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Journal includes the results of scientific researches of leading experts, scientists, doctoral candidats in the issues of world economy development and international economic relations; countries ranks and perspectives in the world markets of goods, services and factors of production; the globalization influence and consequences of its development; paths and forecasts of the international economic system development. Materials can be useful for scientists, researchers, post-graduate students and wide range of readers, who are interested in issues of world economic development.

Вестник включает результаты научных исследований ведущих специалистов, ученых, соискателей научных степеней и званий в вопросах современного развития мирового хозяйства и международных экономических отношений, места и перспектив стран на мировых рынках товаров, услуг и факторов производства, влияния и последствий глобализации на их развитие, путей и прогнозов развития международной экономической системы. Материалы могут быть полезны научно-педагогическим работникам, ученым, аспирантам и студентам, широкому кругу читателей, которые интересуются вопросами мирохозяйственного развития.

Вісник містить результати наукових досліджень провідних фахівців, науковців, здобувачів наукових ступенів та звань з питань сучасного розвитку світового господарства та міжнародних економічних відносин, місця та перспектив держав на світових ринках товарів, послуг, факторів виробництва, впливу та наслідків глобалізації для їх розвитку, шляхів і прогнозів розвитку міжнародної економічної системи. Матеріали можуть бути корисні для науково-педагогічних працівників, науковців, аспірантів та студентів, широкого загалу читачів, які цікавляться питаннями світогосподарського розвитку.

JEL: E32

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BUSINESS CYCLES AND ANIMAL SPIRITS IN A CASH-IN-ADVANCE ECONOMY: THE ROLE OF THE INTERTEMPORAL ELASTICITY OF SUBSTITUTION REVISITED

This note examines the dynamical properties of a one-sector cash-in-advance constraint model with constant returns to scale. It is shown that, in opposition to available results, indeterminacy occurs for values of the intertemporal elasticity of substitution in consumption consistent with the bulk of empirical estimates. Furthermore, we find that sunspot shocks do not necessarily generate countercyclical movements in consumption. Considering simultaneously beliefs and technological disturbances, it turns out that the model performs as well as real sunspot models with increasing returns to scale in matching the business cycle.

Key words: Money, Indeterminacy, Sunspots, Business Cycle.

В статье рассматриваются динамические свойства односекторной предоплаты модели ограничений с постоянной отдачей от масштаба. Показано, что в противовес доступным результатам, неопределенность возникает при значениях межвременного эластичности замещения потребления в соответствии с величиной эмпирических оценок. С выяснений, что шоковые пятна не обязательно порождают антицикличе-ские движения в потреблении. Учитывая одновременно убеждения и технологиче-ские нарушения, следует, что модель работает так же, как и реальные модели пятен с возрастающей отдачей от масштаба в выборе бизнес-цикла.

Ключевые слова: деньги, неопределенность, пятна, бизнес-цикл.

У статті розглядаються динамічні властивості односекторної передоплати моделі обмежень з постійною віддачею від масштабу. Показано, що на противагу доступним результатам, невизначеність виникає при значеннях міжчасової еластичності заміщення споживання відповідно до величини емпіричних оцінок. З`ясувано, що шокові плями не обов`язково породжують антициклічні рухи у споживанні. Враховуючи одночасно переконання та технологічні порушення, виходить, що модель працює так само, як і реальні моделі плям із зростаючою віддачею від масштабу у виборі бізнес-циклу.

Ключові слова: гроші, невизначеність, плями, бізнес-цикл.

1. Introduction

Following the contributions of Benhabib and Farmer (1994) and Farmer and Guo (1994), a research field in macroeconomics has focused on models in which business cycles are driven by self-fulfilling changes in agents' beliefs. Most studies assume that the households' utility function is logarithmic in consumption, which is equivalent to setting the intertemporal elasticity of substitution (IES) in consumption equal to one. Noticeable exceptions are Bennett and Farmer (2000), Lloyd-Braga, Nourry and Venditty (2006) and Harrison (2001) who consider either non-separable preferences or a more generalized CRRA utility function. These works notably show a negative relation between the degree of increasing return needed for indeterminacy and the IES. Consequently, setting the IES significantly greater than one, they are able to generate indeterminacy with empirically plausible scale economies. Yet, this requisite is at odds with the empirical evidence which suggests that the IES is much lower than unity, many estimates being indeed below 0,5 (see, e. g. Kocherlakota (1996) and Campbell (1999)). The second

weakness of these models is their inability to match various moments of key macroeconomics variables. In particular, for reasonable values of the externality parameters, they generate a time series for consumption that is countercyclical, which is not consistent with the data.

The previous considerations cast some doubts on the empirical relevance of indeterminacy and expectations-driven business cycle. In this paper, we focus on monetary imperfections captured by a cash-in-advance (CIA) constraint on consumption in an economy with endogenous labor supply. More precisely, we study the basic (no externalities) monetary Real Business Cycle model of Cooley and Hansen (1989) with constant returns to scale extended to account for non-logarithmic utility in consumption. We establish that this constant returns to scale model exhibits indeterminacy for values of the IES in accordance with the bulk of empirical estimates, that is below 0,5. Numerical simulations indicate that fluctuations solely driven by sunspot disturbances are not necessarily accompanied by countercyclical movements in consumption.[1] Allowing belief and productivity shocks, we show that this „simple" one-sector model with constant returns to scale perform as well as more „complex" real (one or two-sector) models with increasing returns to scale.

2. The Model

2.1. Environment

The economy consists of households, firms and a monetary authority. The representative household chooses sequences of consumption *c_t*, hours worked *l_t*, capital stock *k_{t + 1}* and cash balances *m_{t + 1}* to solve:

$$\max_{\{c_t, l_t, k_{t+1}, m_{t+1}\}} \quad E_0 \sum_{t=0}^{\infty} \beta^t \left\{ \frac{c^{1-\sigma}}{1-\sigma} - A \frac{l^{1+\chi}}{1+\chi} \right\}$$

$$s.t. \quad c_t + k_{t+1} + \frac{m_{t+1}}{p_t} = w_t l_t + (r_t + 1 - \delta) k_t + \frac{m_t}{p_t} \tag{1}$$

$$c_t \leq \frac{m_t}{p_t} \tag{2}$$

for *E* the rational expectation operator, *A* > 0, sigma > 0, chi > 0, beta the discount factor, delta the depreciation rate of capital, *p_t* the price level, *r_t* the real return on capital and *w_t* the real wage.

(1) is the usual intertemporal budget constraint; (\ref{c2}) is the cash-in-advance constraint (hereafter CIA). On the production side, the technology of the representative firm is described by the Cobb-Douglas production function:

$$zK^{\alpha} L^{1-\alpha}, \quad \alpha \in (0,1)$$

for *L* and *K* the aggregate labor and capital factors, respectively; z is the state of technology which evolves as:

$$\log z_t = \rho_z \log z_{t-1} + (1 - \rho_z) \log z^* + \sigma_z \zeta_t \tag{3}$$

where rho_z < 1, sigma_z > 0 and zeta_t is a zero-mean i. i. d. random variable with unit variance. Markets being perfectly competitive, profit maximization implies that factors are paid according to their marginal productivities.

Lastly, as we do not study the effects of the monetary policy shocks, we assume

[1] Barinci and Chéron (2001) build on a related idea and demonstrate that a model with heterogeneous households and borrowing constraint outperform standard sunspots models in explaining business cycle facts, notably procyclical consumption.

that the monetary authority plays a fairly limited role: it supplies a constant quantity of money $M\_t = M$.

2.2. Equilibrium

Let the CIA constraint holds with equality and consider the market clearing conditions. It is straightforward to see that an equilibrium is a sequence which satisfies:

$$\frac{l_t^{\chi+\alpha}}{z_t k_t^{\alpha}} = \beta E_t\left[\left(z_{t+1}\alpha k_{t+1}^{\alpha-1} l_{t+1}^{1-\alpha} + 1-\delta\right)\frac{l_{t+1}^{\chi+\alpha}}{z_{t+1}k_{t+1}^{\alpha}}\right] \tag{4}$$

$$\frac{A l_t^{\chi+\alpha}}{z_t(1-\alpha)k_t^{\alpha}} = \beta E_t\left[\frac{c_{t+1}^{1-\sigma}}{c_t}\right] \tag{5}$$

$$k_{t+1} = z_t k_t^{\alpha} l_t^{1-\alpha} + (1-\delta)k_t - c_t \tag{6}$$

It should be emphasized that if one assumes that the household's utility is logarithmic in consumption the dimension of the equilibrium system (4)–(6) would actually be lowered. In fact, in such circumstances (5) would boil down to a static relation defining and the equilibrium is bound to be determinate.

3. Local Dynamics

In this section we carry out the analysis of the local (deterministic) dynamics of the equilibrium system (4)–(6) around its stationary solution. According to the usual procedure we study the first order Taylor expansion of the equilibrium system evaluated at the steady state. Letting J denotes the Jacobian matrix of the linearized system and T, Sigma and D be the trace, the sum of the principal minors of order two and the determinant of the J, respectively, we obtain:

$$Q(\psi) = -\psi^3 + T\psi^2 - \Sigma\psi + D$$

$$T = 1 + \beta^{-1} + \frac{1}{1-\sigma} + \frac{\nu}{\chi+\eta}$$

$$\Sigma = \beta^{-1} + \frac{1}{1-\sigma} + \frac{1}{\beta(1-\sigma)} + \nu\frac{1+\chi}{(\chi+\eta)(1-\sigma)}$$

$$D = \frac{1}{\beta(1-\sigma)}$$

for $\rho \equiv \beta^{-1} - 1 + \delta$, $\eta \equiv \beta\rho(1-\alpha) + \alpha$ and $\nu \equiv \left(\frac{\rho}{\alpha} - \delta\right)\beta\rho(1-\alpha) > 0$.

Since one variable is predetermined and the others are free, indeterminacy occurs when J has at least two roots located inside the unit circle.

Case 1: the IES is greater than 1, then the equilibrium is bound to be locally unique.

Case 2: the IES is lower than 1, it follows that indeterminacy requires that

$$\sigma > 2 + \frac{\nu\chi}{2(1+\beta^{-1})(\chi+\eta)+\nu} \equiv 2 + \Delta \tag{7}$$

Then, indeterminacy typically emerges for values of the IES lesser than 0,5. In opposition to available results (see the discussion in the introductory section), one sees that the values of the IES that place the economy within the indeterminacy region are in accordance with the recent empirical estimates (see, e. g., Campbell (1999)). It is worthy

to note that such low values are nowadays fairly standard in the RBC literature (see, e. g., King and Rebelo (1999) who set sigma = 3).

We conclude that indeterminacy appears more likely empirically plausible is the current model than in real models which require „high" IES and elasticity of the labor supply in order to generate indeterminacy with realistic increasing returns.

4. Business cycle properties

It is well-known that some time series properties of real sunspot models are not consistent with the business cycles data. For example, for plausible degrees of increasing returns, they generate time series for consumption that are countercyclical (see, {\it e. g.}, Benhabib and Farmer (1996) and Schmitt-Grohé (2001)). In fact, in a walrasian model, the marginal rate of substitution between consumption and leisure equates the real wage. As a consequence, beliefs shocks that shift the labor-supply schedule along the (downward-sloping) labor-demand schedule, tend to force consumption and hours worked to move in opposite directions. In the current model, as long as the CIA constraint is binding, the marginal rate of substitution between consumption and leisure does not equate the real wage. Thus, a spontaneous increase in consumption (optimistic beliefs) does not necessarily translates into a fall in hours worked.

More particularly, even though it is not currently necessary, as an infinite value for the labor supply elasticity is usually assumed in the literature, we set chi = 0. Thus, indeterminacy results when \sigma > 2. Following King and Rebelo (1999), we fix sigma = 3 (IES = 1/3). As a benchmark, we examine how the model responds to sunspot shocks. Table 2 shows that our „endogenous business cycle" (EBC) CIA model produces a procyclical consumption. Nonetheless, it suffers from two stringent weaknesses: the investment is countercyclical and the volatilities of consumption and investment relatively to that of output are hugely overestimated. These counterfactual results come from the fact that even though a sunspot shock induces a simultaneous increase in consumption and hours worked, the rise of hours is so low that it generates a quite small increase in output. Consequently, a strong increase in consumption is sustained by a strong decrease in investment: investment is countercyclical, and relative volatilities are overestimated. This actually suggests that technological disturbances (supply shocks) must be added in order for the model to be consistent with the data. As usual, technological parameters are set to rho_z = 0,95 and sigma_z = 0,007. In addition, since we now consider two sources of uncertainty, the covariance matrix between technology and belief shocks has to be calibrated.

Let rho_{e/zeta} denotes the correlation between beliefs and technological shocks. Table 2 compares several possible moments when the correlation parameter takes three values we calibrate sigma_{z}/sigma_{e} so that the model replicates the relative standard deviation of consumption to that of output, for sigma_e the standard deviation of the belief shock. It is seen in Table 2 that our CIA model generates realistic aggregate fluctuations provided that the correlation between beliefs and technological disturbances is positive which is equivalent of saying that sunspots are overreactions to news about fundamentals. For comparison purposes, we report the dynamical properties of the Benhabib and Farmer's (1996) model generated with rho_{e/zeta} = 1 are also reported. One then can see that our monetary model with constant returns to scale performs as well as a more „intricate" two-sector real model with increasing returns.

5. Concluding remarks

This paper has examined a cash-in-advance one-sector model in which indeterminacy occurs for constant returns to scale and values of the intertemporal elasticity of substitution in consumption consistent with the bulk of empirical estimates. Indeterminacy appears then more likely empirically plausible in this model than in real (one and two-sector) models. However, the model was not found to endogenously produce a procyclical consumption in a satisfactory way. This supports the wisdom that animal spirits

Table 1

Parameters

β	δ	α	σ	χ
0,99	0,025	0,3	3	0

Table 2

Comovements

	US (data)	BF	CIA ($\sigma_z > 0$)			CIA (EBC)
		$\rho_{e\varsigma} = 1$	$\rho_{e\varsigma} = 1$	$\rho_{e\varsigma} = 0$	$\rho_{e\varsigma} = -1$	$\rho_{e\varsigma} = 0$
		$\frac{\sigma_z}{\sigma_e c} = 1$	$\frac{\sigma_z}{\sigma_e c} = 0,7$	$\frac{\sigma_z}{\sigma_e c} = 0,9$	$\frac{\sigma_z}{\sigma_e c} = 1,1$	$\sigma_z = 0$
Consumption *c*						
(1)	0,74	0,74	0,74	0,74	0,74	15,31
(2)	0,83	0,51	0,52	0,22	0	0,96
Investment *i*						
(1)	4,79	3,45	4,05	4,96	5,51	51,92
(2)	0,91	0,83	0,81	0,84	0,86	–0,96
Hours Worked *l*						
(1)	0,94	0,89	0,55	0,51	0,48	1,35
(2)	0,74	0,70	0,88	0,88	0,88	0,94

(1): $\sigma(x)/\sigma(y)$; (2): $cor(x, y)$; y: real per capita output.

(demand shocks) cannot be invoked solely to explain the business cycle. Whenever sunspots and technological disturbances (supply shocks) are simultaneously allowed, the model performs equally as well as existing real sunspot models with increasing returns.

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EMPIRICAL GENERALIZATIONS IN MARKETING: A REVIEW OF APPLICATIONS OF META-ANALYSIS

Meta-analysis techniques are widely used to combine results from different studies to estimate the true effect size in the population and to explain the variability of estimates found in primary studies. These methods have changed over the years and continue to evolve, taking progressively into account the critics raised. This paper reviews applications of these methods in marketing research published in several journals to assess the relevance of such use. We discuss important issues related to meta-analysis methods and how marketing researchers handled them: issues related to studies' selection and screening prior to model estimation, correction for artefacts, publication bias, estimation methods used to summarize effect sizes, and those related to the statistical power of meta-analysis. In light of the results found, recommendations are made for future meta-analysis practice in marketing.

Key words: marketing, meta-analysis, publication bias, statistical power.

Методы мета-анализа широко используются для объединения результатов различных исследований, чтоб оценить истинный размер эффекта в совокупности и объяснить неустойчивость оценок, находящихся в первичных исследованиях. Эти методы изменились за годы и продолжают развиваться, постепенно принимая во внимание растущую критику. В статье рассматривается применение этих методов в маркетинговых исследованиях, опубликованных в нескольких журналах, чтоб оценить важность их использования. Мы обсуждаем важные вопросы, связанные с мета-анализом, а также то, как маркетологи применяют их в действии: вопросы, связанные с выбором исследований, предварительной проверкой модели оценивания, исправлением артефактов, систематической ошибкой, оценкой методов, используемых для суммирования размера эффекта, а также те вопросы, которые имеют отношение к статистической силе мета-анализа. В свете найденных результатов даются рекомендации для будущих мета-анализов в маркетинговой практике.

Ключевые слова: маркетинг, мета-анализ, систематическая ошибка, статистическая сила.

Методи мета-аналізу широко використовуються для об'єднання результатів різних досліджень, щоб оцінити дійсний розмір ефекту в сукупності і пояснити нестійкість оцінок, що знаходяться в первинних дослідженнях. Ці методи змінилися за роки і продовжують розвиватися, поступово приймаючи до уваги зростаючу критику. У статті розглядається застосування цих методів у маркетингових дослідженнях, опублікованих у кількох журналах, щоб оцінити важливість їх використання. Ми обговорюємо важливі питання, пов'язані з мета-аналізом, а також те, як маркетологи застосовують їх у дії: питання, пов'язані з вибором досліджень, попередньою пере-

віркою моделі оцінювання, виправленням артефактів, систематичною помилкою, оцінкою методів, що використовуються для підсумовування розміру ефекту, а також ті питання, які мають відношення до статистичної сили мета-аналізу. У світлі знайдених результатів даються рекомендації для майбутніх мета-аналізів у маркетинговій практиці.

Ключові слова: маркетинг, мета-аналіз, систематична помилка, статистична сила.

Introduction. Empirical generalizations constitute the basis for knowledge accumulation in science. In 1995, the review *Marketing Science* devoted a special issue to this theme in marketing. Bass and Wind (1995) defines empirical generalisation as *„a pattern or regularity that repeats over different circumstances and that can be described simply by mathematical, graphic or symbolic methods"* (page G1). According to this author, there are four main approaches to synthesising results, with a view to generalize, from empirical studies on a common scientific issue: meta-analysis, literature review, content analysis, and clustering and informal methods. Nowadays, meta-analysis is the most widely used (and recommended) approach in searching for generalizable results (Cooper and Hedges, 1994). It constitutes a rigorous alternative to narrative literature reviews (Farley et al., 1995). Indeed, compared to narrative literature reviews, meta-analysis permits determining not only the sign of the relation between two variables but also its magnitude. Moreover, it allows testing statistically various hypotheses. Besides, it has been shown that literature reviews does not account for sample size (the number studies included in meta-analysis and the number of observation used in each study), have low statistical power, and give rise to biased results (Hedges and Olkin, 1985). As to the remaining methods, namely informal and content analyses, they are seldom used in practice. This paper therefore focuses on empirical generalizations in marketing by the way of meta-analysis.

The purpose is to examine applications of meta-analysis for the accumulation of knowledge relevant to marketing research. The following two questions are addressed: What are the practices in this domain? Do those practices conform to the usual recommendations for performing a meta-analysis? The answers to these questions are of primary importance to assess the validity of the results obtained in the applications to marketing published so far. As underlined by Wolf (1990), *„there is need for more reviews (meta-analytic or otherwise) of the meta-analyses that have already been conducted in order to better understand the implications of the varying philosophical, methodological, and statistical practices that have been used"* (p. 151). In marketing, none of the previous surveys has examined how meta-analysis procedures have been used and how threats to the validity of a meta-analysis have been dealt with by researchers.

It is to be noted that our work differs from the review carried out by Franke (2001), which focused on the substantive results of meta-analysis applications in marketing. Our research takes place upstream, concentrating on issues of methodology rather than substantive results. We propose a critical review of procedures used in these applications. The principal objectives of the present research are:

i) a descriptive analysis of the characteristics of the published studies such as the number of effects estimated per study, the size of the sample used, the length of the period for which the effect size is estimated, and so on. These results are useful in carrying out a simulation (which has to reflect the real practices) or in calculating the power of the meta-analysis;

ii) an assessment of the quality and appropriateness of the meta-analytical techniques used in practice. In other words, it is relevant to verify whether the statistical assumptions of the methods used are met.

In light of our findings, we identify problem areas and suggest avenues for improvement and discuss future perspectives of meta-analysis use.

