on Mutual Coincidence of Return on Capital Measuring Principles by Adam Smith and Karl Marx (A Critique of "Capital in the Twenty-First Century" by Thomas Piketty)

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Annotation

In his book "Capital in the XXI Century" by Thomas Piketty justified the two basic laws of capitalism. On the basis of these economic laws Thomas Piketty concluded destabilizing role of accumulated national capital. Based on his critical analysis this paper studied alternative ways of identification and knowledge of the objective laws' system that would become the tools of detection imbalances in the economy and assessing the impact of the regulatory impacts on the development of a market economy. Develop an appropriate model for the analysis of regulatory impacts.

Keywords Capital, Profitability, Scientific and technological Potential, Law, Macroeconomics, Balance, Effect Methods

Thomas Piketty, author of the bestselling book "Capital in the Twenty-First Century", has paid serious attention to the methods of measuring economic growth, including the method of measurement of nominal GDP, defining its by multiplication of return on capital by its volume. He correctly noted that "the concepts of inflation and growth are not always very well defined. The decomposition of the nominal growth (the only kind that can be observed with the naked eye, as it were) into a real component and inflation component is in part arbitrary and has been the source of numerous controversies" [1].

Speaking about the effects of accumulation and return on capital's decrease, he notes, "...on the basis of historical experience, the most likely outcome is that the volume effect will outweigh the price effect, which means that the accumulation effect will outweigh the decrease in the return on capital."[1]. At the same time, he pays attention to that in agriculture there is a reverse process: "... capital (such as farmland in the case in point), it is inevitable that beyond a certain point, the price effect will outweigh the volume effect... There is no better illustration of the maxim "Too much capital kills the return on capital" than the relative value of land and land rents in the New World and the World" [1].

In general in the Piketty's book, the principle of two-dimensional measurement

of economic growth was successfully used to analyze the price effect, as a form of the capital's cost in its form of goods, and volume effect, as a form of the capital's cost of in its form of money. The same principle is used for two-dimensional measurement of the two fundamental economic laws of capitalism (in the terminology of the author).

However, deeper analysis shows that these laws have no any relation to the fact that the "the volume effect is will outweigh the price effect, which means that the accumulation effect will outweigh the decrease in the return on capital". Moreover it hasn't related to"...farmland in the case in point it is inevitable that beyond a certain point, the price effect will outweigh the volume effect". Pikettydoes his findings on the basis of historical retrospective in some combination of it with the dynamics of economic laws. The reason for these inconsistencies and inaccuracies has often derived from an outdated theoretical basis of establishment of analytical toolsthat are being used now in the practice of market economies institutions and management agents' regulatory impact assessment.

In our opinion, the main factor that has a destabilizing effect on the sustainability of the market economy is the outdated persistence of a one-dimensional measure of return on capital, which is recommended by Adam Smith as a tool to assess the true value of goods and money[2].

So, up to this day the principle of a one-dimensional measure of return on capital by Adam Smith has existed in the theoretical basis of current models of balanced economic growth. As an example, the traditional formula of the GDP deflator (inflation) - pb, can be taken for, which has the known form as follows:

$$pb = \frac{NGDP}{RGDP}(A)$$

where NGDP-is nominal GDP, which by its content is the final product in money terms.

The theoretical basis of the formula (A) is the Adam Smith's principle of a one-dimensional measure of return on capital. According to this formula, if nominal GDP (NGDP) grows faster than real GDP (RGDP) in the long term, what is happening in some developing countries nowadays, then the GDP deflator (pb) as an indicator of inflation, fueled by the national currencies devaluation may tend to infinity (pb $\longrightarrow \infty$).

This is not the only example, which defines the Adam Smith's principle of one-sidedness of return on capital's measurement and its limitation as a balanced growth's theoretical base models. Thus, in the equation of monetarism, by replacing pb*RGDP onto NGDP, we have got:

$$NGDP = V * M$$

where M - money supply, V - velocity of money.

Since V (velocity of circulation) according to the monetarism model is a constant, and taken M (money supply) tending to infinity, then nominal GDP (NGDP) may also tend to infinity. Even though Thomas Piketty properly finds out the formula (A)'s limit to assess the balanced economic growth, he himself falls into the formula's trap. For instance, in his analysis of the real growth rate's measurement tools ThomasPikettyhas failed to go beyond the limits of the Adam Smith's principle of a one-dimensional measure of return on capital.

