how much can be consumed annually without harming the environment but does not permit us to specify whether we are on the path of sustainable growth.

 DOI 10.7172/1644-9584.75.3

In the theory of economics, sustainability/durability has its origin in the definition of equilibrium taken from classical mechanics and is developed in the theory of economic growth. With regard to economic processes, Walras's concept of static equilibrium has been adopted, which assumes the alignment of the demand price and the supply price, that is the equality of demand and supply (Woźniak, 2008, p. 32). This concept assumes the existence of factors (forces) affecting prices and the volume of demand and supply, such as: population growth, human needs, knowledge and the resulting increase in labour productivity, as well as other factors that stimulate production – wars, climate change, changes in economic legislation. These forces inflict shocks on the demand and supply sides and throw the economy off the static equilibrium. According to the proponents of this concept, authors and supporters of economic growth models (e.g. Solow), as a consequence of these forces there is a certain path of production growth (economic growth) which is characterised by Walrasian features that ensure a balance whereby production fluctuates around the demand and supply equilibrium. "In practice, only in this sense can balance be a property of systems subject to development" (Woźniak, 2008, pp. 32–33). With regard to such a balance then the discourse is geared towards durability of development. R. M. Solow (Solow, 1994, p. 45) and T. W. Swan (Swan, 1956, pp. 334–361) attempted to identify and quantify the sources of economic growth by means of Cobb-Douglas production function.

Various economic theories describe the sources and mechanisms of economic growth. R. M. Solow distinguishes three research trends related to:
- the impact of Keynesian theory of economic growth, which was initiated in particular by the works of F. R. Harrod (Harrod, 1939),
- the emergence and development of neoclassical models, especially of R. M. Solow and T. Swan, but also G. T. Mankiw, D. Romer and D. N. Weil (Mankiw, Romer, & Weil, 1992, pp. 407–437),
- the appearance and impact of the endogenous growth theory and models of P. Romer (Romer, 1986, pp. 1002–1037) and R. Lucas (Lucas, 1988, pp. 3–42).

From the point of view of sustainable development, two aspects are particularly important in the discussion on economic growth models: the method of restoring balance and the possibility of expanding these models to cover factors of significance for the sustainability of growth. According to the classical model, the balance is provided by the mechanism of flexible prices, referring to the theory of money and Say's law of markets (Skousen, 2011, p. 14 and further). They show the ability of an economy characterised by adjustment reactions to automatically reach equilibrium at the level of full employment. Price flexibility is a sufficient condition for the actual rate of economic growth to fluctuate around the path of sustainable growth. Interference from outside the market – interference of the state – is not necessary and may be limited solely to the regulation and

elimination of sources of limitations to the adjustment processes. In the Keynesian model, the equilibrium is achieved through changes in the level of income, followed by modifications in the level of demand, because in this model prices are sticky, i.e. they cannot decline in short periods. It is, therefore, a quantitative adjustment model in which external interference is necessary and should involve the stimulation of demand. In the Keynesian economy, economic growth is inherently unsustainable as adjustments of planned investments and savings result from the decisions of bodies with diverse preferences. The economy is thus a matter of chance, and its market equilibriums (demand, supply and price) do not guarantee full utilisation of production capacities and economic growth.

While synthesising the Keynesian model with the achievements of classical economics, J. R. Hicks carried out an analysis of the general equilibrium at the level of the optimal choice of income and interest rate (Woźniak, 2008, p. 33). He formulated the conditions of equilibrium in the commodity market, whereby the sum of savings and taxes is equal to the sum of investments and government expenditure. According to Hick's analysis, equilibrium occurs in the money market when the demand for money equals the exogenous supply of money. The equilibrium in both markets occurs at the point of intersection of the "investment-saving" (I-S) identity and "money demand-supply" (L-M) curves, discussed further in the study. The equilibrium in the money market is necessary so that there is a balance in the commodity market. The equilibrium can be easily achieved by eliminating rigid wages, prices and interest rates.