Methodology. Over the last fifteen years, important methodological improvements have been achieved in conducting meta-analyses. They relate to criteria for inclusion of studies, to the choice of the method of estimation, to tests of publication bias, and to problems linked to correlated estimates. These developments allow improving the robustness of meta-analysis results and palliating the deficiencies recorded in the literature: the „apples and oranges" and „garbage in, garbage out" problems, where it is argued that studies are too dissimilar[2] to make comparisons relevant (Eyssenck, 1978); „the file drawer" problem which arises from failure to obtain a representative sample of the population of studies on some domain of interest (Rosenthal, 1979); and other secondary critics (see Sharpe, 1997; Matt and Cook, 1994). Procedures for performing a meta-analysis. The statistical literature on meta-analysis discuss numerous alternative procedures and methods for assessing the validity of a generalization (Bangert-Drowns, 1986). In consequence, it is difficult to propose a best way to carry out a meta-analysis, all the more because some recommendations are recent and have not been subjected to an evaluation. Nevertheless, it is possible to present the main lines common to the different approaches that will be used as guidelines in assessing applications of meta-analysis in marketing.

A widely accepted definition of meta-analysis is as *„the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating findings"* (Glass, 1976, p. 3). Over the last 25 years, meta-analysis has become a popular and methodologically sophisticated technique for quantitatively summarizing findings from a large body of replication studies.

A number of text-books on meta-analysis are now available (Hedges and Olkin, 1985; Farley and Lehman, 1986; Wolf, 1986; Hunter and Schmidt, 1990; Cooper and Hedges, 1994). Meta-analysis methods are widely used in medicine and psychology, and more and more researchers in marketing have recourse to these techniques to summarize findings from various studies and to explain the variability of estimates.

A major contribution of meta-analysis is the increased statistical power that can be obtained by combining information of primary empirical researches. This increased power is crucial to detect a small effect size and to resolve the problem of conflicting findings of independent studies. A second contribution is the potential precision of the overall effect estimate. Indeed, a large sample of meta-analysis (compared to that of a single study) yields a decrease in the standard error of the estimated effect size (Hunter and Schmidt, 1990; Cooper and Hedges, 1994). A third contribution is that it allows achieving a greater generalizability of findings than any single study does because it accounts for numerous moderator variables that could explain the variability of the effect sizes found in various imperfect replication studies (Farley and Lehman, 1986; Hunter, 2001). A fourth contribution of meta-analysis is to examine complex theoretical models through research synthesis or to create an empirical model with the existing data. Indeed, none of the primary studies can by itself examine the whole relations of a complex theoretical model (Farley et al., 1994; Geyskens et al., 1999). Often, each of them is confined to the examination of only some of these relations. The interest in meta-analysis lies in its capacity to organise the whole set of conclusions from these studies to get the most accurate fit of the theoretical model. Meta-analysis can thus contribute to theory testing by providing data to be analysed with other methods such as bayesian regression (Vanhonacker and Price, 1992) and structural equation models (Viswesvaran and Ones, 1995; Cox et al., 1994). Thus, beside innovative or creative articles, meta-analysis can contribute to theory development.

In marketing, meta-analysis is increasingly used to summarize findings and to set the agenda for future research (Farley et al., 199, 1998; Franke, 2001). It has been applied to a variety of research topics in marketing. Obviously, the accuracy of these applications

[2] Studies measuring different things, manipulating different concepts ("apples and oranges" threat), and/or being of different quality („garbage" threat).

depends largely on the correct use of the recommended procedures, in conformity with the underlying hypotheses.

Issues related to selective inclusion of studies and coding. The criteria for selecting studies to be included in the meta-analysis need to be considered with particular attention so as to prevent the „apples and oranges" threat and selection bias. The criteria of selection, such as the definition of research topic, have to be specified a priori in the protocol of the meta-analysis in order to well delimit the field of potential studies to include. The results of two meta-analyses on the same research topic can diverge if the inclusion criteria are different. For example, the inclusion or exclusion of certain papers may modify substantially the conclusions of the meta-analysis (Grègoire et al., 1995).

Literature search: Once the research area is defined[3], relevant studies are identified by searching journals, books, conference proceedings, theses, as well as numerous electronic bibliographic databases (EBSCO, ABI inform, Psychlist, ERIC, Econlit), professional databases etc. Another important source consists of consulting colleagues and/or experts in the domain under study. Of course, when selecting studies one must ensure that each study is somewhat a replication of the topic of interest (Hunter, 2001).

However, in practice, some constraints such as the language of publication and the fact that relevant articles may be unpublished, limit the scope of study identification (selection bias). As a consequence of this non-exhaustiveness, the studies included in the meta-analysis may be non-representative and can thus lead to biased conclusions. Grègoire et al. (1995) showed that including non-English studies in their meta-analysis affects findings.[4]

Quality criteria: The choice of quality criteria is problematic (Cook et al., 1992). Wortman (1994) argued that quality is determined by relevance (construct and external validity) and acceptability (internal and statistical validity). However, there is no consensus on this subject (Sharpe, 1997). Although the procedure for mixing up results from studies of different quality was criticized[5] (Wachter, 1988), most meta-analyses in the social sciences include all of the studies treating the topic of interest because of the lack of a rule (see Cooper and Hedges, 1994).

Coding schema: The characteristics of the studies are coded for sample size, effect size and potential moderator variables defined a priori. Nevertheless, the latter does not easily lend themselves to codification because several definitions and measures may coexist for the same variable. In addition, imprecision and lack of information in some studies make their coding difficult. At last, the limited number of observations for some moderators leads to aggregate them to increase the number of observation. In consequence, the comparability of findings in several imperfect replications is not always straightforward (Orwin, 1994). Two independent authors may code differently the same study. Hence, there is advantage in having the primary studies coded by several authors and searching for a consensus about contradictory coding so as to obtain a high inter-rater agreement coefficient.

Issues related to measurement of effect size. ***Common effect size metric:*** To be compared, primary studies findings must have a common measure. This common effect size refers to the magnitude of effect observed across studies. There are numerous effect size indicators or metrics for measuring the strength of relationship or the magnitude of

[3] Choice and definition of the dependent and independent variables of interest. As for any eligibility criterion, there exists a risk of excluding relevant empirical studies simply because they do not meet the definition adopted.

[4] These authors shows that in at least one of the 36 meta-analyses they reviewed, the exclusion of papers for linguistic reasons produced results different from those which would have been obtained if the exclusion criteria had not been used.

[5] To deal with the „garbage" threat, some authors advocated exclusion of poor studies (see Kraemer And Yesavage, 1998).

difference between variables: differences between means (Cohen's d and Hedge's g), measures of association (Pearson's r and explained variance indicators: ω^2, η^2, ε^2), regression slopes (β coefficients) and combined probability (p-value). The formulas for calculation and conversion as well as the properties of all of the indicators are discussed by Fern and Monroe (1996). Cohen (1988) provides some guidelines for interpreting effect sizes.

Correction for artefacts: The variability of effect size across studies can partly be due to methodological and statistical artefacts such as sampling error, measurement error, and range restriction. These artefacts can induce a large error[6] in the estimation of the effect size so as to create spurious findings (Hunter and Schmidt; 1990). According to the work of Hunter and Schmidt (1996), the proportion of variance due to artefacts in I/O psychology amounts on average to 80 % of variance of effect size. This statistical and methodological variability across effect size estimates can lead researchers to incorrectly conclude that it is due to moderating variables. Therefore, the bias introduced by these artefacts should be controlled and corrected for in order to obtain accurate effect size.

However, some researchers argued that the implementation of corrections for artefacts is not always desirable when methodological artefacts and substantive situational moderators are correlated (James et al., 1992). In this case, the correction for artefacts may be eliminate a substantive moderator.

Exploratory analysis: Data screening is a prerequisite step for model estimation. An exploratory statistical analysis effect sizes adjusted for artefacts (stem-and-leaf plot, box-plot, funnel plot, normality tests) has to be performed for, on the one hand, detecting outliers and assessing normality,[7] and, on the other hand, discovering patterns to make hypothesis development and refinement (Light et al., 1994; Behrens, 1997).

Estimation and testing procedure issues. ***Weighted effect sizes:*** Since the primary studies use different sample sizes, the studies with large samples should be given more weight, as they produce more precise effect sizes. Therefore, the estimates of effect size should be weighted by the sample size or by the inverse of the variance, (Hedges and Olkin, 1985; Hunter and Schmidt, 1990). Other authors advocate the unweighted meta-analysis (Osburn and callender, 1992). However, Fuller and Hester (1999) showed that some of the advantages of the unweighted average overall effect size predicted by Osburn and Calender's (1986) simulation did not hold.

Homogeneity tests: Moderator variables are another source of variability of results. Indeed, primary studies addressing the similar questions will be expected to vary in a number of ways: definition of outcomes, methods used, situational factors, and so on. Therefore, any meta-analysis should check for a possible heterogeneity of findings. Several authors noted that heterogeneity of results is the rule rather than an exception in the real world data (Hunter and Schmidt, 1990, 2000; Field, 2003; Erez et al., 1996; RC, 1992). Formal statistical tests for assessing the degree of variability of the effect size corrected for artefacts across studies are available (Hedges and Olkin, 1985). Such tests, in spite of their low statistical power for samples of small size can be used to decide whether the primary studies are considered as sharing a common effect size (Field, 2001, Hedges and Pigott, 2004).

Moderator variables analysis: Sources of heterogeneity (moderating effects) should be investigated and quantified (Sagie and Koslowsky (1993). Two approach have been proposed:

– *Sub-group analysis:* This investigation is accomplished by breaking out the full set of studies into subsets ones based on a hypothesised moderator variable. However, sub-group analysis tends to increase the number of analyses and hence increase the probability to have significant results by capitalization on chance (type I error inflated). Let's

[6] The effect size has a systematic downward bias.

[7] The methods of estimation of the effect size require the assumption of multivariate normality.

illustrate the problem of capitalization on chance in the following example. Suppose that the primary studies' results vary according to the estimation method (OLS, GLS, ML)[8] and data characteristics (annually, monthly, weekly). Then, we can conduct more than 15 subgroup analyses: OLS, IV, GLS, OLS-annual, OLS-weekly, and so on. If we add other variables such as environmental characteristics and model specification, the number of possible combinations is so high that some „positive" results can arise by chance with no plausible explanation (Matt and Navarro, 1997). In addition, the number of sub-group analyses may be limited by the number of observations necessary to obtain a sufficient statistical power. Finally, a sub-group analysis is univariate and thus does not allow controlling for simultaneous factors that may interfere in the relation tested (existence of confounding factors).

– *Meta-regression analysis:* For the reasons cited above, several authors have criticised sub-group analysis (Berkey et al., 1995; Olkin, 2004). They advocate the use of a multiple regression model to account for heterogeneity among studies. In contrast to conventional meta-analysis (sub-group analysis), meta-regression relates the size of effect (regression coefficient) to one or more moderator variables of the primary studies involved. So, this approach is more suitable for measuring the impact of independent variables on the dependant variable (Farley et al., 1995). While often, sub-group analysis focuses only on the percentage of variance explained.

Another advantage of multiple regression is that it is possible to carry out various tests: homoscedasticity, outliers detection, normality, overall goodness of fit. Furthermore, there exist numerous methods of estimation suited to different hypotheses on the linearity of the relations, to the normality assumption and to the existence of outliers (robust estimators). Finally, when the moderator variables are continuous (not categorical) only regression analysis can be carried out. Therefore, meta-regression is flexible enough to enjoy generality (Farley and Lehman, 1986, Olkin, 2004). However, meta-regression has some limitations due to the possibility of multicollinearity among the characteristics of primary studies and aggregation bias because the scarcity of observations for certain characteristics may force the researcher to group them with other ones. In some cases, procedures to solve these problems consist in not taking into account the whole set of relevant information. The estimated model may be hence miss-specified.

Statistical models for inference: There are four principal statistical models in meta-analysis for inferring the magnitude of the effect size from a sample of independent results: the fixed-effects (FE) and the random effects (RE) models for a sub-group analysis, and the fixed regression and the random regression models for a meta-regression analysis (see appendix B). These models imply different statistical assumptions. The FE approach assumes that the primary studies included in the meta-analysis are sampled from populations with the same or constant effect size (homogeneous case) or when researchers regard the studies in their meta-analysis as the entire universe of studies of interest rather than the broader task of estimation of the population effect sizes for the given topic as a whole[9] (Hedges and Vivea, 1998, Hunter and Schmidt, 2000). Under these assumptions the FE model has an appropriate level of Type I error (Overton, 1998, Hedges and Vivea, 1998). However, if there is evidence of heterogeneity among the population effects[10], then the RE model should be used (Hegdes and Vivea, 1998; Hunter

[8] OLS, GLS and ML stand for Ordinary Least Squares, Generalized Least Squares and Maximum Likelihood, respectively.

[9] Hedges and Vivea (1998) call this case a conditional inference. In other words, the conclusions of the meta-analysis describe only the findings of the studies included and cannot be generalized to the entire domain of interest.

[10] Effects sizes vary randomly from one study to another. In others words, each primary study reviewed comes from a population that is likely to have a different effect size to any other primary study included in the meta-analysis.

and Schmidt, 1990, 2000; Field, 2003). The RE approach assumes that the studies included in the meta-analysis are a sample of all possible studies that could be done on a area of interest. In this case, effect size estimates collected on different local contexts constitute a super-population of random effect sizes characterised by its mean and standard deviation. Thus, the RE model takes into account two sources of variation: within-studies, due to error sampling (i. e., like the FE model), and between-studies, due to differences among studies. Due to its larger confidence intervals the RE model is then less subject to Type I error bias than the FE model is (Field, 2003). For all these reasons, several authors recommend systematic recourse to the RE model (Hunter and Schmidt, 1990, 2000; Hall and Brannick, 2002; Overton, 1998; Field, 2003; Erez et al., 1996). Fixed regression and random regression models are some extensions of, the FE model and the RE model, respectively (see appendix B). Estimation methods of these models are described in several text books (Cooper and Hedges, 1994; Hunter and Schmidt, 1990) and articles (see also appendix B).

Independent samples: The majority of classical estimation methods used in meta-analysis make the assumption that effect sizes are obtained from independent samples. However, in practise the same study with the same sample can report multiple effects. For instance, different procedures can be used on a same sample to estimate a price elasticity. In consequence, these outcomes are potentially correlated and the assumption of independence is violated. Ignoring these inter-correlations among effect sizes conducts to an inflated Type I error rate (Raudenbush et al., 1988; Bijmolt and Pieters, 2001).

One approach, rarely used, to remedy this problem is to restrict the domain of testable hypotheses and to conduct a separate analysis for each effect. The recourse to this procedure is limited by the scarcity of data. Another way is to average out (or to compute the median of) the multiple outcomes for each study. However, this method does not fully account for all the available information and is only appropriate when the multiple outcomes are parallel measures of a single domain or construct (Hedges and Olkin, 1985, Hall, 1994). Several authors (Raudenbush et al., 1988; Gleser, 1994; Sohn; 2000) proposed an alternative method based on weighted multivariate regression for dealing with studies that use multiple effects (see appendix B).

Sensitivity analysis issue. Because the best way to conduct a meta-analysis does not exist and different methods can lead to divergent results, the robustness of the conclusions of the particular meta-analysis should be examined in a thorough sensitivity analysis. Various analyses must be performed to assess the robustness of findings: comparison of the overall effects calculated according to different methods, carrying out various meta-analyses by including and excluding of some primary studies in order to estimate the overall effect with the same method, use of robust methods (Brown, Homer, Inman, 1998), examination of temporal patterns (Kayande and Bhargava, 1994), and publication bias. Finally, meta-analysis applications use various tests for which the calculation of the statistical power is recommended.

Assessing publication selection effects: Publication and selection biases[11] occur in a meta-analysis when the effect size estimates are observed in only a subset of the studies that were actually conducted (Hedges, 1992). The dissemination of findings in several journals, laboratories (working papers), conferences and countries modifies the probability that a study is included in a meta-analysis (selection bias). In addition, studies reporting „positive" results are those that are likely to be published and therefore to be included in a meta-analysis, which may introduce a „positive" bias (publication bias). Various methods have been developed to identify and remedy publication bias (Rust et al.,

[11] A more restrictive definition states that publication bias arises when only studies reporting statistically significant or „plausible" results are being published. Rosenthal (1979) called this the „file drawer problem". So, a meta-analysis based on published studies (biased sample) may result in bias in favour of significant or „positive" findings.

1990; Hedges, 1992; Dear and Begg, 1992; Egger et al., 1997). Recent methods for adjusting the meta-analysis for publication bias use weighted distribution theory based on the premise that a study is included in the analysis with a probability determined by the outcome (e. g., *p* value) (Dear and Begg, 1992). Another simple method to assess publication bias is to calculate a fail-safe N[12] statistic or „file drawer" N to estimate the number of unpublished studies with an effect size of zero that would have to exist so as to render the overall effect size insignificant (Rosenthal, 1979).

Statistical power: The statistical power is recognised as an important indicator for assessing the validity of results from a research study. Cohen (1988) defines the power of a statistical test of a null hypothesis as *„the probability that it will lead to the rejection of the null hypothesis, i. e., the probability that it will result in the conclusion that the phenomenon exists".* Therefore, the power of a meta-analysis is the probability that it will lead to a statistically significant result. In medicine, Flather et al. (1997) showed that invalidation of results of meta-analyses by larger clinical trials[13] for various topics can be explained to a large extent by the fact that meta-analyses are underpowered. Although researchers should conduct power analysis prior to a meta-analysis in order to avoid an underpowered meta-analysis (Flather et al., 1997; Hedges and, 2001; Cohn, 2003; Muncer et al., 2003), it is not always possible to obtain beforehand the necessary data for carrying out this analysis. Generally, it can be only conducted once the meta-analysis is performed.

Application of meta-analysis in marketing

Data. First, we identified a set of journals which are likely to publish applications of meta-analysis in marketing from 1980 to 2003[14]. Second, the ABI/inform, EBSCO and Sciencedirect databases were used for any articles in other journals that contain applications of meta-analysis in marketing with key terms „Meta-analysis", „integrative review", „quantitative review", „empirical generalizations", and including key terms used in marketing: marketing, consumer, price, advertising, product, brand, channel, promotions, trust, sales-force and so on. We have also consulted French journals and the English abstracts of the main German and Spanish journals, and identified two articles translated from English. For an application to be included, it had to meet one criterion: it must use meta-analytical techniques. Studies using conventional vote-counting methods were excluded (p. e. Lancaster and Lancaster, 2003; Chetty and Hamilton, 1993; Souza, 2004). As noted by Hedges and Olkin conventional vote counting procedures are very simple, *„inherently flawed and likely misleading"* (1985, p. 48) (see also Bushman, 1994). The relative contradiction between the results of Andrews and Franke (1991) and those of Lancaster and Lancaster (2003) who used vote-counting approach to study the determinants of cigarette consumption is an illustration[15]. In total, among the 98 applications identified, 68 passed our screening criterion.

Table 1 gives the number of meta-analyses published during the period 1980 to 2003 by journal. It shows that few leading journals[16] in marketing account for the majority of applications and *Journal of Marketing Research* (JMR) represents about 24 % of the total. The diversity of reviews that published at least one meta-analysis in marketing is encouraging. However, this diversity did not involve an increase in the number of meta-analyses each year. Indeed, the Figure 1 shows that this number remained stable

[12] However this statistic offers no guidance when the differences in the file drawer studies are significant but in the opposite direction to the results from the studies included in the meta-analysis (see Bangert-Drowns, 1986).

[13] The probability to detect certain differences in treatment effect is low.

[14] Principally, the leading journals in marketing.

[15] The inclusion criteria used to select primary studies also explain these conflicts results.

[16] Journal of Marketing, Journal of Marketing research, International Journal of Marketing Research, Marketing Science, Journal of Consumer Research.

over the period. This is confirmed when the number of applications is regressed on the linear and quadratic effects of time. The results show that the linear trend is insignificant. To examine whether the introduction of the meta-analysis approach may be considered a successful innovation in marketing research, we used the discretised version of the Bass diffusion model (1969). We regressed the number of applications per year on the number of cumulative applications up to previous year and the square of the latter term. When several papers are due to the same author(s), only the first one is retained, in conformity with the hypotheses of the Bass diffusion model.

Table 1

Number of applications by journal

Title of Journal	Number of applications
Journal of Marketing Research (JMR)	16
Journal of Consumer Research (JCR)	7
Journal of Public Policy & Marketing (JPPM)	6
Journal of Business Research (JBR)	5
Journal of Marketing (JM)	4
International Journal of Marketing Research (IJRM)	4
Marketing Science (MS)	4
Journal of Advertising research (JAR)	3
Journal of the Academy of Marketing Science (JAMS)	3
Psychology & Marketing (P&M)	3
Others*	13
Total	**68**

* Each of these journals published only one or two meta-analyses.

The OLS estimation method shows that both parameters of the Bass model have expected sign, magnitude and order between them ($p = 0{,}017 < q = 0{,}11$) but neither the innovation coefficient (p) nor the imitation coefficient (q) were significant, indicating that meta-analysis methods are weakly diffused among researchers in marketing[17].

