Moving Force of the Competitive Mechanism Econometric Analysis

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Abstract

The theory of a competition exists for many years, but is a subject of permanent changes owing to economic activity conditions variability. To authors' opinion, theoretical postulates which concern its dynamic component, i.e. competitive mechanism, are insufficiently researched. With the purpose of the above-mentioned theory pithiness deepening, the authors carry out the given research.
In the article results of the competition theory researches are stated, in particular – the essence and objective base of the competitive mechanism are singled out; the authors' definition of the competitive mechanism is offered. By means of the historic-logic approach the sights of scientific-economists of different times on the source of economic dynamics are analyzed, the authors' concept of competition moving force is offered, which is personified in a hedonistic principle. At the macroeconomic level the character and intensity of connection between the competitive mechanism and parameters of economic growth dynamics are investigated by means of correlation-regression analysis, namely – the econometric model of interrelation between the Economic Freedom Index and a Gross Domestic Product per capita nominal and GDP/PPC per capita is constructed.
The object of the research is the competitive mechanism as a dynamic component of the competition systematic phenomenon. The perspectives of the given research consist in the estimation of the other macroeconomic parameters of the country development (for example, The Global Competitiveness Index, The Human Development Index) from the competitive mechanism development degree connection narrowness and importance.

Key words: the competitive mechanism, objective bases, moving force, the law of the needs increasing, the law of limited resources, The Economic Freedom Index, The Gross Domestic Product, the econometric analysis, the correlation coefficient, the determination coefficient, the parameter's displace estimation, the relation narrowness estimation, the relation significance estimation.
JEL classification: C51, D41.

The present stage of the Ukrainian economy development is deeply specific. Formal transformations completeness, fixed in the global economic space recognition of the country's market status, encounters the real absence of majority of the expected results from the market system functioning, as for example: the strong competitive structure of the country, the availability of the companies-leaders at the separated markets at the global scale, the impetuous demand growth for the competitive goods made in Ukraine, the surpassing rates growth of the population well-being, the significant changes and shifts in the national economy structure which flexibly would be guided by market needs. To our opinion, such discrepancy is explained by the association of minimum conformity to "the perfect market" conditions and simultaneous significant freedom reception in making commercial, administrative, household decisions. Therefore the basic specific features of modern Ukrainian economy development, to our opinion, are the alterations, deformations, non-fasten of the market-competitive economic activity conditions. That's why authors have determined the research of the depth of macroeconomic growth parameters dependence degree from the competitive mechanism development inside of the country as a problem of the given article.

For a long time scientists-economists were interested in the question: what moves economy forward? What forces economic subjects to create new goods, to render new services, to expand their range? Why, who, how and when wins competition, and becomes, at last, the leader of the market [4]?

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For example, the "economic person" of Adam Smith is guided in his activity by self-interests, by diligence to improve his position; being guided by personal benefit, this person optimizes his efforts, and this turns beneficial for the society. With the aim of an "invisible hand" mechanism (the competitive mechanism) had an opportunity to act, the "natural freedom" to protect his own interests is needed. Such ideas of the "natural order" which for the first time were stated by F. Kene, Smith distributes to the state activity. Thus it was emphasized, that the personal interest will serve as motive power of progress under condition if everybody receives identical opportunities.

The idea about a personal interest as a moving force of social development is present also in D. Ricardo's works. But in his concept interests of industrial bourgeoisie, instead of landowners are defining.

J. Mill in the center of economic development puts interests of the separate person, sharing sights of philosophers such as D. Hume and J. Bentham about the individualism' determinism; he considered that economic laws can be realized only through interests' collision.

J.St. Mill in his researches refers to the objective law of a personal interest, or a hedonistic principle, according to which the distinctions in interests are the real freedom, through interests' collision rational subjects form their behavior. At the same time, individualism counteracts to any interference from the state in economic activities freedom.

Socialists-utopians oppose the ideas of organization and coordination to the ideas of economic freedom and egoism, with the aim of anarchism, disorder and chaotic avoidance. But they do not refuse the thesis that aspirations of the person (S. Furje names them "passions") push and regulate the public progress.