The theoretical equilibrium patterns proposed by the neoclassical economics and their empirical counterparts were not related, which led to attempts to look for new equilibrium models. Economic phenomena and processes are stochastic, while the neoclassical economics formulates the equilibrium criterion of a deterministic nature, thus simplifying excessively the essence of the equilibrium mechanism. In the theory of systems dynamics, the concept of "normal state" or "normal path" was introduced as the initial conditions around which the system must fluctuate if it is to meet the conditions of equilibrium. If such a standard (pattern) were formulated, it would be a solution to many problems posed for the theory of sustainable development. Kornai (1985) used such a standard in relation to the centrally planned economy. In the study of economic systems, he adopts a "normal state of equilibrium" of which the Walrasian condition is a special case. It suggests a link with experimentally established tendencies to treat development processes as contradictory to the models of sustainable growth postulated by the classical economy. The shortage economy assumes the existence of only unsustainable systems that encounter limitations from the demand or supply side. Demand-side constraints are characteristic of the market economy, and limitations on supply (resource) are a feature of state-controlled systems (Woźniak, 2008, p. 35). As a result of demand-

 DOI 10.7172/1644-9584.75.3

side constraints in the market economy the producer and the seller are forced to look for buyers through various organisational and production undertakings. Non-sustainable growth in these conditions has such negative effects as: unemployment, violation of consumer sovereignty and imposing a materialistic lifestyle, dehumanisation of social relations, depletion of natural resources, growing ecological threat. Non-sustainable growth in the economy managed by the state reduces the efficiency of production and consumption, quality of life and economic development. The buyer becomes a petitioner forced to make a considerable organisational effort to obtain the necessary goods and access to services. Shortages impel to violate the principles of social coexistence, generate social frustration, numerous conflicts, and distort income allocations.

3. Identity of Investments and Savings in the Macroeconomic Market Equilibrium Model

The macroeconomic model of market economy presents the behaviour of the consumer, investor, public and foreign sectors on the demand side and the behaviour of corporations on the supply side on the market along with interactions between them in market processes. According to the classical theory, supply is determined by the economic potential of the economy, by its resources of material and human factors of production. However, it does not depend on global demand. A decline in global demand does not trigger off a drop in supply but only a fall in prices and wages (as being infinitely flexible). A decrease in producer prices will prompt a fall in cost of living, so real wages remain unchanged and the economic potential of the economy is utilised.

Keynes questioned the thesis of the classical school of economics and showed that prices and wages are rigid over short periods, which means that supply must adapt to reduced demand, as a result of which the GNP goes down because some factors of production remain unused.

Currently, most economic theorists and practitioners share the view that prices and wages are fixed over short periods, and therefore, the application of fiscal and monetary policy instruments is recommended to fully utilise factors of production and stimulate global demand.

The fiscal and monetary policy should be subject to permanent rules and should not rely on arbitrary decisions made *ad hoc*. It seems that the paradigm of sustainable development may constitute such a principle. Strong and sustained economic growth is indispensable to raise real income for citizens. The state has obligations towards the next generations – preserve resources and develop capacities, including social capital. It is crucial in this field to ensure full employment, use of material factors of production, save natural resources and exercise control over inflation. Such goals may be supported by the effective implementation of the stabilisation function of

finance, in line with the macroeconomic model of market economy already developed and known in the theory of finance.

As stated hereinabove, the macroeconomic model of market economy consists of two functions: the IS (Investment-Saving) identity and the LM (Liquidity-Money) function. These functions were introduced into economics by the British economist J. R. Hicks. The IS-LM model allows for analysing the influence of exogenous variables, i.e. the variables of the economic policy (government expenditure, changes in money supply) on endogenous variables, such as production, employment, market interest rates (Rosati, 2017, p. 134 and further).