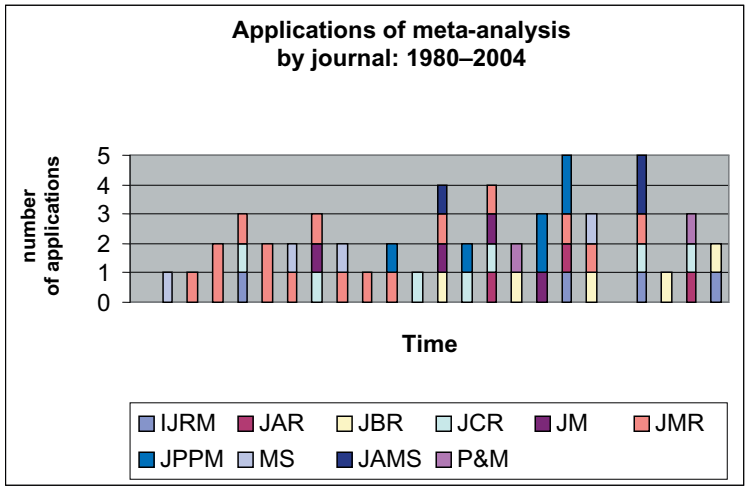

Figure 1

[17] For comparison, by using the Bass model, Baumgartner and Homburg (1996) found that the diffusion of Structural Equation Models in marketing is successful.

Two main reasons can be put forward to explain this result:

– Lack of replication[18] studies in marketing to perform a meta-analysis. Hubbard and Vetter (1996) noted that replications constitute less than 5 % of published empirical work in the management and marketing fields. Unfortunately, these authors noted that the replications of existing studies are depreciated and often rejected by scientific reviews, the latter preferring innovative articles generating new paradigms or methods (see also Wright, 1998). Yet, as underlined by Hunter (2001), *„we need a total sample size of N = 153,669 to estimate a causal effect to two digits… If the average sample size were as high as N = 200, we would need over 700 replication studies"* (p. 149); and

– Lack of training or lack interest of researchers in these statistical tools. Of the 68 meta-analyses in marketing considered here, a great number is due to a few authors.

Other relevant statistics for the applications are summarized in the Table 1. It appears that the average sample size reported by applications is of 306 observations. When large studies are excluded, the average sample size decreases to 206. Theses values are quite high compared to average samples used in other research areas in the social sciences such as psychology (N = 100) (Hunter and Schmidt, 1992). We also calculated the quartiles of sample sizes, which are robust (less sensitive) to extreme values. The median is of about 195 observations.

Moreover, the median number of articles included in a meta-analysis is high (37 articles). Since the statistical power of a meta-analysis is a function of the sample size as well as of the number of studies (Hedges and Pigott, 2001), one may expect a large statistical power for meta-analyses in marketing.

Finally, the meta-analysis can be used to summarize the results of several studies or to test theories. Most published applications belong to the first category (84,6 %). Meta-analyses devoted to theory testing represent 15,4 %, a satisfactory proportion though rather low.

Issues related to selective inclusion of studies and coding. It is encouraging that among the applications identified according to some criteria defined to narrow the research domain, a majority (61,7 %) covers both published and unpublished articles in English. However, the applications including only studies published in English represent 89,7 % of the total. Therefore, it is likely that relevant works written in languages other than English (either published or not) are not included in these meta-analyses. As a consequence, their results can be biased and/or not generalizable for every setting.

Regarding the difficulties related to the coding of the characteristics of studies, there are only a few applications which contain enough information to have a precise idea about inconsistencies in coding and procedures to resolve them. Nevertheless, the few applications (16,2 %) reported a high interrater agreement coefficient, about 95 % agreement between authors coding the same study and only one meta-analysis reported a low coefficient. Though several authors excluded studies for failure to report sufficient information to calculate effect sizes and/or to carry out necessary tests (statistical validity), no quality criterion other than that of publication status[19] was used in the selection of studies.

Issues related to measurement of effect size. ***Common effect size metric:*** The choice of indicators and their interpretation are very little discussed by the authors who merely mention the definition of the metric. Table 2 presents the different effect size indicators used in the applications. It appears that regression slopes (β's) and measures of association are used by 55,9 % and 48,5 % applications, respectively. Surprisingly, 7,4 % of applications reported an overall p-value indicator (significance level) but did not produce neither the magnitude of the effect size nor its variability across primary studies.

[18] Hubbard and Armstrong (1994) discuss several reasons for the paucity of replication.

[19] Some authors limited their investigations to published articles.

Table 2

Descriptive Statistics

	% of applications used or examined	Quartiles			
		Mean	Q1(25 %)	Q2(50 %)	Q3(75 %)
Characteristics					
Period of estimation (years)		21,5	12,25	19	27,5
Number of studies included		42,8	17,00	37	59,0
Number of measurements of the Effect size per study		5,7	2,14	4,12	7,7
Sample size (number of observations)		355	133	197	371
Only published articles	61,7				
Effect size metrics*					
Cohen's d and Hedge's g Pearson's r	39,7	0,27	0,16	0,26	0,35
Magnitude (absolute value)					
Indicators (ω^2, η^2, ε^2)	8,8				
Regression slopes	52,9				
p-value	7,4				
Screening data and correction for artefacts					
sampling error					
measurement error	13,2				
Exploratory analysis	13,2	0,28	0,082	0,144	0,41
Statistical methods used forcombining and inference	22,1				
Weighted effect sizes					
Independent samples	63,7				
Homogeneity tests	7,3				
a) Subgroup analysis with	38,2				
Fixed -Effect model					
Random-Effect model	42,6				
b) Meta-regression analysis with:	19,1				
Fixed-Regression model					
Random-Regression	52,8				
Estimator used	0,0				
OLS					
GLS	38,2				
ML	16,2				
Goodness-fit R^2	0,0				
Sensitivity analysis	38,2	48,2	37,0	48,3	54,6
Statistical power					
Fail-safe Number	0,0				
Selection bias test	20,5				
Trend	0,0				
Robust regression	8,8				
	1,5				

* Some applications reported more than one metric.

Although this combined probability method is useful to calculate the so-called fail-safe N number (Rosenthal, 1979), it is not very informative to summarize the results of studies (Hedges and Olkin, 1985; Hunter and Schmidt, 1990). Finally, although effect size measures based on the proportion of variance accounted for are inherently non-directional and can have identical values for two studies with conflicting results or patterns (opposite values), they are still used by 8,8 % of applications.

Correction for artefacts: The effect sizes observed across studies can be affected by sampling error, measurement error and other artefacts (see Hunter and Schmidt, 1990). While sampling error cannot be corrected for in a single effect size indicator (unsystematic error), measurement error must be (systematic error). Most of the studies did not discuss this point: only 13,2 % of them corrected for measurement error and sampling error whereas a great majority of them manipulated latent variables. However, the authors who corrected for measurement errors point out the lack of information in primary studies to compute reliabilities.

To evaluate the importance of the bias in the effect size due to measurement error, we calculated an overall reliability of the applications that reported this index (13,2 % of applications). It is equal to about 0,79[20] (with s. e. = 0,10). Thus, on average the magnitude of the effect size is systematically reduced by about 21 %. Therefore, after correction the average r (not corrected for artefacts) reported across applications, arose from 0,27[21] to 0,34 with 95-percent confidence interval [0,078; 0,602]. Finally, the proportion of variance due to artefacts (observed variance/sampling error) on represents only to 28 % of the observed variance. Moreover, the sampling variance estimators often are biased negatively (Aguinis, 2001). So, our findings indicated that some extent more than 70 % of the total variation is associated with others factors (moderators variables).

Thus, if we add the bias due to sampling error of the variance observed across primary findings as well as measurement error, it appears that the magnitude and precision of the effect sizes reported in the majority of applications and not corrected for these artefacts have to be interpreted with caution.

Exploratory analysis: 22,1 % of the applications carried out an exploratory analysis (see Table 2). This analysis is often limited to a graphical representation of the data. Only 5,9 % conducted an analysis to identify outliers and/or to assess the normality of variables. This result is similar with those obtained by Baumgartner et al. (1996) on the applications of structural equation models (8 %). It seems then that this step prior to estimation is largely neglected by researchers.

Estimation and testing procedure issues. ***Weighted effect size:*** Encouragingly, 63,2 % of the applications used the weighted average of the effect size estimates (see Table 2). However, this proportion decreases drastically when restricting to authors who used regression models. Only 27,8 % of meta-regressions used the GLS estimator[22] despite the fact that the primary studies used different sample sizes. The recourse to OLS regression (72,2) % of application used regression model) may threaten the validity of applications' findings when the assumption of homoscedasticity is violated (Chandrashekaran and Walker, 1993). Sometimes, the authors justify the use of OLS by arguing that the results obtained with the GLS method are similar.

Homogeneity: The homogeneity test is of great importance to decide about the choice of the estimation method. For example, the fixed-effects model assumes the assumption of homogeneity. When the effect distribution is heterogeneous, a random-

[20] For comparison, meta-analysis carried out by Churchill and Peter (1984) on the reliability of rating scale reported an average reliability equal to 0,75 (s. e. = 0,156).

[21] Calculated from 402 effects reported by applications which used measures of association to estimate the effect size. It is interesting to note that the observed effect size (0,27) is roughly similar to that obtained by a meta-analysis of effect sizes in consumer behaviour experiments (Peterson et al., 1985).

[22] The weighted estimator tends to be unbiased.

effects model is required. Yet, only 38,2 % of the applications carried out a homogeneity test to assess differences across studies (see Table 2). Another interesting result is that the vast majority of these tests are significant (assumption of homogeneity rejected), implying that the heterogeneity of the results reported by empirical studies is rather the rule in marketing.

Moderator variables analysis: Several approach are available to explain the variability of estimates (see Table 2). However, we observed that the vast majority of meta-analyses used a fixed-effects model (sub-group analysis) or a fixed-effects regression model for any period of publication[23]. The systematic recourse to the fixed-effects model is disconcerting since the homogeneity hypothesis is seldom verified. So, this procedure is only adequate when there is one substantive moderator variable (Schmidt, 2000). In the case where there are more than one moderator variable, the subsets of studies must be internally heterogeneous.

In addition, in the case of sub-group analysis, little attention is given to control for Type I error when conducting multiple tests (capitalization on chance). Unfortunately, only 19,1 % of the applications used the RE model recommended by Hunter and Schmidt (1990), of which three recent applications made explicit reference to the RE model (Farrell and Hakstian, 2001; Cano et al., 2004; Jaramillo et al., 2004). Thus, it seems that most of the authors paid little attention to this issue, which again questions the validity of the results obtained. Yet, the use of the FE model for correlation coefficients instead of the RE model in the heterogeneous case, lead to overestimate the effect size by about 15 % to 45 % depending on the sample size used and to fail to control for Type I error for the associated significance tests for meta-analyses including less than 15 studies (see Field, 2001). Moreover, the probability of detecting small effects was low (Field, 2001, 2003).

Independent samples: The vast majority of the applications report multiple measurements of the effect size from the same sample. The median number of measurements of the effect size reported per application is about 4 (see Table 2). These measures are potentially correlated and the assumption of independent findings made in the applications can be violated. Although some researchers are aware of this problem (13,2 %), the procedure used to remedy it consists of merely averaging out (or computing the median of) the multiple outcomes for each study. This solution is far from being sufficient. We recommend the use of the new statistical methods which deal with the correlated measurements within studies (Raudenbush et al., 1988b; Gleser and Olkin, 1994; Bijmolt and Pieters, 2001; Sohn, 2000).

Selection bias test: Although the methods to deal with the selection bias exist, none of the applications used them whereas the majority of applications included only published English language studies. Yet, as noted in other domains, the inclusion of studies written in other languages can modify the conclusions of a meta-analysis (Grègoire et al., 1995). A possible explanation for the absence of these tests is that the recent techniques to test for publication bias, to the exception of graphical procedures, are mathematically sophisticated.

Sensitivity analysis: Few studies conducted sensitivity analyses of results (see Table 2). Thus, none of the applications provided the statistical power of tests used in the meta-analysis. As already noted by Cohen (1988), researchers concentrate too often on the control for Type I error, with little attention being paid to the control for Type II error (Hunter and Schmidt, 1996). As regards, robust methods of estimation of the effect size, they were neglected by almost all the authors. Only one study used robust methods (Brown, Homer and Inman, 1998) to explain the variability across primary results.

[23] Applications published before 1990 and after 1990 were compared. We found that the practises are similar.

Lastly, only a few authors explored the stability of the overall size time (8,8 %) and the number of filed studies -Fail-safe N- (20,5 %).

In summary, for any period examined, the reviewed applications paid little attention to publication bias, correction for artefacts, stochastic dependencies among effects sizes, adequate methods of estimation and control for Type I error when conducting a large number of tests. However, in overall, it is not clear whether the findings are biased and, if so, in which direction. Indeed, some threats (e. g. publication bias, FE approach) tend to overestimate the magnitude of the effect size while others (unreliability of measures used) tend to underestimate it.

Discussion and perspectives. In view of all the insufficiencies discussed above, it is legitimate to question the validity of the empirical generalisations drawn from the applications of meta-analysis in marketing. To resolve this important issue, we evaluated the statistical power of the different tests used in the applications. We used the procedures proposed by Hedges and Pigott (2001, 2004) to compute the statistical power levels for various tests used by researchers.

Power of significance tests of measures of association: About 55,8 % of the „true" effect sizes computed in the applications are measures of association. In total, among 402 effects size reported in the applications, we found 358 for which there is sufficient information to calculate the statistical power. We converted these measures into a common metric (Pearson's r).

The computation of the power p of the two-tailed test for an effect size $\rho = \rho_o$ is given by:

$$p = 1\text{-}\phi(C_{\alpha/2} - \lambda) + \phi(-C_{\alpha/2} - \lambda),$$

$$\text{with } \lambda = (\rho - \rho_o)/\sqrt{\nu}.$$

where ϕ is the standard normal cumulative distribution function, the parameter $C_{\alpha/2}$ is the 100(1-α/2) percent point, $\sqrt{\nu}$. is the standard error of ρ, ρ is the correlation coefficient and λ is the mean of the normal distribution of $z = (\rho - \rho_o)/\sqrt{\nu}$. when the null hypothesis is false ($\rho \neq \rho_o$). The value of ν. depends on the model used to estimate the overall effect size ρ: $\nu. = 1/\sum_i^k w_i$ ($w_i = 1/\sigma_i^2$) the case of the FE model (homogenous case) and $w_i = (\sum_i^k \sigma_i^2 + \tau^2)^{-1}$ in the RE model (heterogeneous case). When the between-studies variance component τ^2 was not reported,[24] to compute the statistical power of significance test the RE model we adopted the convention suggested by Hegdes and Pigott (2001), namely that $\tau^2 = 0{,}33\sum_i^k \sigma_i^2$ is a small degree heterogeneity, $\tau^2 = 0{,}66\sum_i^k \sigma_i^2$ (k is the number of studies reviewed) is a medium degree heterogeneity and $\tau^2 = \sum_i^k \sigma_i^2$ is a large degree heterogeneity.

Illustration Geyskens et al. (1999) carried out a meta-analysis of satisfaction in marketing channel relationships. For each relationship examined, they computed the coefficient of correlation (effect size), the number of independent studies k, and the number of observation of each study. Unfortunately, these authors did not reported the variance of the effect size, so to calculate the power for Geyskens et al. (1999) review, we use the Fisher's z-transform of the observed correlation where $z = 1/2\ln[(1 + r)/(1 - r)]$. Indeed, the variance of z-transform is $\sigma_i^2 = 1/(n_i - 3)$ which depends only on sample size, n_i, which is often reported in the applications. In addition, we suppose the values of σ_i are

[24] As most of the reviewed applications used the FE model, τ^2 is rarely reported.

identical to obtain an estimate of v. which depends on n_i and the number of studies k. Here, we examine only the relationship between economic satisfaction and trust. Geyskens et al. (1999) reported an average sample per study $n = 94{,}4$, the number of studies $k = 5$ and average effect size $r = 0{,}393$ ($z = 0{,}412$). If we suppose that the values of σ_i are approximately identical (n_i constant across studies) then $\sigma^2 = (94{,}4 - 3)^{-1} = 0{,}0109$. Therefore, an estimate of v. can be computed as $v. = \sigma^2/k = 0{,}002188$.

The power of the two-tailed test at $\alpha/2 = 0{,}025$ for $z = 0$ (or $\rho = 0$) inferred by the FE model requires the computation of $\lambda = (0{,}415 - 0)/0{,}00218^{0{,}5} = 8{,}79$. Then the power test to reject the null hypothesis ($\rho = 0$) is given by $p = 1\text{-}\phi(1{,}96 - \lambda) + \phi(-1{,}96\_\lambda) = 1$. If the effect size is inferred by RE model, to compute statistical power, we need the values of ρ and τ^2. However, Geyskens et al. (1999) did not used the RE Model, so τ^2 is unknown. Then, following the recommendations of Hedges and Pigott (2001), we posit different value for τ^2: a small degree of heterogeneity ($\tau^2 = 0{,}33\sum_i^k \sigma_i^2$), medium degree of heterogeneity ($\tau^2 = 0{,}66\sum_i^k \sigma_i^2$) and large degree of heterogeneity ($\tau^2 = \sum_i^k \sigma_i^2$).

Besides, under heterogeneous hypothesis of effect size, Field (2001) shows that the FE model for correlation coefficients tended to overestimate effect sizes by about 15 % to 45 % (mean = 30 %). Then, we posit $r = 0{,}393/(1 + 30\ \%) = 0{,}302$ as the value inferred by the RE model. So, for a small heterogeneity the power is $p = 0{,}999$. A moderate amount of heterogeneity yields the power as $p = 0{,}999$. With a large heterogeneity the power is $p = 0{,}997$. Thus, given our assumptions, under FE model or RE model, we have very satisfactory power to detect at least a correlation of 0,3 between trust and economic satisfaction.

We applied these procedures for the tests reported by applications. Encouragingly, for any the model used (FE and RE models) in the applications for inference about effect size, we have reasonable power level to detect a significant population effect size (reject the null hypothesis $\rho = 0$). Only 18 % of the applications that used the FE model have a low power (< 0,8); the proportion increases to 28 % for those applications that used the RE model (Table 3).

Power of goodness-fit of the regression model: The lack of necessary information did not allow us to calculate the power of significance tests of the β slope index. However, we computed the statistical power of the test of goodness of fit of the regressions. The weighted sum squares about regression line is used as a test of Goodness of fit[25]. As for the procedure referred to above, we computed the statistical power of this test for fixed-regression model and random-model under three assumptions: small, medium and large heterogeneity between effect sizes (Hedges and Pigott, 2004). The results obtained (see Table 3) show that the statistical power is low in the case of a large heterogeneity between effect sizes, indicating that the models estimated were not correctly specified. However, the latter result is to be interpreted with caution because the parameters used to calculate the statistical power were estimated by means of the fixed-regression model instead of the random-regression model (as required).

Power of homogeneity tests: More than one third of the applications used a test of homogeneity of the effect sizes. We computed the statistical power of these tests under three assumptions: small, medium and large heterogeneity between effect sizes (Hedges and Pigott, 2001, 2004). Table 3 shows that these tests have low power to detect small and medium heterogeneity for a population of effect sizes. Consequently, the homogeneity

[25] This test compares the null hypothesis which assumes that the estimated model holds with the alternative hypothesis which assumes that at least one of the parameters of the model is not significant in the linear relation.

hypothesis can be wrongly accepted when differences between effect sizes are of small or medium magnitude. Fortunately, all of the homogeneity tests reported in the applications are generally significant, indicating a strong heterogeneity of the primary findings. This result also shows that the use of the FE model in these applications was not adequate.

Table 3

Statistical power of tests used by applications

Significant tests used for	% of applications with statistical power p:		
	$p < 0,5$	$0,5 \leq p < 0,8$	$p \geq 0,8$
The mean effect size (Pearson's r) in:			
FE model	11	8	81
RE model with			
small degree heterogeneity	17	5	78
medium degree heterogeneity	20	8	72
large degree heterogeneity	19	10	71
Goodness-fit of regression model in	0	0	100
Fixed regression model			
Random-regression model with	0	0	100
small degree heterogeneity	0	21	79
medium degree heterogeneity	37	21	42
large degree heterogeneity			
Homogeneity with*	90	5	6
small degree heterogeneity	58	24	18
medium degree heterogeneity	28	37	35
large degree heterogeneity			

* Only for subgroup analyses involving at least four studies.

All these results are encouraging, the power levels of the tests used in the applications being satisfactory. Thus, one can assume that when reported estimates of the effect size are considered to be significant they really are. But, a doubt subsists as to their precision (level and range). Indeed, the procedures and models used in the applications involve estimation bias of effect size.

Meta-analysis is recognised as a powerful procedure for summarizing, exploring moderator variables and generalizing conflicting empirical findings from various studies. As stated by Hunter and Schmidt (1992), *„meta-analysis is not merely a new way of doing literature reviews. It is a new way of thinking about the meaning of data, even our views of the individual empirical study and perhaps even our views of the basic nature of scientific discovery"* (p. 1173). Unfortunately, only 68 applications of meta-analysis in marketing were published over the period under review (1980–2004). Therefore, it is advisable to encourage researchers in marketing to use these techniques and journal editors to publish replication and extension studies in order to improve the primary findings because the generalisation of results from a small number of studies cannot be conclusive (Lindsay and Ehrenberg, 1993; Hubbard and Vetter, 1996; Hunter, 2001).