His artistic success in the establishment of two economic laws of national income and the national capital, could not spread further towards the correct breakdown of "nominal growth into real and inflationary components", and towards the elimination of errors in evaluation methods for growth rateand inflation. In short, Thomas Piketty diagnosedproperly the market economy disease, but was not able to determine the treatment methods.

Identification and knowledge of the market economy development laws is needed to make key management decisions and adjustments of previously taken ones. Otherwise, inaccurate directions and contradictory readings of analytical tools result in the destabilizing and social inequalities that are listed in the Thomas Piketty'sbook.

As already mentioned, the theoretical basis of all actual current market equilibrium and balanced growth's models, including Piketty's economic equilibrium model, up to this day is founded on the Adam Smith's one-sided principle of return on capital's measurement. Adam Smith's one-sided approach consists in reducing the economic growth'stwo-dimensional,by working time and national currency, measurement system into the one-dimensional system measured by money.

For Adam Smith, "the annual cost of the product" is identified with "the cost that is newly established during the year[3]. More precisely, he was correct that the value of the annual product can be reduced to the same components of the newly created during the year value. Adam Smith and his modern followers are right in establishing the value of the final product by deducting material resources spent costs from the "cost of the ready product". From a mathematical point of view these transactions by A.Smith and his followers are perfect.

However, economy development indicators, both by the Adam Smith's theory and by the Karl Marx's theory, are measured in the first place by working time. By both theories the price of the working time is the base measure for productive forces of labour and capital . Thus, Adam Smith specifically states that "Labour measures the value, not only of that part of price which resolves itself into labour, but of that which resolves itself into rent, and of that which resolves itself into profit"[2]. Then he gives a specific example:"In the price of corn, for example, one part pays the rent of the landlord, another pays the wages or maintenance of the labourers and labouring cattle employed in producing it, and the third pays the

profit of the farmer. These three parts seem either immediately or ultimately to make up the whole price of corn. A fourth part, it may perhaps be thought is necessary for replacing the stock of the farmer, or for compensating the wear and tear of his labouring cattle, and other instruments of husbandry. But it must be considered, that the price of any instrument of husbandry, such as a labouring horse, is itself made up of the same time parts; the rent of the land upon which he is reared, the labourof tending and rearing him, and the profits of the farmer, who advances both the rent of this land, and the wages of this labour. Though the price of the corn, therefore, may pay the price as well as the maintenance of the horse, the whole price still resolves itself, either immediately or ultimately, into the same three parts of rent, labour, and profit."[Ibid, p.105].

This approach of Adam Smith is static, and focused on the short term and for a momentary effect when the scientific and technological potential of the country has no time to be updated, or when its impact on the real economy can be ignored. Karl Marx's approach is focused on long-term development and the market economy sustainable development. But his approach does not replace the Adam Smith's principle of return on capital, but summarizes and complements it.

A commodity, according to Marx, is in development, its dividing onto "the goods and money is the law of the expression of the product as a commodity" [3]. It is this law Thomas Piketty did not consider by partly remaining within the framework of the Adam Smith's principle of a one-dimensional measurement. He failed to take into account that goods and money were developing and transforming into capital, which became a form of its product or its form of money.

In the third volume of "Capital" which explores the development and self-development of capital in general Karl Marx introduces two-dimensional measurement of capital in its form of money and capital in the form of its goods. These measures or economic growth measurement "rulers" are being presented by working time in form of man-hours and money in form of the national currency of each country.

Marx's summary with respect to the Adam Smith's one-dimensional approach is the following: "He does not distinguish the dual nature of labour itself, i.e.does not distinguish between labour,as a cost of wage creating value, and labour, as a specific and useful labour creating commodities (use-value). The total amount of goods produced in a year i.e. an entire annual product is a product of useful labour active during the past year; all these products exist only due to the fact that publiclyemployedlabourwas consumed in diversified extensive system of various kinds of usefullabour. That is the only reason the cost of the means of production has been consumed during manufacturing but kept in the total cost of manufactured commodities, preserved as reappearing in a new kind. Consequently, the entire annual product is a result of the useful labour expended during

the year. But only a part of the annual cost of the product has being created newly; this part is the newly created cost for the year, which embodies the sum of labour,spent during the year" [3].

Our studies done based oneconomic science latest achievements, in particular the Nobel Prize Leonid Kantorovich and TjallingKoopmans' duality principle, show that Adam Smith is partly right in saying that "the cost of the annual product",according to that principle, can be reduced to "the newly created cost for the year."