The IS-LM model is derived from the financial income/expenditure identity, in accordance with the equation:

$$Y = C + I + G + Z \tag{1}$$

where:
Y – sales revenue equal to the value of gross national product GNP (gross domestic product and net exports) in current prices,
C – consumption expenditure in the private sector,
I – investment expenditure,
G – public expenditure on the purchase of goods and services,
Z – net exports (surplus of exports over imports expressed in the national currency).

The income-expenditure identity is objective; it is always preserved *ex post* and implies that the basic manifestation of development, i.e. the GNP growth, takes place in real sphere corporations and means the equilibrium between sales revenue (equivalent revenue) and consumption expenditure of the household sector, investment expenditure and public expenditure on the purchase of goods and services. The value of the GNP is not created by the banking & capital sector, whose function is to transform savings into investments. Nor is the GNP generated by fiscal transfers, including public aid, which are the tools of the allocation and distribution functions of finance.

The most important financial (monetary) condition of the income-expenditure identity is compliance – equilibrium between the stream of savings and the stream of investment outlays. This equilibrium applies to a longer period (at least a business cycle), taking into account the temporary share of public transfers and credit money in incurring investment expenditure. Ultimately, credits and loans should be repaid and a part of the equivalent revenue of corporations and households should be allocated for transfers (which reduces the disposable income of these sectors and the ability to deposit savings in the banking & finance sector, channelled to finance investments).

 DOI 10.7172/1644-9584.75.3

Savings can be generated by: the private sector (Sc), the public sector (Sg) and the foreign sector (Sz), which can be described by the following dependencies:

$$Sc = Y + (F + N- T) – C \quad (2)$$

$$Sg = (T – F – N) – G \quad (3)$$

$$Sz = – Z \quad (4)$$

where:
F – transfers of the public sector to the private sector (wages of persons employed in the public sector, benefits, grants, subsidies, including state aid for entrepreneurs, households),
N – interest paid by the public sector on public debt – in the form of interest on government bonds and treasury securities),
T – taxes and other cash benefits (fees, social security contributions, etc.) paid by the private sector to the public sector,
other designations – as in formula (1).

The conditions for the preservation of the saving-investment identity/ equilibrium *ex ante* can be described by adding to the income-expenditure equation (1): the consumption function (C), the investment function (I) and the net exports function (Z), which are expressed by the following relationships:

$$C = a + bY(1–t) \quad (5)$$

$$I = e – dR \quad (6)$$

$$Z = g – mY – nR \quad (7)$$

where:
a – constant volume of consumption,
b – marginal propensity to consume (a proportion of disposable income earmarked for consumption),
t – the rate of net burdens of the private sector towards the public sector,
e – constant investment rate (independent of other conditions),
d – coefficient of sensitivity of investment expenditure to interest rate,
R – interest rate,
g – constant volume of exports (independent of changes in income and interest rate changes),
m – propensity to import (volume of imports per unit of income),
n – coefficient of sensitivity of exports and imports to interest rate in the country.

The function of investment demand in a market economy is a derivative of not only disposable income of each sector, but is also a derivative of the basic monetary policy tool, i.e. the interest rate, according to the following relationship:

$$i = e - dr \tag{8}$$

and

$$I = \sum_{1}^{n} (e - dr) Dn \tag{9}$$

where:
i – investment rate (share of investments in disposable income),
r – interest rate on the financial market (cost of own or foreign capital involvement),
Dn – disposable income of individual sectors of the economy.

The coefficient of sensitivity of investment expenditure to interest rate is generally negative, which means that an increase in interest (costs of capital involvement in investment activities) reduces propensity to invest. This eliminates some of the projects that at a lower interest rate would be profitable for investors who await the expected rate of return (profitability) of capital employed.