However, meta-analytical techniques are not easy to use. The lessons drawn from the applications reviewed in this paper show that numerous lacunas subsist, threatening the validity of the conclusions. The most important, in our view, is that researchers focus mainly on the substantive difference between studies while little interest is given to problems related to errors of measurement and to the sampling scheme. A second threat to the validity of generalization is the lack of interest in screening the data to, for instance, identify outliers or assess the assumption of normality. A third limitation is the

predominant use of unweighted regression analysis to assess moderator variables, which ignores differences in precision. A fourth threat to the validity of the conclusions resides in the potential publication bias. Finally, the excessive use of to the fixed-effects model also constitutes a limitation. Several simulation studies showed that the random effects model is better suited to real data (Field, 2003; Hunter, 2001).

To protect against these threats, we thus recommend the following nine-steps procedure:

1) delimit precisely the research area for identifying the relevant literature;
2) pre-specify which covariates are going to be examined;
3) assess by two ore more reviewer in order to check the relevance and the quality of each article retrieved, and to test the reproducibility of coding decisions;
4) screen the estimates obtained from primary studies;
5) correct each estimate of the primary studies for artefacts;
6) test the overall homogeneity of study-level effect size estimates;
7) use meta-regression (fixed or random) when two ore more moderator variables are investigated. It is recommended to use a random-regression;
8) compute the statistical power of the meta-analysis;
9) conduct a sensitivity analysis.

This procedure has not been applied to the applications examined in this article because the data used by the researchers are not available. Therefore, we recommend that journal editors adopt policies requiring all authors using meta-analysis to provide with the data used in their manuscripts[26]. Such practice is relevant in as it allows: verifying the validity of the results in light of new methodological improvements of the meta-analysis, and re-examining these results as new studies become available.

Conclusion. In fact the conflicting results reported by empirical studies on the same topic disappoint not only researchers but also managers and policymakers. Meta-analysis is one of the methods used to explain and to handle the variability findings across studies. This article is aimed at providing a state of the art of the applications of meta-analytical techniques in marketing research, particularly how researchers deal with threats to validity of meta-analysis (the „apples and oranges" problem, selection bias, estimation bias). This article shows that although many researchers are aware of at least one of these validity threats, most of them continue to use straightforward methods, despite of numerous insufficiencies. Consequently, the conclusions of the great majority of the applications reviewed are to be interpreted with caution, particularly the precision of magnitude of effect sizes reported. Moreover some threats to the validity of inference about the existence of a relationship between variables, such as unreliability of coding, stochastic dependencies among effect sizes and bias of publication, have not been examined in the present research, because of the lack information reported in the reviewed applications.

In future, we hope that the „complexity" of recent methods such as random effects models, publication bias tests and robust regressions should not discourage researchers from using them in performing a meta-analysis. Some of those statistical tools are now available in well-known statistical software packages such as STATA and SAS. All the more, several authors showed their efficacy, though they did not take into consideration for all the critics raised in the literature about the use of meta-analytical methods.

Finally we recommend that replication and extension of existing empirical studies should be in order to build up a large database of facts on each particular research topic, thereby increasing the number of application of meta-analysis in marketing. Indeed, as underlined by Hubbard and Vetter (1996), *„many empirical findings in the business literature are isolate and fragile, as they have been largely immune from examinations designed to assess their reproducibility and generalizability"* (p. 62).

[26] The data may be made available upon request or through the Internet.

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Appendix A
Applications of meta-Analysis reviewed

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Appendix B
Models for inference in meta-analysis

The problem is to estimate the „ true“ value of the unknown effect size β observed from *k* independent studies. We denote $\hat{\beta}_i$ the population effect size observed in the *ith* study, $i = 1, 2\ldots k$. Four somewhat different statistical models can be used for inference about the „true“ effect size β. The choice of a statistical method is crucially determined by the assumptions made on the statistical process followed by this parameter.

Fixed-effects model

The true parameter β is assumed to be the same in the different studies. So, the estimates $\hat{\beta}_i$ could be set as follows:

$$\hat{\beta}_i = \beta + \varepsilon_i. \quad \text{(A-1)}$$

Assuming $\hat{\beta}_i \sim N(\beta; \sigma_i)$ and the sampling error $\varepsilon_i \sim N(0; \sigma_i)$, then the estimator of β that minimizes the variance is

$$\hat{\beta} = \sum_{i}^{k} \hat{\beta}_i w_i \Big/ \sum_{i} w_i \qquad \text{(A-2)}$$

with $w_i = 1/\hat{\sigma}_i^2$, $\hat{\sigma}_i$ is an approximately unbiased estimate of σ_i.

Fixed-effects regression model

A natural extension of the fixed-effects model is to suppose that the true effect is depending on a set of study characteristics $X(X_{i1\ldots} X_{im})$, where X_{i1} is a row vector that contains the values of the covariates for study i and α is a column vector of regression coefficients.

So, equation (A-1) becomes $\hat{\beta} = X\alpha + \varepsilon_i$. (A-3)

OLS can be used if $\hat{\sigma}_i$ across studies are approximately equal (homoscedasticity assumed), otherwise a weighted-least-squares (WLS) procedure is appropriate. So, the estimator of α is $\hat{\alpha} = (X'VX)^{-1}X'V\hat{\beta}$, with V being the covariance matrix. This matrix is diagonal when the estimates are independent. When the estimates are correlated, V is a full symmetric matrix. V has diagonal terms of the form $\sigma_i^2 + \tau^2$ and sub-diagonal terms are the covariance between estimates of the same study (correlated effect sizes).

Random-effects model

The random effects model assumes that the studies are a random sample of a much larger population of studies and that their results have different true effects. In this case, the true parameter β_i follows a random process $\beta_i = \beta + \nu_i$, with $\beta_i \sim N(\beta; \tau_i)$, where τ^2 is the between–study variance or the variance of the population from which $\nu_1, \ldots, \nu_k$ are sampled. The random term ν_i gives the measurement of the specificity of the *ith* study.

It is convenient to decompose the observed effect into fixed and random components. Indeed, as $\hat{\beta}_i = \beta_i + \varepsilon_i$, $\hat{\beta}_i = \beta + \nu_i + \varepsilon_i$. Assuming ε_i and ν_i are not correlated, then $V(\hat{\beta}_i) = V(\varepsilon_i + \nu_i) = \sigma_i^2 + \tau^2$. So $\hat{\beta}_i \sim N(\beta, \sigma_i^2 + \tau^2)$ and the estimate of the „true" effect size becomes:

$$\hat{\beta} = \sum_{i}^{k} \hat{\beta}_i w_i \Big/ \sum_{i} w_i \qquad \text{(A-4)}$$

with $w_i = (\sigma_i^2 + \tau^2)^{-1}$.

Random-effects regression model

An extension of the random model is to suppose that the true effect is depending on a set of study characteristics $X(X_{i1\ldots} X_{im})$ plus a random term: $\beta = X\alpha + \nu$. Then,

$$\hat{\beta} = X\alpha + \nu + \varepsilon. \qquad \text{(A-5)}$$

In other words, equation (A-5) assumes that only part of variability in the true effects is explainable by studies characteristics ($X\alpha$). In contrast, the fixed-effects regression model supposes that the study characteristics account completely for variation in the true effect sizes ($\tau^2 = 0$).

The residual variance $V(\hat{\beta}_i)$ will be heteroscedastic as long as ν varies across studies. Clearly, it would be inappropriate to use OLS to estimate both the unknown values α

and τ^2. In large samples the ML estimates are efficient (Hedges, 1992; Berkey et al. 1995, Sohn, 2000). For other alternative estimators (see Sohn, 2000).

Note that the equations (A-3) and (A-5) are sometimes called the meta-regression.

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GLOBAL AND LOCAL DETERMINANTS OF ECONOMIC GROWTH AND COMPETITIVENESS OF UKRAINE

The article is devoted to investigation of key factors that influence Ukrainian economy further development. The main determinants of economic growth and competitiveness improvement of Ukraine are considered. These determinants were divided into local (corruption, bureaucracy, ineffective infrastructure and legislation, political instability etc.) and global (global financial crisis, geopolitical and geoeconomical situation, integration processes level etc.).

Key words: economic policy, economic growth, competitiveness, global and local determinants.

Статья посвящена исследованию ключевых факторов влияния на дальнейшее развитие экономики Украины. Выявлены основные детерминанты экономического развития и повышения конкурентоспособности Украины. Данные детерминанты разделены на локальные (коррупция, бюрократия, неэффективные инфраструктура и законодательство, политическая нестабильность) и глобальные (глобальный финансовый кризис, геополитическая и геоэкономическая ситуация, состояние интеграционных процессов и т. д.).

Ключевые слова: экономическая политика, экономический рост, конкурентоспособность, глобальные и локальные детерминанты.

Стаття присвячена дослідженню ключових факторів впливу на подальший розвиток економіки України. Визначені основні детермінанти економічного зростання та підвищення конкурентоспроможності України. Ці детермінанти поділені на локальні (корупція, бюрократія, неефективна інфраструктура та законодавство, політична нестабільність) та глобальні (глобальна фінансова криза, геополітична і геоекономічна ситуація, стан інтеграційних процесів тощо).

Ключові слова: економічна політика, економічне зростання, конкурентоспроможність, глобальні та локальні детермінанти.

Introduction. The complex concept of national economy competitiveness includes main success determinants of the country development. The high level of nation competitiveness is characterized by strong and flexible economy, innovative business environment, investment potential, dynamic market growth, effective companies and social institutions. However current conditions and level of country's competitiveness is under strong impact of both global and local determinants. It's essential to consider them in order to form optimal policy of economic growth and competitiveness improvement. The issue has been investigated by many famous researchers including Timo J. Hämäläinen, S. Demurger, J. Sachs, W. T. Woo, S. Bao, G. Chang, D. Evans, and others.

However global financial crisis as well as some other current changes caused changes of key determinants of countries' economic growth and competitiveness.

So, **the aim of the article** is to determine and analyze global and local determinants of economic growth and competitiveness of Ukraine.

Research results. Since Ukraine became independent state in 1991 and it has started to transform its planning economy into market economy and has passed through significant and difficult political, economic, financial, social changes. Even now the transformation is not completed yet and it is still in the reforming process. Ukraine has also experienced problems connected with legislative and institutional framework of development that caused significant shadow sector of economy appearing. Besides Ukraine has high level of dependence on Russian natural gas and oil. So, by this moment we are speaking about twenty years of constant transformation process, instability, alterations, modifications, and unsteadiness in all spheres of everyday life of the country and its citizens. Protracted economic transformation is the first national determinant of Ukrainian economic growth and competitiveness.

Let's address to the main economic indicators of Ukraine starting from the year of its independence declaring. Chart 1 shows Ukrainian Gross Domestic Product (GDP) annual growth since its independence.

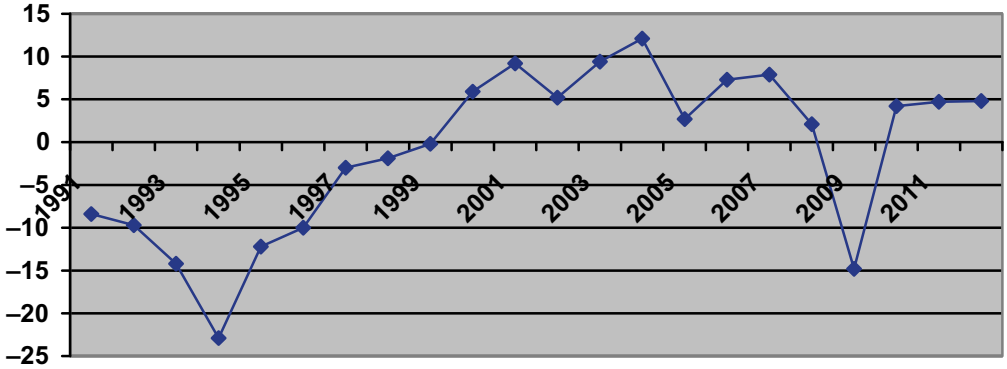

Chart 1. Ukraine's GDP percent change during 1991–2012 (2011–2012 projected by IMF), %
Sources: World Bank, IMF.

1991–1998 were hard times for Ukrainian economy. Even more or less „good" 1999–2007 years were not stabile for Ukraine in terms of its GDP growth. In 2009 GDP change was –15,1 % as a direct consequence of the global financial crisis. Such GDP dynamics was one of the worst all over the world in 2009.

But to be objective it's worth to address to comparative analysis of GDP growth. There are some authoritative international country rankings. For instance, Forbes magazine constructed the list of the worst economies. 177 countries were ranked according to three-year average statistics for GDP growth and inflation (including the IMF's 2012 estimates), plus GDP per capita and the current account balance, a measure of whether the country is importing more than it exports. To our regret Ukraine became the 4th worst economy after Madagascar, Armenia and Guinea. It's mentioned that „This former Soviet Republic has rich farmland and generous mineral resources and could become a leading European economy – yet per-capita GDP trails far behind even countries like Serbia and Bulgaria. The U.S. State Department blames „complex laws and regulations, poor corporate governance, weak enforcement of contract law by courts, and particularly corruption" [1].

From the other hand Ukraine took the 14th rank among economies with the highest GDP growth according to Ernst&Young and Oxford Economics prognoses [2]. The most highly growing economies are Qatar, BRICS countries (Brazil, Russia, India, China, South Africa), Kazakhstan, Chili, Saudi Arabia, United Arabian Emirates. It's conside-

red that these markets will have 50 % of world GDP, 38 % of world consumer expenses and 55 % of world fixed assets funding by 2020. According to the chart 1 Ukraine's GDP growth was about 5 % in 2010 and IMF prognoses 5 % GDP growth during 2011–2012. As it was mentioned, it caused that Ukraine became one of the leading economies of the world in terms of GDP growth during 2010. So, it's obvious that Ukrainian economy has great potential to increase its competitiveness.

As for the other determinants that influence Ukrainian competitiveness and economic policy. During 1993–1996 Ukrainian economy faced galloping inflation (Chart 2). In 1993 it was almost 5000 %, then each year it became lower and lower and in 1996 annual inflation rate was 80 % and in 1997 – 15 %.

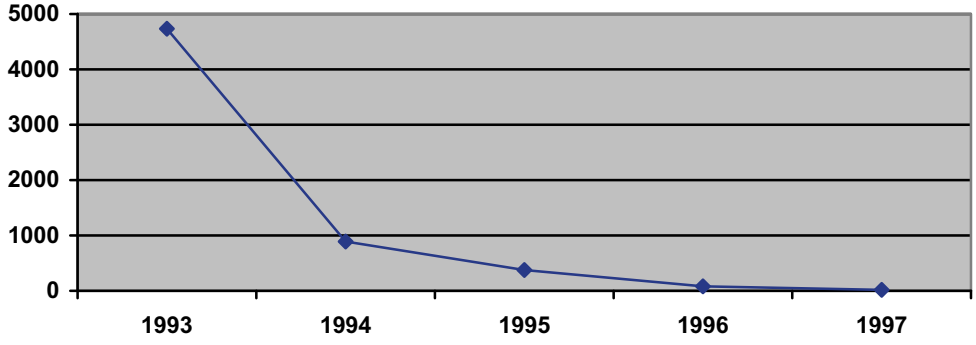

Chart 2. Annual consumer prices inflation rate in Ukraine in 1993–1997, %
Source: World Bank.

After 1997 inflation in Ukraine remained relatively high – from 10 to 25 % increase annually excluding 2002–2004 when it was up to 10 % (Chart 3). Since 1996 when Ukrainian national currency hrivna was implemented the lowest inflation level was in 2002 (0,7 %) and the highest ones in 2000 (28,2 %). Global financial crises caused one more leap forward of inflation in 2008 – 25,2 %.

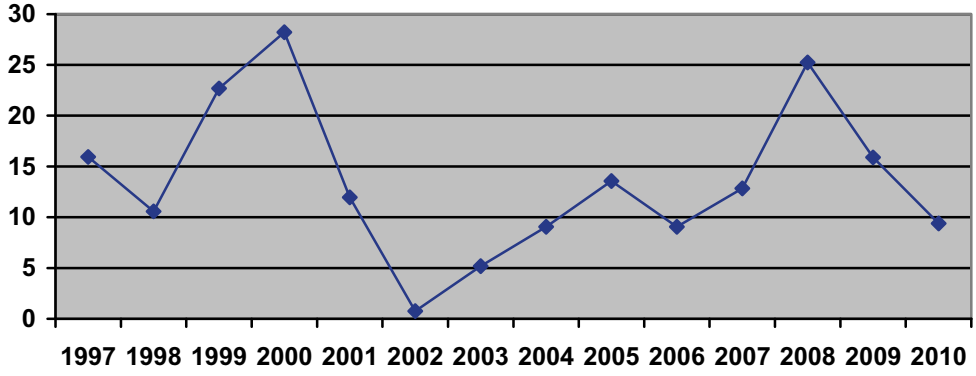

Chart 3. Annual consumer prices inflation rate in Ukraine in 1997–2010, %
Source: World Bank.

Chart 4 demonstrates the current account balance of Ukraine during 1994–2010. It was a surplus during 1999–2005 period with the highest percent in 2004 (10,6 % of GDP or 7 billion US dollars) and a deficit during 1994–1998 and 2006–2010 with the lowest level in 2008 (–7,1 % of GDP or 12,8 billion US dollars).

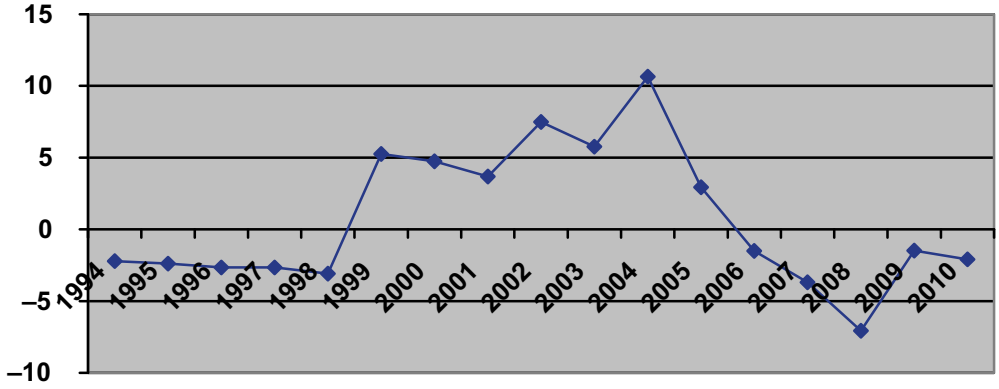

Chart 4. Ukraine's current account balance in 1994–2010, % of GDP

Source: World Bank.

Economic instability has a direct impact on demography. The population is steadily declining every year, dropping from more then 52 million people in 1992 to 45,8 million in 2010 (Chart 5). Brain drain and population aging are the next local determinants of Ukraine's competitiveness development.

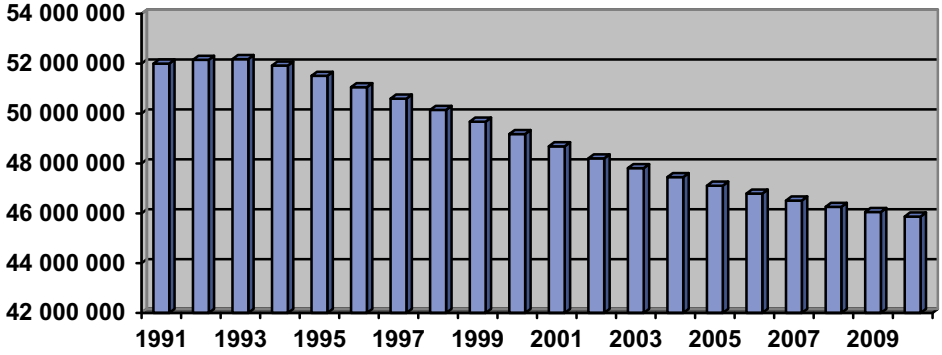

Chart 5. Population of Ukraine in 1991–2010, people

Source: World Bank.

The analysis of above charts and figures raises some difficult questions. Is it possible to build competitive economy in such conditions? What economic policy should be developed and implemented to overcome all existing difficulties?

Let's make a short comparative country analysis. Table 1 compares basic data of Ukraine, Hungary and France. Hungary is selected as a post social country which joined the European Union (EU) in 2004 and has positive economic and competitiveness dynamic. France is developed economy, one of the founders of the EU, G7 member. Besides France is comparable to Ukraine by its area and population.