Marxist philosophies in general and Marxist economic sights in particular, are penetrated by the opposites' unity and conflict idea, which are the source of any development. Finding at a theoretical level the means of the dialectic decision of disagreements for the majority of the socioeconomic phenomena, Marxists at an interclass level do not see alternative to a revolutionary way.

Representatives of German historical school had nation, society, lawful state as a main acting person, that's why they denied an individualism principle and the economic interests' opposition in the society, but recognized the interests of different nation's rivalry (Muller, Gildebrand).

In the Austrian marginalism school economic subjects are homogeneous and equal in rights, each acts exclusively in his own interests, and economic laws are the consequence of individual decisions mutual balancing. In economic process needs of an individual have a main role, they are the version of unsatisfied desires which infringe physiological balance.

The founder of the market mechanism theory, A. Marshall, emphasized, that the economic science is interested mainly *in motives* of the person's behavior, and as a moving force of economy considered the freedom and the competition.

Neoclassics and neoliberalism kept almost without changes a hedonistic principle, supplementing and concretizing its action at different starting conditions (at monopoly, monopsony, oligopoly, etc.). The principle of individualism was also saved in the based by Joseph Shumpeter theory of the enterprising initiative. Maximum individual freedom is at the heart of the theory of "spontaneous order" of F. Haiek, and any organizational forms and formations are the consequence of circumstances coincidence. Interests' collision of separate people in occasion of concrete economic events generates the rational social order. Economic individualism provides competitiveness to any forms of private economy, including monopolies. Function of the state consists in competition freedom, choice freedom, development freedom protection.

Institutionalism has strengthened the psychological interpretation of economic progress. In particular, the moving forces which induce the person to productive activity are: parental feelings, inquisitiveness, an instinct of skills. J. Commons explains the economic activities by the people's desire to reach the better life. W. Mitchell recognizes the gravitation to profits, a habit (instinct) to

receive and spend money as a movers of the economy, which are often predetermined not only by the needs, but by the diligence to support image or to surpass the contender.

According to F. Engels, "Each small group of competitors should wish monopoly for itself against all others. The competitiveness is based on interest and interest again creates monopoly" [3]. Interest of the economic subject grows from the realized need. In connection with that the enterprise (firm) is often considered as a basic subject of competition, such interest is regenerated to profit maximization aspiration that considerably simplifies the theoretical analysis in most cases. To our opinion, the moving force of the competitive mechanism (the subjects of it could be enterprise, state, mankind as a whole, separate persons) is *a hedonistic principle*, i.e. a primary source of human activity which is a chain of needs' satisfaction: comprehension of existing need – aspiration to satisfy it (interest) – motivation for certain action – action. Public needs (on behalf of which the state authorized bodies cares), are satisfied owing to realization of the taxation and income redistribution system. In this circuit constantly is decided and revived in new form the contradiction between human needs which constantly increase, and existing opportunities of their satisfaction (the present limited resources).

Objective bases of the competitive mechanism are caused by infinity of society needs increasing process and physical limitation of present resources, according to the general law of increasing needs. Each subject of economic activities (person, family, enterprise, state, etc.) is limited in his opportunities of needs satisfaction. Therefore, owing to impossibility of increase in necessary resources in public scales, subject turns to its redistribution which lasts constantly and has an object of more complete needs satisfaction. Non-uniformity of starting conditions, disproportions in a starting resources distribution induce subjects to find the means to change the disproportionality in their advantage for the sake of advantages today or in the future reception. A complex of definitely ordered actions to which the subject turns for the sake of reception of advantages before other subject of the same or higher level of economic system, making a start from the present opportunities, outlined by the field of economic activity (the competitiveness environment), form the mechanism of a competitiveness, are its dynamic subsystem.

We suggest to define the competitive mechanism as the mechanism of conscious use of the law of a competitiveness for the sake of existing resources redistribution in own advantage with the purpose of needs satisfaction. The competitive mechanism represents a functional subsystem of a competition which components are forms, methods, tools of interaction between subjects of the competitive environment.