4. Demand for Money and Sources of Its Acquisition in the Financial System

Finance is defined as the total of economic phenomena regarding the collection and distribution/disbursement of financial resources, both by public and private bodies, including consumers (Fedorowicz, 1995, p. 7). The term finance is considered to be synonymous with the category "financial resources"[3]. Z. Fedorowicz (2007, p. 15) defines finance as "those financial phenomena that are associated with creating and moving real financial resources or with incurring liabilities to mobilise financial resources in the future." S. Owsiak (2017, p. 477) emphasises: "An important practical goal of the science of finance is to create scientific premises for changes in the financial sphere of the economy so that they would foster the achievement of the basic goal of management – better satisfaction of human needs."

The finance category concerns the movement of money, and this movement takes the form of diverse financial phenomena. In terms of economic units, the following categories are distinguished (Fedorowicz, 1995, p. 12 and further):
- corporate finance,
- population (household) finance,
- public finance,
- finance of banks and various credit institutions,
- insurance finance.

 DOI 10.7172/1644-9584.75.3

The subject (type) criterion allows for distinguishing groups of cash flows, which include:
- equivalent (market) revenue and expenditure,
- redistribution revenue and expenditure (transfers),
- monetary credit revenue and expenditure.

The relation between the body-based and the subject-based approach to finance is presented in Table 1.

Bodies/sectors of finance	Types/subject of financial flows
Corporate finance Household finance	Revenue from labour and sale of products (equivalent revenue, source of savings and investments, channelled to the banking sector)
Public finance	Transfers (non-equivalent, unilateral benefits)
Finance of banks, credit and insurance institutions	Credit and insurance revenue and expenditure (non-equivalent, repayable) Savings/deposits

Tab. 1. Body-based and subject-based approach to the financial system of the economy. Source: Author's own work.

Finance fulfils various functions, depending on the body and the researcher's approach. It is widely recognised that finance, especially public finance, carries out: the allocation function, the distribution function and the stabilisation function. The functionality of the financial system has developed on the basis of criticism of the institutional approach in which intermediation plays a fundamental role (Karkowska, 2015, pp. 27–28). The most mature definitions of the financial system appreciate the orderly arrangement of its complementary elements, the relations between them that strengthen each other. The financial system regulates the behaviour of various bodies of both the public and private sectors and the mutual relations between them, which can be described by the phenomena of collecting and spending financial resources in accordance with the financial law applicable in a given country and at a given time. The superior criterion of a good system is the ability to achieve the goals for which the system is founded or is developed (Owsiak, 2017, p. 527). The most important function of the financial system is to satisfy specific social needs with public and private cash.

The development considered in this study, which has its roots in the factors of production of the real GDP-generating sphere is recognised in the so-called social accounting. which most frequently brings it down to the presentation of creation and distribution of the gross national product (GNP). It uses the theory of finance, in particular: separate groups of bodies (economic units) and financial flows between them, using the already mentioned types (subject) of financial flows (Table 2). The economic system

is determined by its macroeconomic model, which allows for presenting the stabilisation function of the state finance, which the author of this paper proposes to consider as the basic condition for equilibrating the economy in the short- or long-term (depending on the research horizon and the term of scheduled development activities).

Sector	Revenue/income/proceeds	Expenditure
P – corporate sector	Revenue from sale from C, G, I, Z	Wages for C Taxes and other transfers for G Savings to B
C – Households sector	Wages from P Wages, benefits from G	Purchases from P Taxes for G
G – Public sector	Taxes from P Taxes from C	Purchases from P Wages, benefits to C
B – Banking & capital sector	Savings from P Savings from Z	Financing of I
I – Investments sector	Credits and loans from B	Purchase of investment goods in P
Z – Foreign sector	_	Net exports for P Deposits in B

Tab. 2. The financial flows of sectors in the economy. Source: Author's own work.