The Adam Smith's principle of return on capital allows to estimate the cost of capital in its form of money; while Karl Marx is right in saying that the total costs of producing a particular product, as capital, in the form of its goods are consumed in the production of the final product "capital plus income" [4]. Both of these indicators are not just theoretical, but also have a crucial practical significance.

In accordance with the principle of duality, they form the basis for the two-dimensional measurement of the balanced economic growth. Thus, the newly created value for the year by Adam Smith is an exact expression of the cost of capital in its form of money. The practical implementation of this concept is found in the nominal GDP, which is the cost of the final product. And the cost of the annual product by Karl Marx is an exact expression of the cost of capital in its form of goods. The practical implementation of this concept is in real GDP, which is to represent the volume of actually produced final product.

The conclusion is that to eliminate errors in the measurement of inflation and real growth,which is possible by adding the Adam Smith's one-dimensional approach with the Karl Marx's approach based on assessmentof the labour' total costs, that are objectively necessary for the production of the given structure's final product amount. Therefore, the rationale of the new market equilibrium equation can start from that point where ThomasPikettystopped his theoretical research of two-dimensional measurement: of the national income ÍCby money, and of the national capital ÍC by working time, man-years.

In this case, the duality theory allows you to take advantage of the two-dimensional measurement criterion. Firstly, the cost of the working time is measured by estimating the product's direct and full labour-intensity of economic activities. Second, the cost of the final product (nominal GDP) and resources total costs for the production of nominal GDP are set in monetary terms. According to the duality principle, solutions for interlinked problems identified on the basis of the industries intersectional balance report will meet following criteria [5-7]:

$$L = t * X = T * Y (B)$$

where t - is direct line and T- product fulllabour-intensity, L - the entire fund of working time, in man-years, Y- final product value (nominal GDP) and X-

resources full costs for the nominal GDP production.

Fourthly, we introduce the extension transformation below:

The tool for solving the contradictory problem is extension transformation. By using certain transformations, an unfeasible problem can be transformed a feasible one. We only introduce the general concept and the basic types of transformation.

In the formula (B), each component of the full labour-intensity Tof the final product value Y is determined by the scalar multiplication of the product's direct labour-intensity components t by components of each column of the full costs technology matrixB = (E - A)-1, which serves as a carrier of scientific and technological progress and, therefore, the true value of goods and services.

At the national level we have the equalities t = L / X and T = L / Y. From here we denote the level of scientific and technological potential (STP) as c and get as follows:

$$c = \frac{t}{T} = \frac{Y}{X}(C)$$

STP ratio of the country c with its growth (+,-) is determined either by the magnitude of the margin, which is correlated with changes in the prices of goods and services, or by the amount of rent which changingrate is correlated with the intensity of productive resources utilization.

In any case, the effect of volume, which represents the level of scientific and technological potential of the country, is measured by the difference between the growth in labour productivity, defined by value of the final product and used in its resources production, as they have both utilized the very same equal fund of working time:

$$\frac{c}{c} = \frac{Y/L}{Y/L} - \frac{X/L}{X/L}.$$

The new equation of market equilibrium derives from the basis of adding the Adam Smith'sprinciple of return on capital to the principle based on the ratio of direct and fulllabour-intensity, as determined by the Karl Marx's theory of capital's labour value.

Thus, on one hand, the new equation ofthe balanced economic growth of nominal value of the final product (NGDP = Y) defined by the formula:

$$NGDP = c * X.$$

In this formula the level of national income is measured by the value of nominal GDP. It is determined by multiplying the level of scientific and technological potential (STP) of the country c by a volume of domestic capital X. Here, the scientific and technological potential (STP) of the country c represents coefficient of national capital efficiency. This equation is the analog of the first fundamental

law of market economy development, defined on the basis of the principle of duality.

On the other hand, multiplying both sides of the GDP deflator equation by the purchasing power of the national currency (not to be mixed up with purchasing power parity) pp, we have got as follows:

$$pp * NGDP = pp * pb * RGDP$$

Hence we have a qualitatively new equation of balanced economic growth, which determines the actual volume of the final product RQ:

$$RQ = pp * NGDP = pp * pb * RGDP(D)$$

where NGDP, as well as previously, represents nominal GDP, which determines the cost of the final product, and its multiplication by the level of the true value of money represents the real final product.