Table 1 shows that GDP of Ukraine is almost the same as of Hungary which has 5 times less population, more then 5 times less labor force, and almost 7 times less area. However, GDP growth in Hungary and France was from 4 to 5 times less then in Ukraine (it depends on statistic data source – according to IMD it was 4,2 %; according to IMF and World Bank it was about 5 %). These and other figures are again evidence of undiscovered potential of Ukraine.

To determine other factors which influence competitiveness of Ukrainian economy we address some well known authoritative and comprehensive country rankings.

Table 1

Countries basic data in 2010

Indicator	France	Hungary	Ukraine
Population, million	62,8	9,98	45,87
Area, ’000 sq. km (2009)	549,2	93	603
GDP, USD billion	2588,4	130,3	137,9
GDP (PPP) per capita, USD	35127	20638	6603
Real GDP growth, %	1,5	1,2	4,2
Consumer price inflation, %	1,5	4,9	9,4
Unemployment rate, %	9,7	11,2	8,1
Labor force, million	28,69	4,26	22,05
Current account balance, %	–2,05	2,08	–2,09
Direct investment			
Stocks inward, USD billion (2009)	1132,96	248,68	55,02
Flows inward, % of GDP	1,48	1,24	4,71

Source: IMD.

The rank of Ukraine in Global Competitiveness Index 2011–2012 rankings computed by World Economic Forum (WEF) is 82 with score 4,00. Trinidad and Tobago, Namibia and Guatemala have the same score. But it’s 7 points better then the last year rank and considered to be a very good progress after the steepest decline of all countries (16 places falling over the last two years). Well-educated population, flexible and efficient labor markets, large market size are Ukraine’s competitive strengths and base for future growth performance. However, weak institutional framework (131st place), highly inefficient market for goods and services (129th), undeveloped financial sector (116th) were not improved regardless declared reforms and cause weak position of Ukraine in this ranking. To compare Hungary has the 48 rank with score 4,36 (the same as Cyprus), Russian Federation – the 66 rank with 4,21 score. France takes 18th position in this rankings (score 5,17). The highest rank has Switzerland with score 5,74, the lowest – Chad 2,87 [3].

Another country competitiveness ranking is International Institute for Management Development (IMD) World Competitiveness Online which includes 16-year time series from the IMD World Competitiveness Yearbook and covers 59 countries. It analyzes the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people [4].

Table 2 demonstrates Competitiveness Indicators Rankings of France, Hungary and Ukraine.

It’s obvious that France has the best results concerning overall competitiveness as well as all its components (economic performance, government efficiency, business efficiency and infrastructure) among presented countries. There are 18 points better then Hungarian overall competitiveness and 28 better – then Ukrainian. Mostly it’s the result of much better infrastructure and economic performance of France.

Let’s pay attention that Ukraine overall competitiveness decreased from 46th position in 2007 to 57th position in 2011. And all competitiveness components decreased during this period. The sharpest decrease was demonstrated by government and business efficiency.

Charts 6, 7 and 8 present selected countries’ detailed competitiveness landscape [4]. Numbers on these charts show country’s ranking in the specific sphere – so, „the higher hills the better competitiveness rankings“.

Table 2

France, Hungary and Ukraine Competitiveness Indicators Rankings

Country	Indicators	Rank				
		2007	2008	2009	2010	2011
France	Overall Competitiveness	28	25	28	24	29
	Economic Performance	19	13	17	17	22
	Government Efficiency	42	45	46	42	44
	Business Efficiency	42	35	42	35	47
	Infrastructure	18	11	14	14	18
Hungary	Overall Competitiveness	35	38	45	42	47
	Economic Performance	38	39	33	40	44
	Government Efficiency	40	47	50	51	52
	Business Efficiency	41	45	52	47	50
	Infrastructure	25	27	33	35	35
Ukraine	Overall Competitiveness	46	54	56	57	57
	Economic Performance	43	50	55	55	45
	Government Efficiency	48	52	56	56	58
	Business Efficiency	46	52	53	54	55
	Infrastructure	47	46	48	41	48

Source: IMD.

According to Chart 6 France's strong sides are international investment, basic infrastructure, health and environment, scientific infrastructure, societal framework. Among weak points fiscal policy, attitudes and values, labor market should be mentioned.

Strong side of Hungarian competitiveness is different then French one – international trade, but weak sides are the same as France has – Fiscal Policy and Attitude and Values.

Ukraine has „the lowest hills". International trade and education is among strong points in its competitiveness. The worst situation is in health and environment, societal framework, business legislation, institutional framework, finance, management practices. As we can see, mostly these problems could be resolved in the frames of sustainable development concept. So, sustainable development imperative has become one of the most significant for country's competitiveness improvement.

Another determinant which influence country's competitiveness significantly is economic freedom. The Heritage Foundation and Wall Street Journal compute Economic Freedom Index (EFI) yearly [5]. Chart 9 shows its dynamics for Ukraine, France and Hungary during 2001–2011. It's considered that if EFI is up to 50 it's repressed country, 50–60 – mostly unfree, 60–70 – moderately free, 70–80 – mostly free, 80–100 – free. Ukraine had repressed index in 2001–2002 and then in 2010–2011. In 2003–2009 Ukraine was mostly unfree in terms of economic freedom. To compare: Hungary and France were mostly free during the whole period.

In 2011 Ukraine's economic freedom score was 45,8 and it's lower then world average score (59,7) and 0,6 point lower then in 2010. It's one of the lowest scores in the world (the 164th ranking) primarily because of declines in government spending, freedom from corruption, low investment and financial freedom, weak property rights.

Let's consider main components of economic freedom provided by The Heritage Foundation & Wall Street Journal. First of all, it's worth to say that trade freedom of Ukraine is rather high (85,2). „Some export restrictions, services market access barriers, import taxes and fees, import licensing requirements, non-transparent government pro-

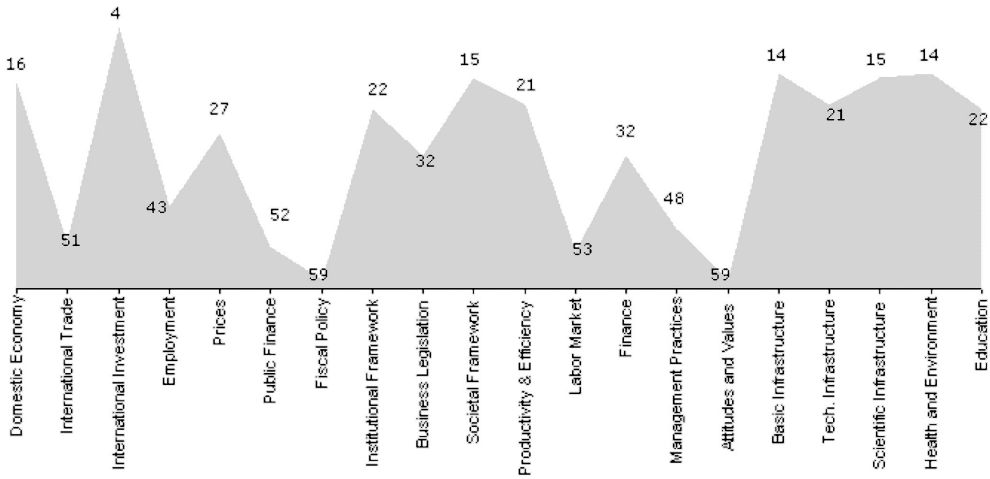

Chart 6. France's Competitiveness Landscape

Source: IMD, 2011.

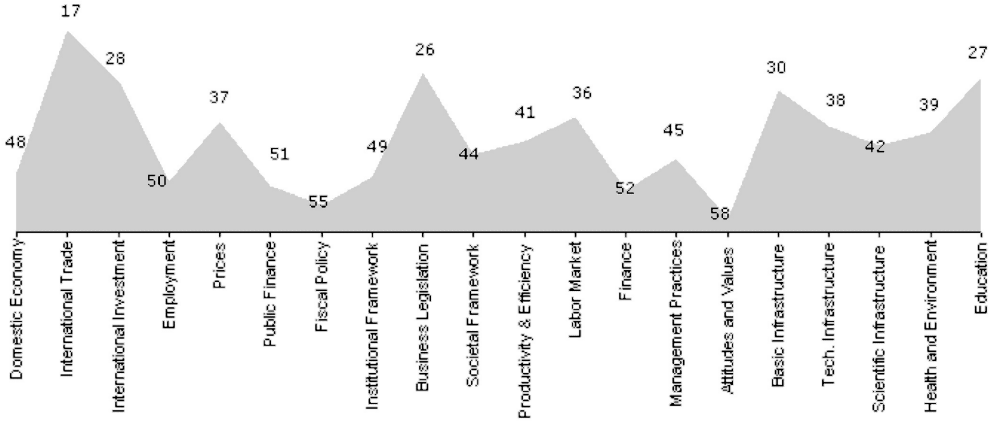

Chart 7. Hungary's Competitiveness Landscape

Source: IMD, 2011.

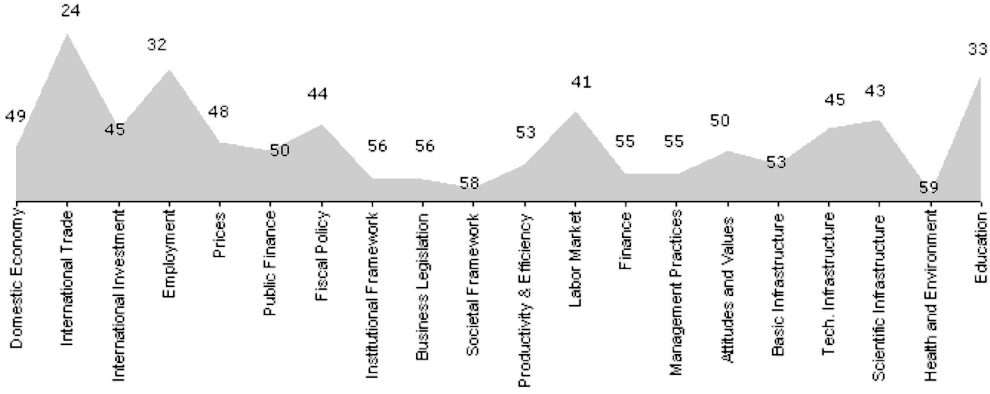

Chart 8. Ukraine's Competitiveness Landscape

Source: IMD, 2011.

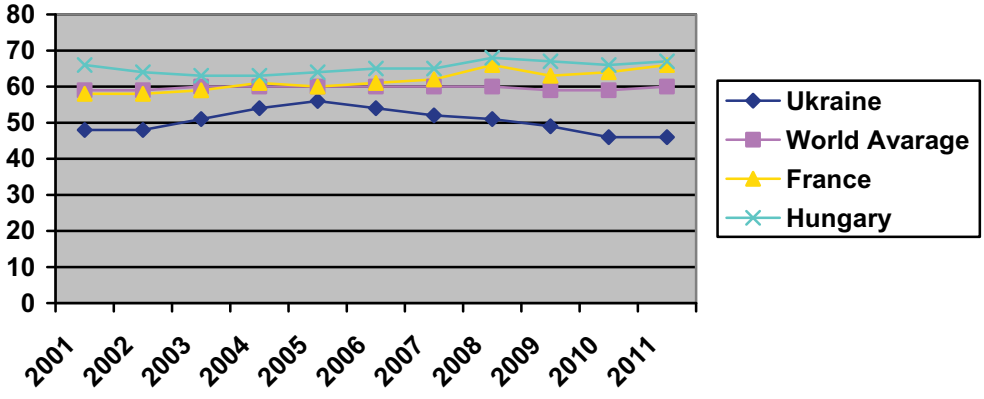

Chart 9. Economic Freedom Index during 2001–2011
Source: The Heritage Foundation & Wall Street Journal, 2011.

curement, complex standards and certification regulations, and weak enforcement of intellectual property rights add to the cost of trade. Customs procedures are improved but can still result in questionable customs valuation. Ten points were deducted from Ukraine's trade freedom score to account for non-tariff barriers." As soon as Ukraine has relatively tax rates, its fiscal freedom (77,3) and monetary freedom (63,2) are also relatively high. The standard income tax rate is 15 percent (gambling income is subject to a 30 percent rate), and the standard corporate tax rate is 25 percent. Insurance companies and agriculture profits are subject to lower rates. In the most recent year, overall tax revenue as a percentage of GDP was 37,7 percent. As it was mentioned above inflation fluctuations were high (Chart 2 and 3). The executive branch can set minimum prices for goods and services, and the government influences prices through regulation and state-owned enterprises and utilities. Ten points were deducted from Ukraine's monetary freedom score to account for measures that distort domestic prices [5].

Labor freedom as well as business freedom were around 50,0. The reasons are the following: outdated labor legislation and ineffective labor regulation, high non-salary cost of employing a worker, difficult dismissing an employee. As for business freedom experts point out the inefficient regulatory framework and lingering complexity which create uncertainty in commercial transactions and impose a significant burden on private enterprise [5].

The weakest points of Ukraine is government spending (32,9), financial freedom and property rights (30,0), freedom from corruption (22,0), investment freedom (20,0). Total government expenditures, including consumption and transfer payments, are almost 50 % of GDP. Ukraine's financial system is underdeveloped, and experts stress that the country remains primarily a cash-based economy. Restructuring of banking has proceeded slowly, and the more than 150 small banks often suffer from insufficient capital. A liquidity crisis and an increase in non-performing loans related to the global financial crisis have led to a large bailout package from the International Monetary Fund. Protection of property rights is weak. Contracts are not well enforced, and expropriation risk is rather high.

One of the biggest problems of Ukraine is corruption that perceived as widespread. Ukraine ranks 146th out of 180 countries in Transparency International's Corruption Perceptions Index for 2009 [5], a sharp drop for the second year in a row. Low public-sector salaries fuel corruption in such local bodies as the highway police and tax administration, as well as in the education system. Besides Ukraine's bureaucratic legal and regulatory requirements discourage foreign investment. The law provides equal treat-

ment for foreign and domestic investors in most sectors of the economy. Contracts are not always upheld by the legal system, and privatization has slowed. Resident and non-resident foreign exchange accounts may be subject to restrictions and government approval. Payments and transfers are subject to various requirements and quantitative limits. Some capital transactions are subject to controls and licenses. Foreign investors may not own farmland [6].

Global financial crisis is one of the global determinants. Global financial crisis effected developed countries as well as developing and emerging economies. The global economic downturn has erased the gains of years of economic growth. Significant structural reforms included competitive tax rates and membership in the World Trade Organization after a 14-year accession process. Among other international determinants of Ukraine's competitiveness there are role of Ukraine as an important route for oil and gas exports from Russia to Western Europe, uneasy relations with Russia, strategic geographical position [7–9].

Conclusions. Summing up, Ukraine has great potential of economic growth there are many different factors influence its modern economic policy and competitiveness. They are ought to be divided into local and global determinants. Local determinants include high level of corruption and bureaucracy, political instability, outdated legislation, inefficient infrastructure. From the other side, Ukrainian competitiveness is under significant influence of global determinants like global financial crisis, geopolitical and geoeconomical position and problems of Ukraine, Ukraine's relations with neighborhood countries.

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INDUSTRY OF EUROPEAN UNION: MODERN TRENDS OF DEVELOPMENT

The article present the current state and the features of industrial development of European Union in the dynamics at sectoral and commodity structure by periods of crisis and postcrisis.

Key words: non-financial sector, industry, manufacturing, development, recession, specialization, European Union.

В статье представлены современные тенденции развития промышленности Европейского Союза по отраслевой и товарной структуре в кризисный и посткризисный периоды.

Ключевые слова: нефинансовый сектор, промышленность, производство, развитие, спад, специализация, Европейский Союз.

У статті представлені сучасні тенденції розвитку промисловості Європейського Союзу за галузевою і товарною структурою в кризовий та посткризовий періоди.

Ключові слова: нефінансовий сектор, промисловість, виробництво, розвиток, спад, спеціалізація, Європейський Союз.

Introduction. The globalization of economic relations and the rapid development of science and technology contributes to the formation of post-industrial type of economic development associated with the change of methods and technologies of production of material goods industry. The modern global economy characterized by such contradictory to one another trend: the growing share of services in the creation of world GDP by reducing the share of industry, and in parallel with this, activated the development of high-tech industrial production, which are concentrated in manufacturing. As stated in the monograph „The potential national industry: goals and mechanisms of effective development“ [1, p. 218], the industry does not disappear but only changes its role and position in the chain of financial products and bring it to the final mass consumer.

In world industrial production remain dominant developed countries (USA, European Union, Japan), which created about ¾ of industrial products worldwide.

The study of various aspects of foreign economic activity of Ukraine with European Union (EU) and the possibility of entering the country on the european market for goods and services involved in such ukrainian scientists-economists, as O. H. Bilous, V. S. Budkin, A. S. Galchinsky, B. V. Gubsky, D. G. Lukyanenko, A. M. Poruchnik, A. S. Filippenko and others. However, scientists still ignore the dynamics of industrial development of European Union during the global instability (during the global crisis and the current post-crisis period).

Statement of the problem. The purpose of this article is to analyze the modern industrial development of European Union in the dynamics under changing paradigm of civilization, which started during the global crisis and continues in modern post-crisis period.

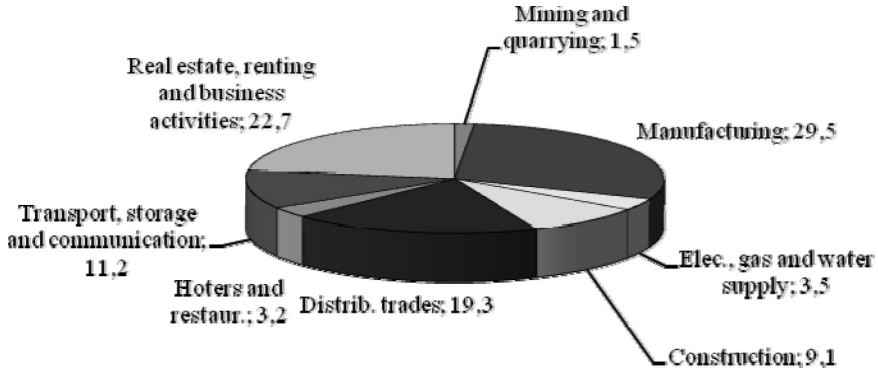
The methodological basis are scientific methods of empirical analysis (comprehensive system analysis, methods of comparative and logical generalization).

Results. European Union holds key positions at the modern world economy: 41,4 % of world commodity exports and 39,8 % of imports.

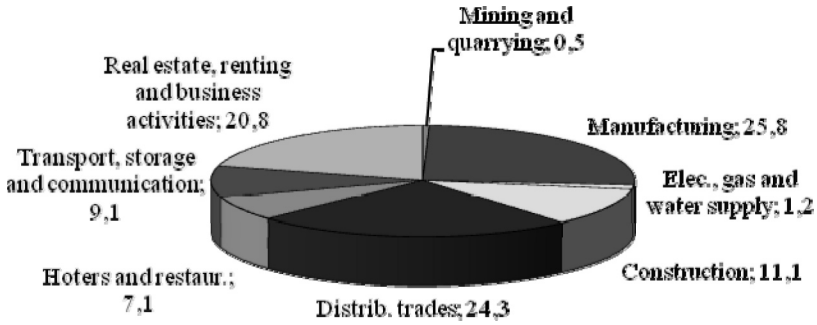
Non-financial sector of EU, covering industry, construction, trade and non-finan-

cial services, in 2007 there were 20,9 million businesses, 133,8 million employees and created value added in the amount of 6146 EUR billions.

This industry is, among the eight sections of non-financial sector, is the largest of EU on such basic indicators of economic activity: number of employees and gross value added (Fig. 1). Feature of industrial development in EU-27 for the period 2000–2008 was that output increased by 1,3 % on average per year, while employment declined annually by 0,9 %.



a) by gross value added



b) by number of employees

Fig. 1. The structure of non-financial sector of the EU in terms of gross value added (a) and number of employees (b) in 2007, % *

* Compiled according to [2, p. 93].

In 2007 to 2,3 million industrial enterprises employed 34,5 million persons employed, allowing a 1813 EUR billion of gross value added. Already in 2008 under the influence of global financial and economic crisis there are negative trends in the development of EU industry: number of enterprises decreased by 8,6 % compared to 2007 (to 2,1 million), number of employees decreased by 4,3 % (to 33,0 million) and the share of gross value added by 2,4 p. p. (person points).

As a result of the global financial and economic crisis in EU-27 decreased industrial production, especially in I q. 2009 (Fig. 2). Signs of recovery observed during 2009–2010 famine in most economic activities in EU. New industrial orders rose by 7,0 % in IV q. 2009 compared with the previous period of 2009 stepped up production caused by the bull, especially the expansion of external demand.

In some countries of EU-27 reduction in activity in the industry was bigger most of the 1930s (Tab. 1). Industrial production at EU in the period 2008–2011 most fell in I q. 2009 compared with IV q. 2008 – by 8,4 %.