The analysis of the consumption function and the investment function should help estimate the demand for liquid money (M), i.e. for cash, necessary to discharge all kinds of obligations and liabilities related to the implementation of development projects. Demand for money can be presented as the money liquidity function (LM) with the equation:

$$R = k/h\ Y - 1/h\ M \tag{10}$$

where:
k – inverse of velocity of money
h – coefficient of sensitivity of demand for money to changes in interest rate

In accordance with the model of macroeconomic market equilibrium, acquiring the necessary means of payment becomes a fundamental issue in planning development activities. The target sources of investment financing in the long-term are always savings – postponed. In a short-term, such sources of investment financing are entrepreneurs' equity and external capital, transfers of the state budget or transfers of local government units. Grants from the EU funds are also transfers that come from taxes – that is a reduction of disposable income (reduction of savings) in the corporate and household sectors.

 DOI 10.7172/1644-9584.75.3

Table 3 presents the institutional and instrumental sources of cash in the financial system of the economy.

Criterion	Financial system of the state	Private finance
Institutional	State budget and local government budgets Ministerial budgets Special-purpose funds Public foundations and agencies Central bank and state banks State and local authority enterprises State-owned public and insurance companies Stock exchange	Enterprises Commercial banks Private public and insurance companies Private foundations and agencies Leasing companies and investment funds Households Foreign financial institutions
Instrumental	Taxes Grants Fees Subsidies (including tax reliefs) Loans Credits Custom duties Income from public property (e.g. dividends) State and local authority bonds Shares Equity holdings Insurance premiums	Revenue from sale Wages Fees Rents Credits Loans Bonds Shares Equity holdings Grants Subsidies Allocations and donations

Tab. 3. Sources of means of payment in the financial system of the economy. Source: Author's own work.

Among the sources of acquisition of means of payment in the economy, market transactions as well as transactional – equivalent money are of particular importance for balancing the economy. However, the market mechanism cannot ensure a satisfactory rate of economic growth, high employment rate and low inflation. Therefore, the instruments serving the stabilisation function, but also the allocation and redistribution functions of public finance, are crucial in mitigating the fluctuations of the business cycle. Such mitigation involves the impact of income, expenditure and budget balance on: propensity to save, propensity to invest, interest rate level, unemployment level (Owsiak, 2017, pp. 104, 107).

A balanced budget was one of the basic principles of classical treasury. The parliament and society assessed governments based on whether they maintained a budgetary balance. This has changed since the Great Depression and the development of state interventionism, in particular due to the accomplishments of J. M. Keynes (Owsiak, 2017, pp. 405–406, 410–411). In his view, the state triggers off the multiplier effect by impacting the economy with the help of income and, above all, expenditure. Keynes's

investment multiplier means that additional investments bring about a much faster growth of the national income. Boosting demand in the economy through additional state expenditure, despite increasing taxes, results in a greater increase in the national product and national income as a result of the multiplier effect.

The financial system and the economic growth, and thus sustainable development, are closely interconnected. The risk generated in the financial system affects the real economy, and the state of the real economy and its changes (development) are highly dependent on financial market conditions. Despite methodological difficulties, empirical studies on the impact of the financial system on the economic growth reveal a strong correlation in this respect both for the USA and many other countries (Karkowska, 2015, pp. 35–38). Further and in-depth research is required into the effectiveness of individual instruments of the new financial engineering, including structured and derivative instruments. Their importance for the efficiency of banks and other credit institutions and financial investments seems more obvious. However, their impact on material investments and the development of the real sphere has resulted in the bankruptcy of even large listed companies.

5. Conclusions

Sustainable development as a category and a paradigm of modern civilisation is the subject of interest, theoretical analyses and research work of many different disciplines. However, this category is still not measurable and quantifiable, and qualitative assessments (e.g. the level of well-being) do not meet the conditions of objective and comprehensive studies.