To our opinion, the theory of the competitive mechanism has the right to life only if its practical significance will be proved. For this purpose the correlation-regression model has been developed with the use of a single-step method of the least squares.

To estimate the regression equation parameters the procedure of a single-step method of the least squares was used, which for pair regression foresees construction and decision of such systems of the normal equations:

- Linear dependence $\begin{cases} na + b\sum_{i=1}^{n} x = \sum_{i=1}^{n} y \\ a\sum_{i=1}^{n} x + b\sum_{i=1}^{n} x^2 = \sum_{i=1}^{n} xy \end{cases}$;

- Hyperbolic relation: $\begin{cases} na + b\sum_{i=1}^{n} x_1 = \sum_{i=1}^{n} y \\ a\sum_{i=1}^{n} x_1 + b\sum_{i=1}^{n} x_1^{\,2} = \sum_{i=1}^{n} x_1 y \end{cases}$ where $x_1 = \frac{1}{x}$;

In our analysis the independent variable is The Economic Freedom Index (EFI), which is calculated by The Heritage Foundation and The Wall Street Journal [2]. This Index is aggregative, it estimates 161 countries by 50 independent parameters, which are divided into 10 categories of economic freedom, in particular: Trade Policy, Fiscal Burden, Government Intervention, Monetary Policy, Foreign Investment, Banking and Finance, Wages and Prices, Property Rights, Regulation, Informal Market (the last one is evaluated by The Transparency International data). Countries are classified in 4 categories: Free, Mostly Free, Mostly Unfree, Repressed. There is a correspondence: the closer EFI to 1, the closer the country to be named Free; to the contrast, the closer EFI to 5, the more repressed is the economy of this country. For separate countries the EFI was not counted, for example, military operations, acts of God and so on. So, for Iraq, Serbia and Montenegro, Sudan, Democratic Republic of Congo the EFI was not counted in 2005 in accordance with the circumstances.

The GDP per capita was chosen as the dependent variable, according to the International Monetary Fund [1]; Nominal GDP per capita does not take into account differences in the cost of living in different countries, but reflects the value of economic output in international trade, that's why more differentiation of countries is observed by this parameter; GDP at purchasing power parity is depleted of temporary factors influence, like currency exchange rates fluctuations, it shows less differentiation among countries, but PPP definition is subjective, evaluative, averaged; to eliminate the above mentioned defects authors compared correlative relations with both coefficients.

The findings are presented in Table 1 and illustrated in Figures 1, 2.

Table 1

Macroeconomic showings from The EFI dependence mathematical estimate

Independent variable, x_i	Dependent variable, y_i	Sample size	Relation type	Regressive equation
The Economic Freedom Index	GDP/PPP per capita	150	Hyperbola	$\hat{y} = \frac{96417{,}289}{x} - 22922{,}386$
The Economic Freedom Index	GDP/PPP per capita	150	Linear	$\hat{y} = 49809 - 12834 \cdot x$
The Economic Freedom Index	GDP per capita nominal	150	Linear	$\hat{y} = 53386.291 - 14498.8582 \cdot x$
The Economic Freedom Index	GDP per capita nominal	150	Hyperbola	$\hat{y} = \frac{110887{,}969}{x} - 29478{,}3$

Also authors held the relation significance estimation using the next algorithm:

- Build the matrix of normal equations system coefficients

$A = \begin{pmatrix} n & \sum_{i=1}^{n} x \\ \sum_{i=1}^{n} x & \sum_{i=1}^{n} x^2 \end{pmatrix}$ was used for linear regression and $A = \begin{pmatrix} n & \sum_{i=1}^{n} \frac{1}{x} \\ \sum_{i=1}^{n} \frac{1}{x} & \sum_{i=1}^{n} \frac{1}{x^2} \end{pmatrix}$ for hyperbola;

- Build the error matrix C, which is inverse to matrix A;
- The residual dispersion calculation $\sigma^2 = \frac{\sum_{i=1}^{n} y - \hat{y})^2}{n-2}$;
- The *a* and *b* parameters estimates standard errors determination

$$S_a = \sqrt{\sigma^2 c_{00}} \quad S_b = \sqrt{\sigma^2 c_{11}}$$

- The F-test calculation

$$F = \frac{\sum_{i=1}^{n} (\hat{y} - \bar{y})^2}{1} \Bigg/ \frac{\sum_{i=1}^{n} (y - \hat{y})^2}{n-2}$$ and its table value comparison.