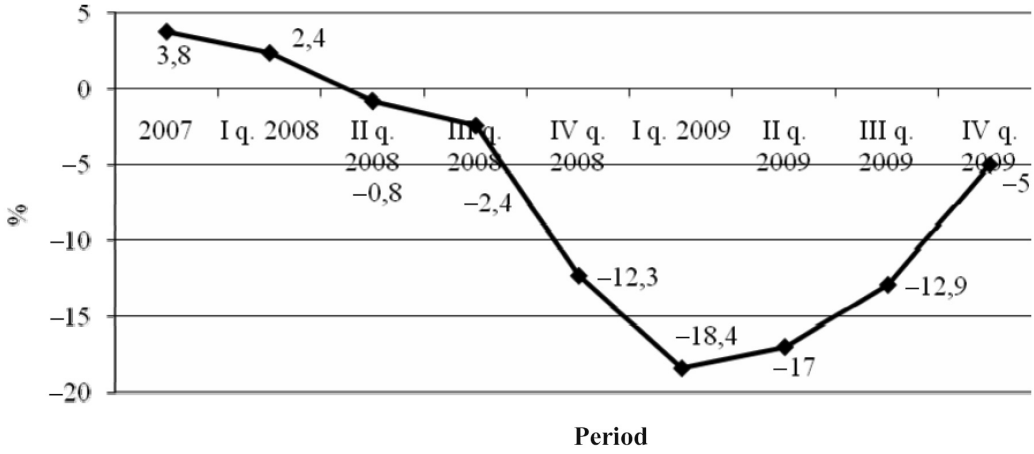


Fig. 2. Dynamics of industrial production
in EU countries 2007–2009, % at the quarter to previous quarter

* Compiled according to [3; 4].

Table 1

Dynamics of recession at industry of European countries from IV q. 2008 to 2011 *

Country	2008	2009				2010				2011
	IV q.	I q.	II q.	III q.	IV q.	I q.	II q.	III q.	IV q.	I q.
EU-27	–6,6	–8,4	–1,3	2,3	1,0	2,4	2,3	1,2	1,5	1,1
Austria	–6,7	–4,4	–4,0	1,6	1,9	1,0	3,7	1,8	2,2	3,3
Belgium	–5,0	–10,4	2,8	5,8	2,1	2,7	2,9	1,6	1,2	1,8
Bulgaria	–5,5	–13,0	–1,2	–0,9	1,5	–2,7	3,6	2,6	1,7	1,2
Czech Republic	–6,7	–6,5	–0,8	1,7	2,9	2,2	2,8	2,9	2,1	2,8
Cyprus	–0,7	–6,2	–1,1	–1,3	–0,2	0,3	–0,6	0,3	–2,3	–1,2
Denmark	–2,9	–7,7	–4,6	–0,6	–4,0	3,7	4,1	–0,1	–1,3	1,5
Estonia	–14,6	–9,8	–7,6	2,6	1,9	8,9	3,3	7,9	10,2	7,2
France	–7,1	–7,4	–0,9	3,1	0,3	1,9	1,8	0,3	0,8	2,1
Germany	–7,2	–12,5	–0,4	3,7	1,2	2,3	5,0	1,8	3,0	1,8
Greece	–5,5	–3,0	–2,1	0,5	–3,0	–2,7	–1,2	0,5	–3,3	–2,1
Hungary	–10,6	–9,3	–1,5	2,7	1,0	3,9	4,3	3,0	–1,8	5,5
Ireland	–3,3	0,9	–2,2	–3,6	–3,4	11,6	0,9	2,0	–1,8	–0,5
Italy	–7,8	–11,0	–2,5	2,5	1,6	2,8	1,7	1,2	–0,7	–0,1
Latvia	–6,1	–9,5	–0,3	–2,6	3,6	5,8	3,5	7,0	0,6	–2,0
Lithuania	–11,6	–5,4	–0,6	2,2	–4,7	0,5	6,5	5,6	3,8	–1,5
Luxembourg	–18,8	–7,9	3,1	9,0	–0,7	4,0	2,3	–0,2	0,1	–0,4
Malta	–2,8	–11,1	–5,0	1,8	6,9	2,1	1,9	–3,3	0,4	6,2
Netherlands	–3,4	–4,8	–2,4	4,2	1,7	4,2	0,4	–2,0	3,2	–0,5
Poland	–4,7	–1,9	2,3	1,7	3,0	3,4	2,3	2,9	0,5	1,9
Portugal	–5,6	–5,3	1,1	2,6	–2,7	2,3	0,1	0,0	–1,3	1,3
Romania	–5,8	–2,5	0,7	1,9	2,2	–1,0	3,1	1,3	3,0	2,1
Slovakia	–11,3	–10,1	2,3	6,9	3,4	5,9	6,2	–0,7	4,6	1,1
Slovenia	–10,7	–7,5	–5,9	4,1	1,5	–0,2	4,7	2,3	1,2	0,6
Sweden	–6,0	–10,6	–2,3	2,1	–0,6	3,3	5,1	2,4	1,1	4,4
United Kingdom	–4,3	–5,2	–0,2	–1,0	0,3	1,6	1,1	0,1	0,8	0,6

* Compiled according to [5, p. 6].

The reduction of industrial production took place during this period as in developed countries: Germany (12,5 %), Italy (11,0 %), Belgium (10,4 %), and so developing countries – Bulgaria (13,0 %), Malta (11,1 %). It should be noted that the most affected by the impact and consequences of the global financial crisis is at that EU countries, where industrial production is concentrated (at 2005 Germany (25,7 %), Unites Kingdom (14,3 %), Italy (12,6 %) and France (11,9 %).

From III q. 2009 there is a gradual increase in industrial production in EU-27: 2,3 % in III q. 2009 and 1,1 % in 2011, however, in industrial countries such as Ireland, Denmark, Greece and Cyprus during the given period continued recession.

The share of the five largest member states (Germany, United Kingdom, France, Italy, Spain) in EU-27's value added gives an impression of geographical concentration; the average share for the non-financial business economy was 71,4 % in 2008: the highest concentration was for mining and quarrying and the lowest for distributive trades; network energy supply had a lower level of concentration by this measure.

Germany's share of EU-27 manufacturing industry was considerable: amounting to above 26 % of the total value added, around double that of the next-ranking contributors France, United Kingdom and Italy. Also of note is that among the main contributors, the shares of Germany, Italy and Poland were larger than for the non-financial business economy as a whole (by respectively 6 p. p., 2 p. p. and 1 p. p.). In contrast, the contribution of United Kingdom, one of the member states most specialised in services, was much smaller than for the non-financial business economy (6 p. p.).

All products manufactured by industrial enterprises in European Union is divided into five major industrial groups: intermediate goods, energy, capital goods, consumer durables and consumer non-durables. Industrial structure of EU-27 according to the groups of products in 2005 as follows: 36,2 % – intermediate goods, 28,6 % – capital goods, 20,2 % – consumer non-durables, 11,7 % – energy and 3,3 % – consumer durables.

For long period (2000–2010) production of these product groups at EU-27 took place with different trends. During the global economic and financial crisis, two groups of industrial products – consumer non-durables and energy least affected by the economic downturn, while three other groups of industrial production suffered a significant drop in production (within 20–25 %) with achievement of peak values – I q. 2009 (Tab. 2).

Table 2

Dynamics of recession in the industry EU-27 by main industrial groups in 2009–2011, % *

Group name	2009				2010				2011
	I q.	II q.	III q.	IV q.	I q.	II q.	III q.	IV q.	I q.
Total industry	–8,4	–1,3	2,3	1,0	2,4	2,3	1,2	1,5	1,1
Intermediate goods	–11,0	–0,6	4,3	1,9	2,0	4,1	1,1	1,0	2,7
Energy	–2,7	–3,0	2,3	–0,8	3,5	–1,1	–0,7	1,2	–1,9
Capital goods	–12,3	–1,7	0,8	1,1	3,2	4,1	2,1	3,5	2,6
Consumer durables	–7,6	–1,9	0,8	1,9	2,0	1,8	0,0	–1,0	0,9
Consumer non-durables	–1,5	0,1	0,1	0,1	2,1	0,5	0,5	0,2	0,3

* Compiled according to [5, p. 4].

Production of energy at EU-27 reached at minimum in April 2009, while in March 2011 there was growth in production of energy by 2,8 %. In March 2011 index of consumer non-durables was the most close to the value of the previous peak (only less than 1,2 %), while the production of consumer durables was at 15,5 % below the peak value. Restoration of industry EU-27 contributed to the growth of intermediate goods by 20,2 % and capital goods – by 18,5 % over the period from April 2009 till March 2011.

Despite the growth of industry at EU-27 pre-crisis period (2002–2007), average annual growth in the period 2004–2009 was negative for most industrial activities (Fig. 3).

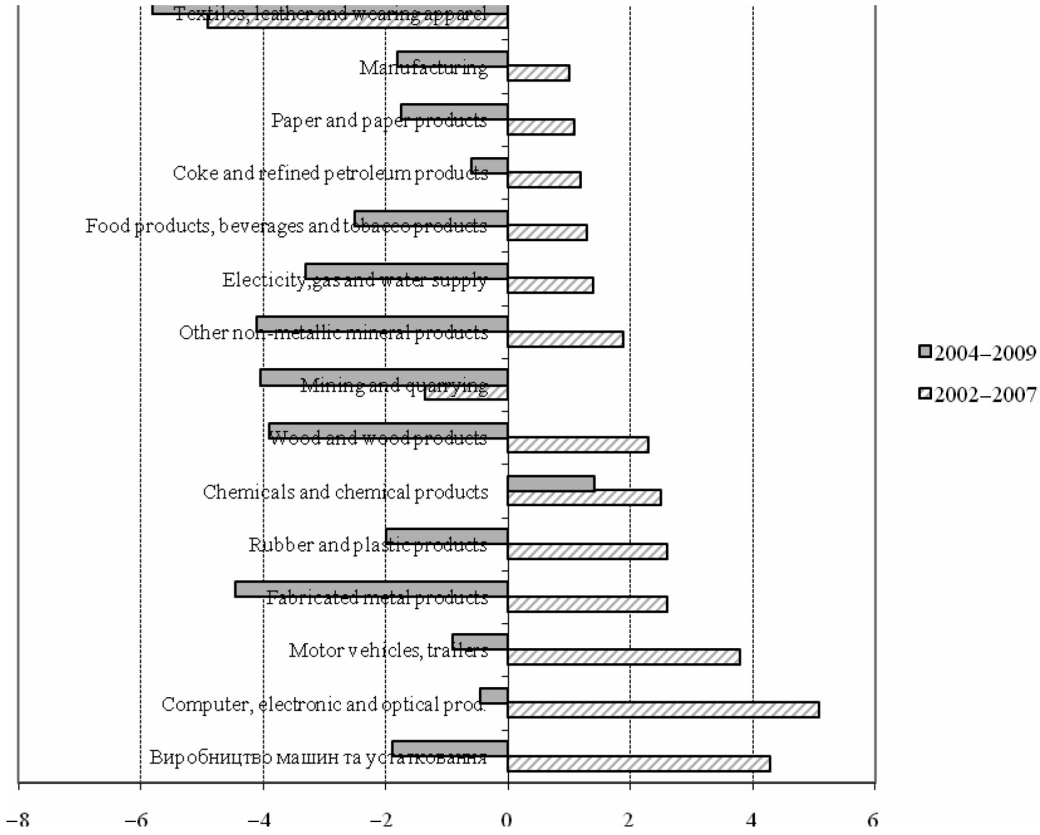


Fig. 3. The average annual growth rate of industrial production in EU-27 for the periods 2002–2007 and 2004–2009, % *

* Compiled according to [2, p. 97; 3, p. 318].

According to Fig. 3, at the period of crisis the most decreased production in such traditional areas of manufacturing for EU-27 as textile industry, tobacco products, wood processing and furniture production, while in the slightest degree affected types of industrial activities with a high level of technology (pharmaceuticals, manufacturing computers, electronic and optical equipment), and the production of consumer non-durables (food production, repair and installation of machines).

Even at the crisis period the chemical industry, production of which belongs to a group of consumer non-durables, there was no reduction in production. For four types of industrial activity – mining of metal ores, food production, fabricated of computers, electronic and optical equipment, in March 2011, output growth is characterized by higher growth rates at the end of 2010 and beginning of 2011.

In other types of industrial activity in recession of production since late 2007 – first half of 2008 with the achievement of the peak of the recession in December 2008 – January 2010, and as of March 2011 although there is the rise of industrial activity, However, the rising level of the previous peak and so is not achieved. In these types of industrial activities as the production of beverages and the manufacture of other vehicles and equipment, with similar negative trends, the lowest level of production observed in the second half of 2010.

Manufacturing subsectors are very diverse, combining activities with low apparent labour productivity, average personnel costs and rates of investment, such as the manufacture of textiles, leather products, wearing apparel and furniture, with those with considerably higher values for the same indicators, such as the processing of coke and petroleum. There is also great diversity between the manufacturing sectors of EU member states: the wage adjusted labour productivity ratio for Ireland was 2,6 times the level in Sweden in 2008, while the investment rate ranged from 8,4 % in Ireland to more than 50 % in Romania, Bulgaria and Latvia.

In modern regional policy of European Union singled out the main directions of industrial policy and defines the so-called „growth poles" and „development poles" that are formed on the basis of dynamic industries (machine building, chemical, electrical engineering, etc.) for a category of regions [6, p. 114]. According to F. Perry, business units that operate in the areas of dynamic influence on the surrounding economic environment, that increases the demand for passive areas (light industry, agriculture, etc.) and cause the formation of poles of development in this territory. These „poles" in different areas tend to each other, and thus, between them gradually established economic ties, that there are areas of development. In turn, development zone together through communication and create a complex system of mutually beneficial economic structures, which can leave outside the country. As follows, the current regional industrial policy of EU directly integrates with innovation and scientific and technological policy, launched on common principles of economic growth based on innovation.

Each European country specializes at the production of certain industrial products. In Tab. 3 shows the first industries which specialize countries – EU members in terms of employment in 2005–2008.

Table 3

Specialization of industrial production in EU countries in 2005–2008, by the level of employment *

Industry	Country	
	1st manufacturing	2nd manufacturing
Food products, tobacco and beverages	Cyprus, Lithuania, Netherlands, Poland	Bulgaria, Spain
Textiles, wearing apparel and leather	Bulgaria, Italy, Portugal, Romania, Slovakia	Belgium, Italy, Latvia, Portugal, Romania
Chemicals	Belgium	—
Pharmaceuticals	Denmark, Ireland	—
Wood and wood products	Estonia, Latvia, Lithuania, Austria	Cyprus, Sweden
Coke and refined petroleum	—	Estonia, Hungary, Netherlands
Non-metallic mineral production	Spain	—
Printing and recorded media	Finland, Sweden	—
Fabricated metal products	—	Luxembourg
Motor vehicles	Czech Republic	Germany, Slovakia
Electrical machinery	Slovenia	Czech Republic, Austria
Computer, electrical and optical equipment	Hungary	Finland
Machinery and equipment	Germany	Denmark
Other transport equipment	United Kingdom	—
Furniture	—	Lithuania, Poland, Slovakia
Other manufacturing	—	Ireland

* Compiled according to [7, p. 57; 8, p. 4].

The vast majority of countries – EU members specialized in production of engineering. Germany, Czech Republic and Slovakia – specialized in production of motor vehicles, Hungary and Finland – the production of computer, electrical and optical equipment.

Specialization of EU production and engineering appears on volume sales processing industry in value terms (Tab. 4).

Table 4

Manufacture of engineering products in the EU-27 in 2006–2009, EUR million *

Section of manufacture	Product	Value, EUR million		
		2006	2007	2009
Machinery and equipment (DK)	Machine tools for metal processing	—	98 959	—
Transport equipment (DM)	Motor vehicles	232 200	233 334	180 015
	Other cars	16 900	20 233	—
	Parts and accessories for motor vehicles and their engines	—	—	66 744
	Parts for all types of aircraft excluding propelles, rotors, under carriages, for civil use	—	—	21 607

* Compiled according to [2, c. 95; 8, c. 4; 9, c. 121].

European engineering, especially machine tools, is the leader at the global market. Thus, in 2008 the world was produced machines worth 55 EUR billion, which accounted for 44 % of producers at EU. Manufacturers of machine tools with EU in 2008 exported to the world market 71 % of production, amounting to 55 % of total world exports [3, p. 320].

At EU level, the high-tech trade balance was negative in 2008, with imports some EUR 29,5 billion higher than exports. Within the EU-27, Germany was the leading exporter of high-tech products, with 8,2 % of the world market, followed by the Netherlands (4,7 %) and France (4,5 %). In a majority of EU member states, intra-EU trade in high-tech products was higher than extra-EU trade. Portugal, Malta, Sweden and, to a lesser extent, France, Italy and United Kingdom exported more to countries outside the EU.

In terms of global export shares, the EU-27 was in the lead in numerous product groups such as „Aerospace", „Chemistry", „Non-electrical machinery", „Pharmacy" and „Scientific instruments", whereas the United States of America ranked first only in „Armament". China was the world's foremost exporter in the „Computers-office machines" and „Electronics and telecommunication" product groups, while other Asian countries were leading exporters of „Electrical machinery".

The negative impact of global crisis 2007–2008 manifested itself in the fall of the automotive industry, which led to job losses. General Motors in October 2008 reduced the production of vehicles in Europe and decided to further closure of its own production in Luiton (UK). In October 2008 Ford began 17-day closure of production at our own factory in Southampton (UK), which produces car brand Ford Transit. Opel halted production in Spain for two weeks in October 2008.

German manufacturer of wires and electronics for the automotive industry Leoni AG suffered losses from the unstable situation in the industry. The company lowered earnings forecast for 2008–2009, the reason why it became a general decline in the automotive industry. Board of Leoni AG suggests that if further reductions will be forced to see manufacturing onboard networks that are exclusively abroad (in North Africa and Eastern Europe).

Despite the gradual overcoming EU industry from a long recession, as evidenced by the increasing pace of production in most sectors in most countries during 2011 remains a threat early in the second wave of economic crisis, given the instability of the single currency euro zone and find Greece on the brink of default. It is these aspects of the modern development of EU stressed President of European Commission J. M. Barroso at the speech „Roadmap for stability and growth" 12 October 2011 in the European Parliament.

„Europe 2020" is a multifaceted strategy for sustainable growth and jobs for the next decade, designed to help Europe come out stronger from the world's worst economic crisis since the 1930's.

The objective of Europe 2020 is to develop:

– smart growth (education, knowledge and innovation);

– sustainable growth (a resource-efficient, greener and more competitive economy);

– inclusive growth (high employment and economic, social and territorial cohesion).

Europe has a comprehensive plan to respond to the crisis and to speed up Europe's economic growth. It now needs to focus its efforts in a coordinated manner and with an eye on priorities. This vision of Europe's social market economy for the XXIst century is built on a partnership between the European Commission and the Member States.

In the main Communication the Commission focuses on an integrated approach to recovery concentrating on key measures in the context of „Europe 2020" and encompassing three main areas:

1) the need for rigorous fiscal consolidation for enhancing macroeconomic stability;

2) structural reforms for higher employment;

3) growth enhancing measures.

The Commission highlights ten actions that can be grouped under three main areas (Tab. 5).

Table 5

Highlights ten actions in the context of „Europe 2020"

Areas	Actions
1. Fundamental prerequisites for growth	– implementing a rigorous fiscal consolidation; – correcting macroeconomic imbalances; – ensuring stability of the financial sector.
2. Mobilising labour markets, creating job opportunities	– making work more attractive; – reforming pension systems; – getting the unemployed back to work; – balancing security and flexibility.
3. Frontloading growth	– tapping the potential of the single market; – attracting private capital to finance growth; – creating cost-effective access to energy.

European Union's engineering specializes in motor vehicles, which makes a significant contribution to gross domestic product of EU, has export potential and skilled labor force is concentrated. This branch of engineering is the main driving force of knowledge, innovation, and is Europe's largest private investor in research and development (R&D). It also makes a major contribution to EU's Gross Domestic Product, and exports far more than it imports.

The main objectives of the European Commission regarding the automotive sector are:

1) to strengthen the competitiveness of the automotive industry. The aim is to identify and assess policy issues of significant importance to the competitiveness of the EU automotive industry and to suggest solutions that take into consideration economic, social and environmental objectives;

2) to complete, adapt and simplify the internal market regulatory framework. The work on improving the internal market is built upon the introduction of the EC. Whole vehicle type-approval system which allows manufacturers to have a vehicle „type" approved in one member state and then be able to market the vehicle in all other member states without further tests;

3) to promote globalization of the technical regulatory framework through UNECE. Global technical harmonization is a key factor in strengthening the competitiveness of the European automotive industry world-wide. EU is a contracting party to two agreements of United Nations Economic Commission for Europe (UNECE): Agreement on Uniform Technical Prescriptions for Vehicles (1958) and the Global Agreement (1998).