There is a broad-based consensus that the synthesis and comparability of research results are ensured owing to the application of monetary – price units. They allow for expressing the value of the goods and services produced in the economy as the gross national product (GDP). Quite apart from the deficiencies of its measurement, the GDP fails to demonstrate any developmental changes within the meaning of sustainable development that requires the achievement of three orders: the economic, ecological and social order – now and for the next generations. The original attempt to express the integration of these orders is the concept of ecosystem services and their valuation. Ecosystem services is a new field of research and application (Mizgajski, 2010, pp. 10–19). It is a development of the concept and achievements particularly of R. Costanza (Costanza, 1997, pp. 253–260). The findings of these studies can be used to adjust the value of the GDP by the so far non-measurable goods created by ecosystems and not only by man and technology. But that invariably means the absence of measurements of the states and processes of equilibrium in time and space.

The study indicates that the equilibrium can be expressed in monetary units. However, there are also other concepts of measuring the GDP, e.g.

 DOI 10.7172/1644-9584.75.3

in terms of energy. It is worthwhile recalling the proposal of D. I. Stern and A. Kander (Stern & Kander, 2012, pp. 125–152), which is an extension of the Solow model. The function of production with constant elasticity has been enriched with energy inputs, and capital flows have been linked to energy prices.

Finance as a science about the management of money and the financial recognition of economic processes (continuous financial flows constituting the lifeblood of the economy) seem to be particularly useful for the synthesis of sustainable development. Macroeconomic models allow for recognising sustainable development as an endeavour to preserve the identity of financial flows in two functions – a stream of savings and a stream of investments in the economy. These two streams ensure growth over a longer period. An imbalance between them means the lack of a testament for the next generations, which is the basic requirement for sustainable development.

The identity of investments and savings teaches that, contrary to common expectations, the state should not provide funds (distribute means of payment) to finance the real sphere (generating the GDP) but should create – in the longer term – conditions for boosting the propensity to save and invest, and only temporarily and in selected areas should provide reimbursable means of payment for the implementation of development activities. The lack of evaluation and planning of integrated, financial effects of investment decisions for the macroeconomic equilibrium, in particular balancing investments with savings, makes sustainable development only a terminological innovation and an ideological myth. The state should pursue an effective and responsible financial policy using money (especially payments). The attributes of sustainable development are ensured when the universal goals of the financial policy are achieved, namely: economic growth (GDP growth), preservation of the value of money (counteracting of inflation), creation of jobs (reduction of unemployment), stabilisation of the economy (Owsiak, 2017, p. 481),

Endnotes

1 The global economy is seeing, on the one hand, a rise in the power of representation of trade unions and, on the other hand, the creation of transnational corporations, often with a greater economic potential than individual states. This generated an imbalance between the world of labour and capital. Such imbalance was accompanied by the deregulation of capital markets, which allows for capital speculation on an unprecedented scale and, consequently, for the acquisition of huge financial resources without creating goods (A. Pawłowski & L. Pawłowski, 2013).

2 However, there are works in Polish where *sustainability* is translated as *zrównoważenie rozwoju*, as well as *ekorozwój* (for example Zaleśna, 2016, pp. 280–285). It is emphasised in this paper that *sustainability* comes from German (*Nachhaltigkeit*). The term is considered to have been coined by H. C von Carlowitz with regard to forest management (in a paper from 1713). It made its way into the Englsh language in the 19th century. The term *sustainability* is also treated as a synonym of corporate social responsibility (CSR)

[3] The extensive structure of modern finance is presented in: Flejterski, S. (2007) Metodologiczny status współczesnej nauki finansów. In *Finanse jako przedmiot badań interdyscyplinarnych* (pp. 13–29). He identifies new disciplines and trends in the science of finance, and among them indicates ecofinance, associated with the economics of sustainable development. The author of this study has in mind the use of the classic theory of finance to describe the equilibration of the economy and its development.

References

World Commission on Environment and Development. (1987). *Our common future.* New York: Oxford University Press.

Burchard-Dziubińska, M. (2015). *Zielona gospodarka jako nowy obszar zainteresowania ekonomii.* In B. Fiedor (Ed.), *Nauki ekonomiczne. Stylizowane fakty a wyzwania współczesności.* Warszawa: PTE.