If the calculated F-test is more than value from the table, this means the relation between variables is significant in the econometric model.

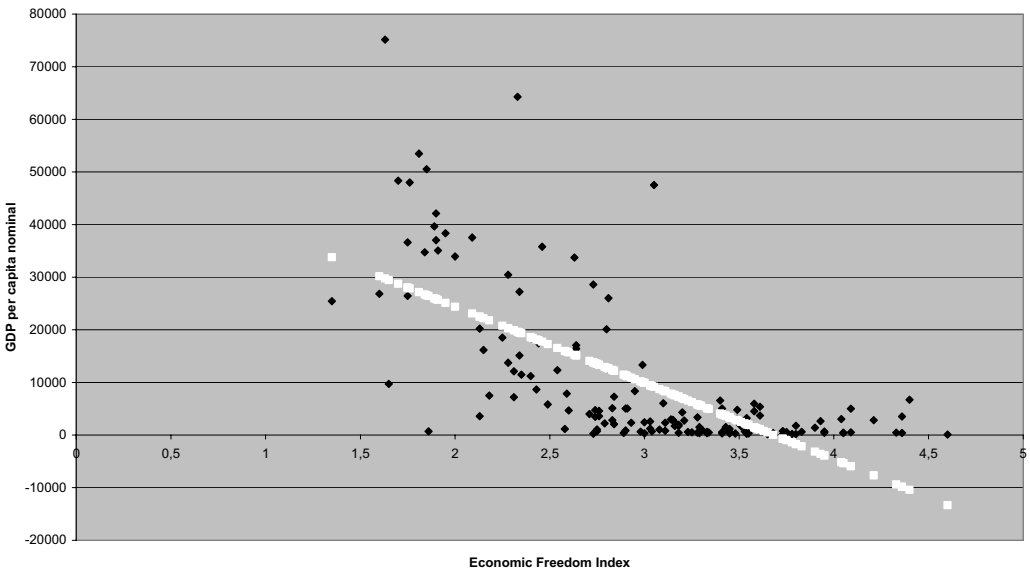

Fig. 1. GDP nominal and EFI linear relation

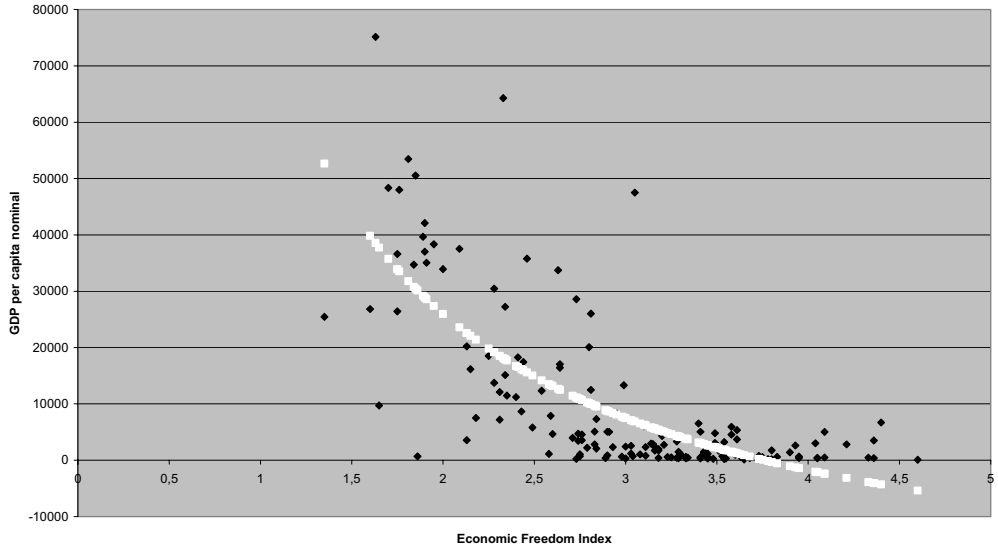

Fig. 2. GDP nominal and EFI hyperbolic relation

Calculated figures are in Table 2.