Since the pp * pb is equal to c = NGDP / Xas by definition the value of money pp = RGDP / X, while the GDP deflator pb = NGDP / RGDP, then the purchasing power of money (not to be mixed up with the parity of purchasing power of money) is defined by formula:

$$pp = \frac{c}{pb},$$

where the value of the ccoefficient, which represents the level of scientific and technological potential of the country, is determined by the ratio of direct labour-intensity to its full labour-intensity (t / T).

This ratio is determined due to the principle of duality solution for interlinked problems, based on the data of given reports on the industries intersectional balance of the country; and it is equal to the ratio of the value of the final product cost used in the country to the total consumption of resources used for its production (Y / X).

To change economic policy, aimed at establishing a real growth index of prices of goods and services, and the level of depreciation of the national currency, is doable due to the system of economic laws and regulations, which are derived from combining the Adam Smith's principle of one-dimensional measure of return on capital to the Karl Marx'sprinciple of two-dimensional measurement of return on labourand capital.

The main ones, which are caused by the definition of the true cost of price indices of goods and services by the purchasing power of money, are as follows:

1) The law on determining overall impact of the takenincentives on innovative investmentsinto the economy and on scientific and technological improvement of the production process, including the strength of competition $c(t)$:

$$c(t) = NGDP/X(t) \neq 1,$$

Though on the basis of return on equity ratio by Adam Smith an STP coefficient: $c(t) = pp * pb = 1$,because by definition, the value of money $pp = RGDP/NGDP$, and the GDP deflator $pb = NGDP/RGDP$.

2) The basic law on determiningreal purchasing power of money, as the ratio of the scientific and technological potential of the country to the GDP deflator $pp(t)$:

$$pp(t) = c(t)/pb(t).$$

3) The law on determining prices of goods and services $pc(t) = 1/pp(t)$:

$$pc(t) = 1/pp(t) = NGDP(t)/(c(t) * RGDP(t)).$$

4) Leading law on determining real growth of the final product on the basis of nominal GDP growth$RQ(t)$:

$$RQ(t) = pp(t) * NGDP(t).$$

5) The control law on determining real growth of the economy, on the basis of real GDP growth $RQ(t)$:

$$RQ(t) = c(t) * RGDP(t).$$

6) The law on defininga GDP deflator, the general price deflation of goods and services $pb(t)$:

$$pb(t) = c(t)/pp(t) = NGDP(t)/RGDP(t).$$

7) The law on determining net benefits of promoting scientific and technological advances and competition $(\pm\triangle c(t))$:

$$\pm\triangle c(t)\% = (c(t)/c(t-1))\% - 100\%.$$

Since any incentives on scientific and technological improvements have certain expenses of costs of labour, capital and materials then their return is associated with risks, and return on these funds can be a value greater than 100 and less than 100. However, where the competitive environment is developed there the contribution of science and technology potential into the development of the real economy, as a rule, would be positive.

The exceptions are those developed countries where sources of reduction of material resources through scientific and technological advances have been exhausted; and those countries trying to maintainthe efficiency of their economies at the expense of reducing their national currenciespurchasing value. However, these attempts are easily detected by a tool developed with the help of a system of laws to promote competition in the market economy.

The path to sustainable economic growth goes through the open labour market, focused on the final product production. Thus, last five - six years the actual "restoration" of the old world monetary and financial system by transferring private risk to the global (system-wide) level, and by the public debt exponential increase in a number of leading countries and the money supply, makes the issue of transition to a new world economic order more difficult.

The problem of transition from the current crisis and unstable state of the world economy to a sustainable growth mode should be investigated in the system, as shown above, in the unity of the macroeconomic, sectoral and microeconomic aspects of market economy development based on feedbacks that exist between the various regulatedagents, and of patterns of the long-term economic development countries of the world.

This approach significantly expands the understanding of the causes of the global financial crisis, allowing to realise mechanisms of modern economy reproduction and to develop reliable tools for its sustainable development. Thus, the history of economic thought tells that objective laws of market economy can justify new, adequate to the new world economic order, models of economic governance, by which it will be able to ensure the unity of the three product types: nominal, real and final.

By and large, the core to ensure the unity of three GDP growth rates is the final product, the real value of which is determined by the equation (D) under the influence of the real purchasing power of the national currency at nominal GDP and the rate of scientific and technological potentialat the real GDP.

According to this model of balanced economic growth the procedure of targeting nominal GDP is implemented instead of inflation targeting'monetary policy.This is the Tate-Shafarevich group: $\text{Ш}_{E/K}$. Here it is as a subscript: $A_{\text{Ш}}$.

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