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Naeem, S., Limburg, K., Paruelo, J., O'Neill, R.V., Raskin, R., Sutton, P., & van den Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature, 387*.

Fedorowicz, Z. (2007). *Istota i funkcje finansów*. In J. Ostaszewski (Ed.), *Finanse.* Warszawa: Difin.

Fedorowicz, Z. (1995). *Podstawy teorii finansów.* Warszawa: Poltext.

Owsiak, S. (Ed.). (2014). *Finanse w polityce makroekonomicznej państwa*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

Flejterski, S. (2007). Metodologiczny status współczesnej nauki finansów. In S. Owsiak (Ed.) *Finanse jako przedmiot badań interdyscyplinarnych.* Kraków: Wydawnictwo Akademii Ekonomicznej.

Galbraith, J. K. (2011). *Pieniądz. Pochodzenie i losy.* Warszawa: PTE.

Harrod, R. F. (1939). An essay in dynamic theory. *The Economic Journal, 49*.

Karkowska, R. (2015). *Ryzyko systemowe.* Warszawa: Wolters Kluwer SA.

Kornai, J. (1985). *Niedobór w gospodarce.* Warszawa: PWE.

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*.

Mankiw, G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics, 107*(2).

Mizgajski, A. (2010). Świadczenia ekosystemów jako rozwijające się pole badawcze i aplikacyjne. *Ekonomia i Środowisko, 1*(37).

Owsiak, S. (2017). *Finanse publiczne. Współczesne ujęcie.* Warszawa: PWN SA.

Pawłowski, A. & Pawłowski, L. (2013*).* Warunki trwałego, zrównoważonego rozwoju ludzkości*. Przyszłość. Świat- Europa- Polska,* (2).

Rogall, H. (2010). *Ekonomia zrównoważonego rozwoju. Teoria i praktyka.* Poznań: Wyd. Zysk i S-ka.

Romer, P. (1986). Increasing returns and long – run growth. *The Journal of Political Economy, 94*(5).

Rosati, D. K. (2017). *Polityka gospodarcza. Wybrane zagadnienia.* Warszawa: Oficyna Wydawnicza SGH.

Sadowski, Z. (2004). *Ekonomiczne i społeczne warunki trwałego rozwoju.* In A. Pawłowski (Ed.), *Filozoficzne, społeczne i ekonomiczne uwarunkowania zrównoważonego rozwoju.* Monografie Komitetu Inżynierii Środowiska PAN, 26.

Skousen, M. (2011). *Struktura produkcji. Giełda, kapitał, konsumpcja.* Warszawa: Fijorr Publishing.

Solow, R. M. (1994). Perspectives on growth theory. *Journal of Economic Perspectives, 8*(1).

Stern, D. I. & Kander, A. (2012). The role of energy in the industrial revolution and modern economic growth. *The Energy Journal, 33*(3).

 DOI 10.7172/1644-9584.75.3

Stiglitz, J. E., Sen, A., & Fitoussi, J. P. (2013). *Błąd pomiaru. Dlaczego PKB nie wystarcza.* Warszawa: PTE.

Swan, T. (1956). Economic growth and capital accumulation. *Economic Record, 32*(2).

Woźniak, M. G. (2008). *Wzrost gospodarczy. Podstawy teoretyczne.* Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

Zaleśna, A. (2016). Relacja między misją a wizją a zrównoważonym rozwojem (sustainability) - ujęcie teoretyczne i praktyczne. In J. Ejdys (Ed.), *Społeczna odpowiedzialność i zrównoważony rozwój w naukach o zarządzaniu. Aspekty teoretyczne i praktyczne.* Toruń: TNOiK.

Ziółkowska, W. (2014). Niektóre aspekty finansów publicznych i zrównoważonego rozwoju w Unii Europejskiej. In S. Owsiak (Ed.), *Finanse w polityce makroekonomicznej państwa*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.