Table 2

Relation significance and extent estimation

Dependent variable, y_i	GDP/PPP per capita	GDP/PPP per capita	GDP per capita nominal	GDP per capita nominal
Relation type	Hyperbola	Linear	Linear	Hyperbola
Correlation Coefficient, $\lvert r_{xy} \rvert$	0,827	0,782	0,685	0,737
Determination Coefficient, η^2	0,6847	0,6121	0,469	0,540
Residuals Dispersion, σ^2	41665210	51254621	116812603	100364547
Estimation of a parameter standard error, S_a	1982	2583	3896	3071
Estimation of a parameter standard error, S_b	5376	838	1278	8339
Estimation of parameter *a* displacement	8,46%	5,18%	7,29%	10,41%
Estimation of parameter *b* displacement	5,57%	6,53%	8,81%	7,52%
F-test	321,5	233,64	130,84	176,53

According to Table 2, correlation coefficients for all relations (except for EFI with the GDP per capita nominal) exceed the marginal value of 0,7. That gives us opportunity to confirm the existence of significant relation between GDP per capita and EFI. The middle extent of relation when r_{xy}= 0,685 is mostly explained by the wrong regression type chosen, to eliminate this lack the hyperbolic relation (r_{xy}= 0,737) was calculated. The determination coefficient shows for which percentage the resulting variable variations (y) are determined by the independent variable variations, i.e. EFI (x). As we can see, the closest connection of EFI is with the GDP/PPP per capita using hyperbolic relation, i.e. GDP variations depend on EFI variations on 68%.

The comparison of parameters estimates standard errors with its value (%) gives us the estimate of the parameter's displacement. It means, if the estimate of parameter *a* displacement is within the limits of 5-10%, it shows non-displacement of such estimate of the parameter. The estimate of parameter *b* displacement varies within 5-9% bounds, and the smallest meaning it takes for GDP/PPP per capita. For all econometric models the table F-test equals 3.94 (if for numerator the freedom degree equals 1 and for denominator the freedom degree equals n-2=148, the accepted significance level is α=0,05 and the confidence level is (1-α)=0,95). I.e. the calculated value in any case is much more than table F-test (*F>Ftable*), that means the relation between variables in econometric models is significant.

So, using the correlation-regression instruments it was proved that macroeconomic development parameters of definite country for definite period (GDP per capita nominal and GDP/PPP per capita) significantly depend on the extent of competition mechanism development degree on the macroeconomic level, i.e. The Economic Freedom Index for definite state. By the way, the mostly significant influence the competition mechanism makes on the GDP/PPP per capita in hyperbolic regression. Mathematical estimate of the results calculated gives the ground to affirm the reliability and significance of the results received. From this point of view we consider advisable to pay special attention to the basic directions of competition mechanism improvement under the current economic conditions in Ukraine.

Econometric analysis gives the basis for the next conclusions:

- Macroeconomic parameters of the economic system significantly depend on the degree of competition mechanism functioning intensity;
- Effectively acting competition mechanism serves as a permanent stimulus to improve all the spheres of productive relations in their connection with the productive forces of the society development;
- Basing on the analysis of competition mechanism dynamics indicators one can work out the prognoses of macroeconomic indicators for definite period;
- The reduction of economic freedom negatively influences the competitive structure of economic system, including the international scope;
- Freedom of the economic subject defines his social-economic position, the well-being of the nation, the satisfaction degree and the level of the needs satisfied, also perspectives of the qualitatively new human capital forming as a main productive force of the society.