Conclusions. According to the results of this research can identify the following features of the industrial development of European Union under the global instability:

– industry is the largest non-financial sector in the economy of European Union, which as of 2007 concentrated 25,8 % of employees and created 29,5 % of gross value added;

– affected the global financial crisis on the industrial development of EU, which led to a rapid decline in production in all countries – EU member states and prolonged recession (2009–2011);

– industrial production of EU specializes in manufacturing of engineering products, which manifests itself in terms of cost of sales. Thus, the flagship engineering in EU are Germany, Czech Republic, Finland, Slovakia and Hungary;

– increased role of the state and activated state of the economy in general and industry, in particular, to ensure sustainable economic growth and increasing employment.

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УДК 339.97

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MANAGEMENT OF SCIENTIFIC AND TECHNICAL EXCHANGE DEVELOPMENT IN THE SECTOR OF HIGH-TECH SERVICES: INTERNATIONAL ASPECT

Peculiarities of functioning of the world market and the specific tools of its regulation at the international and national levels of economic management have been determined.

Key words: world services market, classification of types of services, regulation tools.

Определены особенности функционирования мирового рынка услуг и характерные инструменты его регулирования на международном и национальном уровнях управления экономикой.

Ключевые слова: мировой рынок услуг, классификация видов услуг, инструменты регулирования.

Визначено особливості функціонування світового ринку послуг та характерні інструменти його регулювання на міжнародному та національному рівнях управління економікою.

Ключові слова: світовий ринок послуг, класифікація видів послуг, інструменти регулювання.

Problem statement. Contemporary development of the world economics is accompanied by unfolding of global processes that substantially change the character of international markets functioning. On one hand the international commodity market is growing at a rapid pace, on the other hand such growth leads to development of the world services market – a system of international exchange relations where the principal tradable object is represented by various types of services. In the structure of balances of payments of countries a share of services constitutes approximately 20 percent. The services sector is the biggest recipient of international investments and the demand for professionals in this sector is increasing in the international employment market. The above mentioned trends determine the urgency of research into peculiarities of functioning and regulation of the world services market both for the countries with high level of economic development and for less-developed countries.

Analysis of the latest researches and publications. The problems of development of the world services market, its regulation and forecasting have been studied in the works of such western scientists as K. Haxever, B. Render, J. Fitzsimons, Brue Stanley L., F. Cotler as well as such national and Russian researchers as A. Olifer, V. Tipanov, Y. Melnyk, Y. Sokolova, A. Rumyantseva, Y. Kovalenko, K. Soloninko, T. Tsygankova and others.

Identification of unsolved problem. The analytical review of the works shows that the rapid development of the services market is the subject of regulation of international institutions. However, the complexity of the process is contained in the subject of regulation itself. This is partially connected with the fact that assessment of the trade in services in its essence requires specific methodological approaches as compared with the trade in goods since services are subject to formalized definition with much more difficulty and obtaining necessary information about trade in services depends on the specificity of international and national standards regulating the services sector.

Purpose of the research paper. To define typical features of the contemporary world market of services, to research into the main leverages of international institutions

regulating the development of international services, to systematize methodological approaches to definition of services as the object of international exchange under the conditions of globalization of the world economics.

Results of the research. The chief external feature of the world market existence is the international trade, that is, a system of relations with regard to exchange of goods, technologies, services etc. between countries. The world market, as an economic category, is a system of mutual relations between countries in various sectors of social life which are based on the financial interest. As a rule the international trade is viewed inseparably from international trade in goods, and the international trade is understood as trade both in goods and in services. However, the notion of a service is more multisided than the notion of goods. Rapid growth of the service industries in the second half of the 20^{th} century takes place first of all due to achievement of a high level of maturity of economics and a high level of life of people in numerous countries of the world. And, as practice of the industrially developed countries shows, with complication of production and market saturation with goods the demand for services grows in the first place. Equally important reason is the process of division of labor which accelerated as a result of technological revolution and became the premise for formation of new types of activities and, first of all, in the sphere of services.

As is known a service is a measure or benefit which one party may offer the other one and which, as a rule, is not material according to the form of its provision. Such wide interpretation is true with respect to its contents but it does not reflect a modern idea about a wide range of services. A service is a wide spectrum of various types of activities. According to many scientists, there is no other notion in the practical activity that could have such a big number of definitions, for only such branch as domestic servicing provides more than 800 kinds of services [1].

More general, in our opinion, is a definition of a service as a subject of an entrepreneurial activity aimed at satisfaction of other peoples' needs excluding activities performed on the basis of employer-employee relationships. This is a type of activity that satisfies a certain human want and can have or have no material form; it is closely connected with manufacture of goods or is completely independently executed [2]. In this research the notion „service" implies an entrepreneurial activity aimed at satisfaction of consumers' needs (material, cultural, esthetic, social etc.) and/or obtaining socially positive or economical effect.

The world services market is an exchange system in which interests of buyers and sellers of services are satisfied, and functioning of which is regulated by the market laws [1]. Under the present-day conditions of the market development the services sector has its own distinctive features.

Firstly, the international trade in services is not an exclusive prerogative of the industrially developed countries. In a range of developing countries services as well constitute a significant part of their export. That is why in assessment of participation of countries in the international division of labor it is appropriate to take into account their share in the global trade in services (Table 1).

The most dynamic development is observed in the sphere of commercial services (53,1 % of the overall volume of services) which includes communication, insurance, financial, private, cultural and recreational, computer and information services, construction, royalty and licencing as well as other business services. The main players in this market are the European countries that export and import a half of the volume of all services of the kind and the Asian countries (Japan, China, India and others) where the overall volume of export constitutes 22 % and import – 24 % (Fig. 1).

Today the top ten of the countries-leaders in the field of commercial services is headed by the countries of the European Union and the USA which together make above 70 % of the world volumes of export and import. With regard to commercial services

Table 1

Leading exporters and importers in the world services market as of the beginning of 2010

Place	Exporters	Volumes, billions of USD	Share, %	Annual increase, %	Place	Importers	Volumes, billions of USD	Share, %	Annual increase, %
1	USA	474	14,1	–9	1	USA	331	10,5	–9
2	United Kingdom	233	7,0	–18	2	Germany	253	8,1	–13
3	Germany	227	6,8	–12	3	United Kingdom	161	5,1	–18
4	France	143	4,3	–14	4	China	158	5,0	0
5	China	129	3,8	–12	5	Japan	147	4,7	–10
6	Japan	126	3,8	–14	6	France	126	4,0	–10
7	Spain	122	3,6	–14	7	Italy	115	3,6	–10
8	Italy	101	3,0	–14	8	Ireland	103	3,3	–5
9	Ireland	97	2,9	–5	9	Spain	87	2,8	–17
10	Netherlands	91	2,7	–12	10	Netherlands	81	2,7	–8
Total		1743	52		Total		1562	49,8	
All countries of the world		3350	100	–12	All countries of the world		3145	100	–12

Calculated on the basis of source [3].

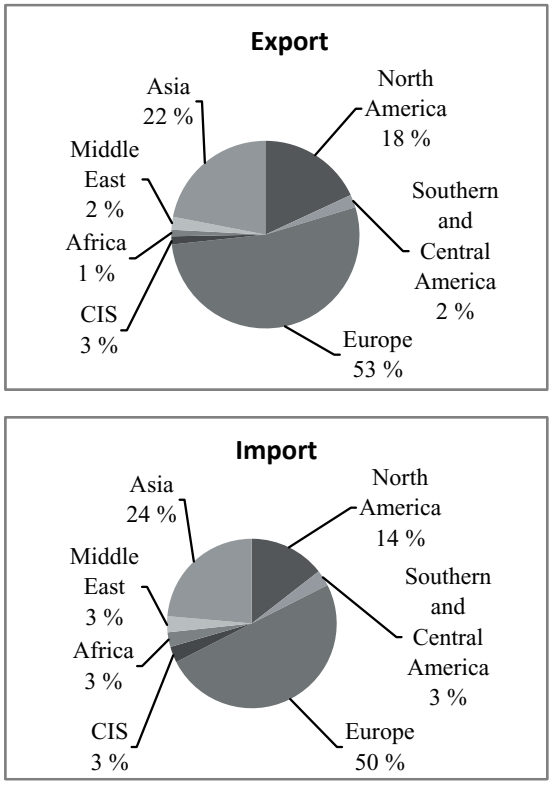

Fig. 1. Main regions of export and import of commercial services as of 01.01.2010 (%) [27]

[27] World Trade Organization [Electronic resource]. – Access mode: http://www.wto.org/english/res_e/statis_e/statis_e.htm – International trade and tariff data. Statistics Database.

they are joined by such exporters as Kuwait and India and such importers as Canada, Russia and China; in the field of construction services – by Japan, China and Russia; insurance services – Canada, Mexico and Switzerland; financial services – Switzerland, Japan and China; private, cultural and recreational services – Canada, Turkey and India; computer and information services – India, China and Japan; royalty and licensing – Japan, Switzerland and Canada; other business services – China, Japan and Korea.

Secondly, specialization of a country in particular types of services depends on the level of development of its national economics and peculiarities of its governmental regulation in the context of favorable entrepreneurial environment formation. Thus in industrially developed countries a preference is shown for financial, telecommunication, information and most of the branches of business services while for the developing countries quite characteristic is specialization in transport, tourist and financial services.

The USA is the chief world exporter and importer of services on which share falls approximately 14 % and 10,5 % of the total world export and import of services respectively. Great Britain (7 % of the world export and 5,1 % of import), Germany (6,8 % and 8,1 %), France (4,3 % and 4 %), China (3,8 % and 5 %) and Japan (3,8 % and 4,7 %) occupy the following 5 places. The ten top of the leaders is rounded out by Spain (3,6 % of the overall export and 2,8 % of import), Italy (3 % and 3,6 %), Ireland (2,9 % and 3,3 %) and Netherlands (2,7 % of export and import) respectively. Thus more than half of the volumes of the world export and import of commercial services falls on the ten countries of the world.

Thirdly, an international demand for services promotes appearance of new related services. As a rule countries that provide harbor services are also specialized in ship-repairing; countries-manufacturers of computers supply the global market with computer services; in the countries-oil exporters freight and services associated with oil transportation prevail.

The international services market, as an object of exchange, as opposed to the goods market has the following essential peculiarities: place of production and consumption of services coincides; close connection between the services market and the goods market, capital market and labor market; concentration level in the market of present-day services is much higher than in the goods market; a number of services is hardly included in the international exchange (e. g., housing and communal services) [2].

Moreover, taking into consideration the described above characteristics and features, this list can also be added by the following peculiarities:

- the process of a service provision and its consumption has to be simultaneous (in most cases services are not subject to storage), therefore most types of services are based on direct contacts between producers and consumers which makes the difference between the international trade in services and trade in goods where very often dealers are involved;
- the sphere of services is better protected by the State from foreign competition than the material sphere since some services are traditionally in the partial or complete ownership and under control of the State (insurance, financial, transport, scientific, diplomatic services, etc.) as a result of which the international trade in services has more regulatory restrictions than the trade in goods.

Rapid development of the international services market, which is constantly enlarged with new types of services, causes an objective reality of absence of their uniform classification. An analytical review of approaches to systematization of international services makes it possible to define several most characteristic features of classification which are used by international institutions in the course of study and regulation of the global market of international services (Fig. 2).

In OECD countries and publications of UNCTD the services are divided into five categories: financial, information (communication), professional (production), tourist

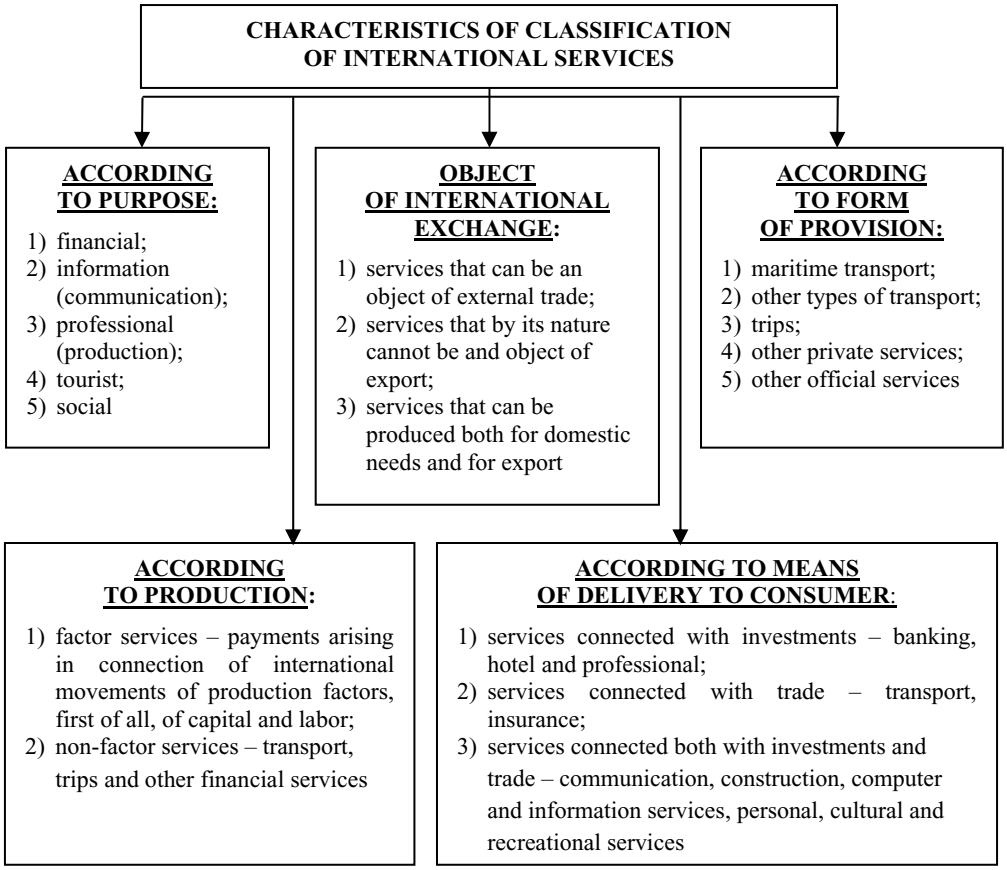

Fig. 2. Characteristic features of classification of international services

and social. In the international practice of execution of agreements a wide use has a classification of services offered by IMF: maritime transport, other types of transport, trips, other private services, other official services [6]. In the World Bank, for example, a widened approach to services, which include the proceeds movement, is accepted. Thus the services are divided into factor ones – payments arising in connection with the international movement of production factors, first of all, of capital and labor (proceeds from investments, royalty and licence fees, salaries paid to non-residents), and non-factor ones – transport, trips and other non-financial services (this division is especially important in discussion of issues of regulation of the international trade in services within WTO that are concentrated mostly on the non-factor services).

It is evident that provision of services in most cases takes place simultaneously with the sale of goods or making investment into one or another country. That is why, according to the means of delivery of services to the consumer, they are divided as follows: services associated with investments – banking, hotel and professional services; services associated with trade – transport, insurance; services associated with investments and trade simultaneously – communication, construction, computer and information services, personal, cultural and recreational services. This classification includes not only services in their traditional meaning but also movement of the production factors which are the carriers of such services. It makes it possible to distinguish 4 types of agreements concluded between exporters and importers of services. These include agreements in which to provide a service a producer moves to a consumer; agreements

in which a reverse movement is observed; agreements in which there is movement of both the seller and the buyer; agreements in which neither producer nor buyer change their location.

Foreign specialists also classify services on grounds of their possible participation in the international exchange. In this way they may be divided into three groups: the first one includes services that can be a subject of external trade. Their share in the overall volume of provided services constitutes approximately 8 %. We are talking about, first of all, air and maritime transportation of passengers and goods, communication, international loan and insurance agreements. The second group includes services which by their nature cannot be a subject of export. These are all types of individual, social, public and infrastructure services. The third group includes services that can be produced both for domestic needs and for export [2].

Thus the services market is a multi-branch system of narrowly specialized markets which is constantly expanding. International statistics shows that the services market is one of the most rapidly growing and promising sectors of the global market and advanced research into the trends of its development will make it possible for the countries not only to receive maximum proceeds using available competitive advantages but also occupy leading positions in new sectors of the world economics in good time [3].

Review of the international tools of trade regulation shows that in restraint of the trade in services mainly the same levers as in the trade in goods are used. Such similarity is based on the fact that the trade in most services accompanies the trade in goods and, therefore, is subject to the same restrictions imposed on the latter. Discrepancies occur only where the trade in some services is connected not with the movement of goods but with the movement of funds tools of regulation of which are somewhat different as compared with those of regulation of the trade in goods. However, as in the case of restriction of the goods import, internal subsidy to the national producers, which is introduced by an importing country, is considered a better method of limitation of the import of services than the import rate. And the import rate, as a means of restriction on the services import, by its effect on the national economics is better or equivalent to the import quota in the event when licences for import quota are sold at auction.

We can distinguish two principal levels of regulation of the international trade in services: international and national (Fig. 3).

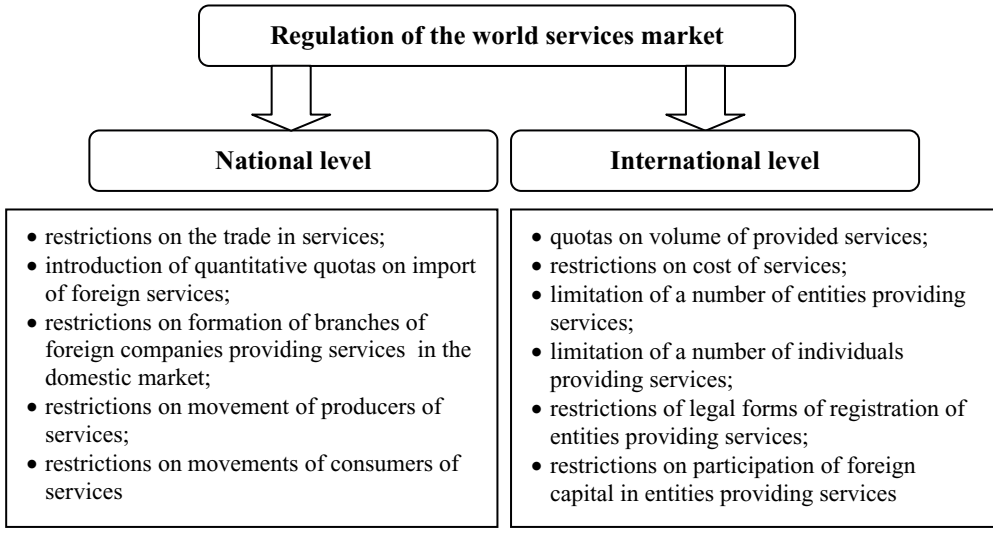

Fig. 3. World services market regulation mechanisms

The national (government) level is, without doubt, determinant since, as in regulation of any other international business, international agreements, multilateral, bilateral and others, are aimed only at unification or harmonization, that is to say, at closing on of standards and rules of the national regulation, liberalization of the activities of entities providing services and regulation of requirements to their activities in various countries [7]. In the development of an effective mechanism of the world regulation of trade in services present-day institutional structures are used, the World Trade Organization in particular. Trade in services within the WTO is regulated by the General Agreement on Trade in Services (GATS) [2].

The world trade in goods became a subject of regulation by the world community from the first postwar years when in 1948 the General Agreement on Trade in Services (GATS) entered into force. It was that very year when the mechanism of regulation of the world services market started to form in which three main stages can be distinguished (Table 2).

Table 2

Main stages of development of the system of international regulation of the services market

Date	Stage
1948–1994	Regulation of the world services market on the basis of provisions of the General Agreement on Trade in Services (GATS) concluded in Geneva on October 30, 1947
1995–2005	Regulation of the world services market on the basis of provisions of the system of international agreements on trade in all types of services (GATS) signed within the Marrakech Agreement of April 15, 1994 in Marrakech
From 2005	Regulation of the world services market on the basis of new provisions of the system of international agreements on trade in all types of services (GATS) that entered into force on January 1, 2005; introduction of the most-favoured-nation treatment (MFN)

Today the WTO is the chief international organization that regulates trades in goods, services and intellectual property. This regulation consists in realization of agreed principles of countries' behaviour in the international trade and a complex of measures carried out under the aegis of the WTO with participation of most countries of the world. A new trend in the WTO activity is research into the interconnection of the world trade and environmental issues for the purpose of ensuring stability of the processes of growth and development.

The General Agreement on Trade in Services (GATS) is the first generally agreed and lawful treaty with a system of rules and principles that have ever existed in the international trade in services. The GATS ensures and expends transparency of trade in services in the domestic markets of the Member States of the WTO and prohibits imposing restrictions bigger than those currently existing. Taking into consideration imperfection of some provisions of the Agreement and impossibility to achieve a higher level of liberalization of the trade in services, the GATS provided for starting a new round of talks in 2005. The GATS covers all sectors of the international trade in services except those provided by the state on the commercial basis and which do not compete with the private sector (services of police, customs etc.). Services regulated by the GATS consist of 12 sectors and 49 subsectors with a lot of subcategories and types of activities. A list of 160 types of services used during negotiations was based on the list made by the UNO which was named „Classification of Main Products (Services)".