The scientific novelty of the results received consists in the next:

- For the first time in the economic science it was defined the moving force, objective basis, essence of the competitive mechanism;
- For the first time it was proved the significant, close, non-eventual relation between The Economic Freedom Index and the parameters of macroeconomic development of the country for the definite period, namely: GDP per capita nominal and GDP/PPP per capita.

References

1. http://hdr.undp.org/
2. http://www.econstats.com/weo/
3. http://www.heritage.org/research/features/index/
4. http://www.weforum.org/en/initiatives/
5. Блауг М. Экономическая мысль в ретроспективе / Академия народного хозяйства при Правительстве РФ. — 4. изд. — М. : Дело ЛТД, 1994. — 687 с.

6. Борисенко З. Умови економічної конкуренції в Україні // Економіка України, 2002. – №10. – С. 4-10.
7. Деркач М. Формування конкурентного середовища в Україні в умовах світової глобалізації // Конкуренція: Вісник Антимонопольного комітету України, 2004. – №2. – С. 22-27.
8. Історія економічних учень: Підручник / Л.Я. Корнійчук, Н.О.Татаренко, А.М. Поручник та ін.; За ред. Л.Я. Корнійчук, Н.О. Татаренко. – К.: КНЕУ, 1999. – 564 с.
9. Кінах А. Ефективна конкурентна політика – основа розвитку цивілізованого підприємництва // Конкуренція: Вісник Антимонопольного комітету України, 2004. – №2. – С. 28-32.
10. Лозова Г.М. Формування конкурентного середовища в транзитивній економіці України. – К.: КНТЕУ, 2002. – 182 с.
11. Парлос Б. Відкриття природних монополій для конкуренції // Конкуренція: Вісник Антимонопольного комітету України, 2004. – №4. – С. 56-58.
12. Полуянов В. Монополізованість промисловості України і тенденції формування ринкових суб'єктів господарювання // Економіка України, 2001. – №9. – С. 36-42.
13. Портер Майкл Е. Стратегія конкуренції / Пер. з англ. А. Олійник, Р. Скільський. – К.: Основи, 1998. – 390 с.
14. Пугачова М., Щербак А. Конкурентне середовище в Україні: тенденції останніх років // Конкуренція: Вісник Антимонопольного комітету України, 2005. – №2. – С. 19-24.
15. Сидоренко Н. Конкурентна політика в колі повноважень органів виконавчої влади та місцевого самоврядування // Конкуренція: Вісник Антимонопольного комітету України, 2004. – №5. – С. 16-21.
16. Сіденко В. Лібералізація та протекціонізм перехідних економік в глобальному середовищі // http://www.uceps.org/ua/show/196/
17. Спальвіш Ю.О. Демонополізація і розвиток конкуренції в роздрібній торгівлі України. – Київ: Київський державний торговельно-економічний університет. – 1999. – 185 с.
18. Управление конкурентоспособностью организации. Учебное пособие / Р.А. Фатхутдинов. – М.: Изд-во Эксмо, 2004. – 544 с.
19. Черненко С. Спільні цілі – спільні проблеми: актуальні проблеми взаємозв'язку конкурентної політики та політики у сфері розвитку підприємництва в Україні // Конкуренція: Вісник Антимонопольного комітету України, 2004. – №6. – С. 9-16.
20. Шишкин М.В. Генезис теорий монополии в марксистско-ленинской и буржуазной литературе (1840-1930-е годы). – Издательство Ленинградского университета, 1985. – 152 с.
21. Щербакова Т.А. Формування конкурентного середовища в економіці України. – Дніпропетровськ: Дніпропетровський державний аграрний університет, 2002. – 177 с.
22. Ядгаров Я.С. История экономических учений: Учебник для студ. вузов, обучающихся по экон. и управленческим спец. / Российская экономическая академия им. Г.В. Плеханова. — 4 изд., перераб. и доп. — М.: ИНФРА-М, 2004. — 480 с.