It is important to mention that the GATS regulations apply to all stages of the state authority (state, regional, municipal) as well as non-governmental organizations acting

under the powers delegated to them by all stages of the state authority, for example, independent agencies, committees and self-government bodies [7].

In addition, the international trade in services is also regulated on the sectorial and regional levels. A big number of international organizations are looking into the matter of regulation of one or another sector of services on the sectorial level. Thus in the sector of transport a great role in solution of many technical issues is played by the International Maritime Organization (IMO) whose primary purpose is to develop co-operation among all countries for the efficiency of shipping. The International Civil Aviation Organization (ICAO) and International Air Transport Association (IATA) are of great importance in solution of administrative, legal, financial and technical questions in the sector of civil aviation. They define international rate policy and represent interests of air carriers in different international organizations. In the second case the external market is regulated within the framework of integration regional agreements (e. g., of the European Union) [8].

Conclusions and proposals. The present-day world services market is a complex multilevel system that continues to expend and attracts new countries to its development. Notwithstanding the crisis processes in the world economics during 2008–2010, the leader countries managed to retain their positions and even enter new international markets due to the growing tendency of popularization of science-intensive services associated with information technologies and know-how. This is an indication of not only successful strategic management and quick reaction to changes in these countries but also of good control and international regulation of relations in these markets which is a pledge of success of any business.

Since the main trend in the world trade development today is its liberalization, the customs tariffs have been substantially decreased, a lot of restrictions and quotas have been canceled, etc. However, in the authors' opinion, there are still some problems. And one of the major problems is accumulation of protectionist trends on the level of economic groups, trade and economic blocs of countries. That is why the level of development of foreign trade relations with particular countries depends, first of all, on the methods of regulation established in the markets of such countries including the rules of international regulation.

Working out of general regulations of trade in services in the external market must facilitate expansion of the international trade on the basis of consensus that the following general principles should be introduced into the practice of exchange in services:

– the international trade in services must be grounded on the principle of market competition and the most-favoured-nation treatment (MFN) as well as publicity (the countries shall publish new regulation standards relating to the trade in services and inform other countries about them);

– treatment of services rendered by non-residents in the domestic markets of foreign countries must be gone out of the national regime, that is to say, it must be non-discriminating and transparent;

– provision of favourable conditions for active participation of developing countries in the international trade in services.

Prospects for further development of the world services market lie, first of all, in the formation of a global system of foreign economic relations where big international associations and organizations, TNC and TNB will become the chief players in the market. In addition, an increase in the volumes of direct foreign investments is expected, so intensification of foreign trade in services among investment-attractive countries is likely to happen. The experts also forecast increase in the share of sales of hi tech and innovation services which is connected with development of industry in this direction. Integration processes in the international market will have to influence the formation of uniform mechanism of regulation of the services market in the world which will result in

intensification of foreign economic relations among countries taking part in such processes and elimination of barriers for free trade.

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MEASURING THE ECONOMIC IMPACT OF MOTOR RACING OR SHALL THE TAXPAYERS PAY FOR FORMULA ONE GRAND PRIX?

In this paper, we study the economic impact of major motor racing. We show that this effect is strong because of the large presence of non-local spectators. Nevertheless, it is essential that the event is repeated many years to make the infrastructure profitable. On the other hand, the positive economic impact can be significantly weakened if some of the revenue is not up to the local organizers and/or if those must pay a franchise, as in the current system in Formula 1.

Key words: Impact studies, sport economics.

В статье изучено экономическое воздействие крупных автогонок. Показано, что этот эффект является значительным из-за присутствия большого количества приезжих зрителей. Тем не менее, важно, чтобы событие повторялось из года в год для того, чтобы сделать инфраструктуру выгодной. С другой стороны, положительное воздействие на экономику может быть значительно ослаблено, если некоторые из доходов не дойдут до местных организаторов и/или если окажется необходимой оплата франшизы, как в нынешней системе в Формуле-1.

Ключевые слова: исследования влияния, спортивная экономика.

У статті вивчено економічний вплив великих автогонок. Показано, що цей ефект є досить значним через присутність великої кількості приїжджих глядачів. Тим не менш, важливо, щоб подія повторювалась з року в рік для того, щоб зробити інфраструктуру вигідною. З іншого боку, позитивний вплив на економіку може бути значно ослаблено, якщо деякі з доходів не дійдуть до місцевих організаторів та/або якщо буде необхідно заплатити франшизу, як у нинішній системі у Формулі-1.

Ключові слова: дослідження впливу, спортивна економіка.

Introduction. Russia is supposed to host, for the first time, a Formula 1 Grand Prix in 2014. This event was made possible by the Russian government's decision to invest $195,4 million in the construction of a racetrack in Sochi. The Russian government's determination to host a Formula 1 Grand Prix breaks with recent decisions of several countries that have renounced to pay the franchise to the powerful Formula One Administration Ltd (FOA)[28], considered too high. Indeed, at the beginning of year 2011, Australian citizens pronounced against the continuation of a Grand Prix in Melbourne, refusing to pay $15 millions for it. Some weeks later, Turkish officials announced that the 2011 Istanbul Grand Prix would be the last one. They refused the doubling of the price of the franchise ($13 to 26 millions) for the years 2012 and after. In the middle of the year, US citizens have brought a legal action against the grants promised by the Texas state to the Formula One contest organizers to get a future Grand Prix in Austin up to the year 2012: regardless of the question of legality of the subsidies, the citizens challenge the legitimacy of a $25 millions support.

For its part, France is no more hosting a Grand Prix, but fore more complex reasons: France is one of the cradles of the Grand Prix (the first was organized in 1906) and one of the founding country of the Formula 1 World Championship (born in 1950): it received a national Grand Prix without interruption from 1950 to 2008[29]. The disappearance of the Grand Prix was officially caused by the obsolescence of the circuit of Nevers Magny-Cours (road access infrastructures, facilities for spectators,...) but also, obviously, by the reluctance of the circuit owners to pay the $ 15 millions franchise. Since that time, the French government encourages the building of a new track near Paris, but some french citizens refuse that public money be used to pay the franchise. In summary, on every continent, the interrogation is the same: is it socially founded to spend annually tens of millions US$ for hypothetical benefits?

The organizers, everywhere, reply that, on one hand, the Formula 1 Grand Prix are enjoying a high prestige and worldwide media coverage and, on the other hand, the economic benefits of such type of event are extremely high. In the Texan case, the economic impact is supposed to run into $287 millions per year… Once more, despite of the many criticisms raised against the economic impact of sport facilities studies, this type of analysis is still cited. Since the papers of Archer (1984) and Crompton (1995), defects impact studies are well known, including: failing to accurately define the impact area, including local spectators spending, using multiplier coefficients not defined on local characteristics or „fudged", omitting costs,… More recently, Matheson (2006), Baade (2006) and Humphreys (2006) have pitiless listed the flaws of impact analyses in the Handbook of Economics of Sport. And when one compares the *ex ante* predictions and the *ex post* reality of the impact of a sport event (especially mega ones), it is clear that the predictions often greatly overstate the true impact (Baade (2006), Porter & Fletcher (2008)). In response to criticisms addressed to impact studies, some authors turned to the use of regional input-output models (IO) expecting to have a better methodological basis and a stronger economic content. Unfortunately, IO models are not immune to the risk of exaggeration. In the case of (non-recurring) events like the Olympics, Porter and Fletcher

[28] Directed by Bernie Ecclestone.

[29] Except in 1955, after the dramatic accident during the 24 Hours of Le Mans.

(2008) show that the largest share of the increase in demand is absorbed by price increases and not by a structural adjustment in supply (especially in the hotel sector). More generally, regardless of the models and tools used, the vast majority of academic work shows that the *ex post* impact of sport facilities is low or even negative, contrary to the optimistic conclusions of *ex ante* studies (Humphreys (2006)). This conclusion does not fail to raise the following question: why, whereas most of the academic works conclude to the weakness of the economic impact of major sporting events, is there such a competition between cities and between nations for the award of major competitions? An interesting answer (taken over by Humphreys) is that the sports team and facilities provide the people with an „important shared bond and sense of community". This argument would lead to try to quantify the social welfare and the potential positive externalities associated with these competitions. Unfortunately, the actual measurement of the welfare (and more generally of the „well-being") is difficult and often at least as questionable as the results of a traditional impact study.

Whatever the shortcomings of the impact studies, and since the citizens needs to be informed about the real benefits of such events, we are nevertheless led to carry out such studies. But we must do so with great caution and with the utmost rigor.

The case of Motor Racing

Among the sporting events of large magnitude, car races held a special place. They are usually recurring (annual frequency), concentrated in a limited geographic area and attract a very high percentage of „non local" paying spectators. Few sporting events bring together features so conducive to a significant impact on local economic area.

The impact of such a sporting event is at least of two types: the financial impact (direct and indirect) of short and medium term, and the long-term benefits. The long-term impact can be defined as „increases in productivity and economic development of the concerned region." This impact emerges through decisions of implantations of firms and workers, and learning or experience effects. The presence of a major sporting event can convince an investor to locate, but it seems undeniable that he mainly considers other criteria: availability of space, availability of transport infrastructure, proximity to suppliers and customers, ... For activities related to the sporting event, it is clear that, in the case of Formula 1, the main industrial district of companies whose business is directly connected to car racing, is already firmly established in United Kingdom (Motorsport Valley) and the prospect of the emergence of another district in Europe is low. Nevertheless the signal effects can be assumed to be determinant to location decisions, but, as learning and experience effects, these phenomena are difficult to isolate and quantify. Assessing the short to medium term impact is more accessible and many studies exist. In the case of tracks hosting a Formula 1 Grand Prix, one can refer, for example, to studies on the circuit of Spa Francorchamps (Belgium), Hockenheim (Germany) and Silverstone (United Kingdom), but these are not free of criticism, particularly regarding the inclusion of expenses of local spectators. Fortunately, as noted by Lilley and Franco (1999) in a study on the impact of the 11 Formula 1 Grands Prix of 1997 that took place in Europe: „Contrary to what is happening in other major professional sports, a large percentage of spectators of a Formula 1 Grand Prix are non-local. And expenditures they make towards the local economy are new expenditure, external, fully profitable for the local economy. This is economically important since the Formula 1 races stimulate an expense for the benefit of the local economy that would not exist in the absence of these events". It is this particular aspect of car racing, as well as the full impact of the presence of a circuit that we want to evaluate in this paper. Unfortunately, we only have very general estimations of the different economic benefits of a formula one Grand Prix. We at least need a detailed study on a great race car, to extrapolate the results for a Formula 1 Grand Prix. Now, we have conducted such a study about the 24 Hours of Le Mans, which is one of the oldest and biggest race car in the world. Up to the results of this analysis, we

are going to estimate the real impact of a Formula 1 Grand Prix and compare it with the amount of all the costs the organizers have to bear.

The 24 hours of Le Mans

The 24 Hours of Le Mans are a race car that was founded in 1923; it became the main endurance race in the world. It gathers high performance vehicles participating in an international endurance championship. Despite the lack of awareness of this championship, the Le Mans race annually attracts over 200,000 spectators and is broadcasted live (in full or in excerpts) by TV on the 5 continents. The circuit of the 24 Hours of Le Mans has particular characteristics in the category of major sport events or equipments: strong influx of non local paying spectators (as opposed to what happens for the games of a local football team), high geographic concentration of spectators for a few days, yearly recurrence of races (unlike the Olympics or football World Cup), permanent activity (due to the existence of a set of complementary activities and events throughout the year)...

Methodology. The first requirement in such a study is to define carefully the relevant geographic area. Due to its geographical position within the *Sarthe* department, the city of Le Mans has all the characteristics of a central place (in the sense of W. Christaller). Tourism professionals indicate that the occupancy rate of hotels of *Sarthe* department is equal to 1 during the week of the 24 Hours of Le Mans -and hotels of neighboring departments also strongly benefit from this race-. The absence of marked relief or other physical barrier reinforces the idea that the *Sarthe* department is the relevant area for the study. Opportunely, the coincidence between the economic zone and the departmental administrative area ensures the availability of local statistics. A second geographical reference – the national/country level – will also be observed.

The objective will be primarily to compare the financial impact and multiplier effect obtained in our model with those obtained in previous studies. We will consider the magnitudes obtained at the national level with great caution, as the relevance of these findings seems limited. We will first measure the „Direct and Indirect Financial Benefits“ both at the department level, indexed by *d*, as well as at the nation/country level, indexed by *n*. We then apply a multiplier to these financial benefits to achieve what we call the „Economic Impact“, that is to say the full impact of the Le Mans circuit on the local or national economy:

$$Financial\ Impact \times Impact\ Multiplier = Economic\ Impact.$$

The direct financial benefits are defined as direct flows from the activity of the circuit, perceived by the organizational structure, that is to say: ticket sales, the entry fees paid by competitors, broadcasting rights, royalties, revenues from space rentals, concessions, rebates paid by suppliers, revenues from the driving school ... We choose to consider the annual activity of the circuit, including several other motor sports in addition to the Cars 24 hours of Le Mans, but who obviously exist due to the existence of the latter. This includes: Motorbike *Grand Prix de France*, Motorbike 24 Hours, Trucks 24 Hours, historical vehicles races... Furthermore, the activity of the driving school and the rental of the circuit for private tests sessions lead to a very intensive use of the track.

The indirect financial benefits are defined as expenses related to accommodation, food and transportation. There must be a distinction regarding the scope of these indirect expenses depending on the geographical reference, either the departmental or the national level. Actually, transportation costs are assumed to be insignificant at the departmental level. Furthermore, since expenditure for food and accommodation incurred by the spectators from the *Sarthe* department has not to be taken into account, these indirect expenses can be summarized by:

– The expenses for accommodation and catering of non-local spectators at the departmental level.

– The expenses of accommodation, catering and transport of non-local spectators at the national level.

The impact multiplier

The impact multiplier is the tool that measures, from a macroeconomic perspective, the cumulative effects of the initial financial boost of the economy. The mechanism that is traditionally invoked is quite trivial: expenditure incurred by the presence of the circuit is injected into the local economy. The income created will itself be converted in new spending. A part of these expenses will benefit the local economy, and the rest will disappear outside the geographical area of reference (by eviction). During each sequence of expenditure the non re-injected part consists in:

– Non-local purchases of goods and services.
– Salaries of employees who do not live locally.
– The taxes and fees collected by supra local authorities.
– Savings.

The multiplier effect is a well known concept. It is also widely criticized because of the tendency, found in many past studies, to artificially overestimate it. As summarized by Gouguet and Bourg (1998), when the reference area is small, poorly integrated and diversified, the multiplier effect is small. In that case, the total impact is not far from the initial injection.

The impact multiplier is built on the basis of a simple Keynesian model. Let us start with the basic aggregate identities:

$$Y_i + M_i = D_i + G_i + X_i \text{ (with } i = d \text{ or } n\text{, department or nation)}$$

where Y_i = GDP in the geographical unit considered,
M_i = Imports in the geographical unit considered,
D_i = Expenditure of private agents resident in the geographical unit considered,
G_i = Government expenditure in the geographical unit considered,
X_i = Exports from the geographical unit considered.

Then, suppose that:

• $M_i = m_i \times Y_i$ where m_i (with $i = d$ or n) is the propensity to import goods and services from outside of the geographic entity ($m_n \leq m_d$),

• $D_i = D_0 + (1\text{-}t_i) \times (1\text{-}s) \times Y_i$ where s is the saving rate calculated on the basis of the net income of individuals, t_i is the average rate of direct taxation, and D_0 the amount of exogenous expenses,

• Public authorities fully reflect their revenue in expenditure.

In this model, we assimilate the financial impact of the circuit to a permanent shock on exogenous expenses (equivalent to an increase in D_0), that we denoted R_i.

Combining these assumptions, it is possible to write how the initial financial boost turns into an economic impact on GDP in the geographical unit considered, Y_i (with $i = d$ or n):

$$\Delta Y_i = \frac{R_i}{m_i + s(1-t_n) + (t_n - t_i)}$$

The result is that the impact multiplier k_i (with $i = d$ or n) is:

$$k_i = \frac{1}{m_i + s(1-t_n) + (t_n - t_i)}$$

which implies that:

$$k_d = \frac{1}{m_d + s(1-t_n) + (t_n - t_d)} < k_n = \frac{1}{m_n + s(1-t_n)}$$

The impact multiplier at the national level is obviously more important than at the local level for two reasons: first, due to the „supra-local" taxation and secondly due to the fact that some of the goods consumed at the departmental level are produced outside of the department.[30]

Data and Calibration. Our focus is on direct and indirect average effcts, calculated over the period 2006–2009. The multiplier impact is calibrated according to information collected over the period 2007–2009.

Data

Data collection was performed from multiple sources. Regarding the direct financial benefits, the organizational structure (the *Automobile Club de l'Ouest*) has provided us very precise information on all of its revenues for the periods 2000 to 2004 and 2006 to 2009.

The indirect benefits are calibrated by using very detailed surveys on expenditures of the spectators, surveys realized during the 2001 and 2003 Cars 24 Hours and the 2000 Motorbikes 24 Hours (with over 4,000 spectators investigated). We assume that the total expenditure, minus i) the amount paid for the purchase of the ticket (and parking) ii) the expenditures for transportation, reveals the amount spent for accommodation and catering.

The table below shows the amounts of reported expenditures by type of spectator and events (converted in today's Euro):

24 Hours of Le Mans	Car race	Motorbike race
Average expenditure by spectator	241,7 €	171,5 €
including transportation expenses	106,1 €	33,8 €

Calibration of the multiplier impact

To calibrate the impact multiplier, we collected data relating to the period 2007–2009. First, we use national data from INSEE to calibrate the saving rate, s = 16 %, and the propensity to import, m_n = 23,7 %. Then, we calculate an apparent tax rate as the ratio of the sum of all direct taxes on the national income and we get t_n = 36,77 %.

Nationally, the multiplier impact is thus estimated at k_n = 2,93. This is a level consistent with the magnitude normally encountered, for example during studies on the economic impact of the Olympique de Marseille (2,67) and the Barcelona Olympics in 1992 (3,53), mentioned by Andreff and Nys (2002).

At the departmental level, to quantify the burden of local taxation, we referred to the publications of the regional delegation of the national office for statistics (INSEE in *Pays de la Loire*) for a measure of departmental GDP and for a measure of the amount of taxes collected for the benefit of local authorities. Our estimation of the GDP of the *Sarthe* department and of the local taxes leads us to the following estimation of local tax rate: t_d = 3,36 %.

Finally, it remains to calibrate the propensity of *Sarthe*-consumers to consume goods from outside the *Sarthe* department (in other words, the propensity to consume goods produced in other French departments or abroad), denoted by m_d. Unfortunately, there are no available statistics for this propensity. Nevertheless, we can identify an upper limit of this propensity using information from the studies on household consumption conducted by INSEE in *Pays de la Loire*; considering this upper limit avoids any overestimation of the multiplier effect at the departmental level (and rather understates

[30] In this model, we implicitly assume that the eviction constituted by the wages of employees not residing locally is negligible. The very central position of the circuit in the Sarthe makes this assumption acceptable. However, our inability to measure the intensity of eviction may be the cause of the existence of a bias of overestimating the impact multiplier.

the true economic impact). Indeed, it appears that non-substitutable goods between geographical areas (including health, recreational and cultural services, and other services) account for one third of consumption: at most, two-thirds of consumption may be composed of „imported" goods, that is to say, produced outside of the department.

This gives the multiplier effect at the departmental level $k_d = 1{,}24$.

Results. Let us start by establishing the amount of the financial impact (R_i). The values estimated here are average values, expressed in Euro 2009:

– Direct Benefits: €38 millions expenses (including €4,9 million from local spectators).

– Indirect Benefits: €27,6 millions at departmental level, €48,1 millions at national level.

These amounts can be compared to the amounts of expenditures (expressed in Euros 2009), measured at the 2000 Formula 1 Grand Prix in Germany and 2002 Formula 1 Grand Prix in Great Britain (calculated on the same basis, i. e. including spending of local spectators):

Direct and Indirect Benefits (at country level)	Euros 2009
GP – Germany 2000	49 900 000
GP – Great Britain 2002	56 800 000
Le Mans Circuit	86 100 000

We note that the Le Mans circuit gets a significantly higher financial impact than an isolated Formula 1 Grand Prix. Furthermore, by subtracting expenditures of the local spectators, and taking the *Sarthe* department as reference area, we then evaluate the financial impact of the Le Mans Circuit to €60,7 millions.

If we now calculate the product of these financial impact by the appropriate impact multiplier we find that the total annual economic impact of the Le Mans Circuit at the departmental level is €75,3 millions.

Applying the multiplier calibrated at the national level (2,93), the total annual economic impact of the Circuit rises to €237,9 millions.

Conclusion. The quantification of the impact of cultural events or sports facilities is not very popular in the academic literature. Nevertheless, such quantifications are very useful for citizens to appreciate the real return of public expenses incurred to finance this events or facilities. Studying the case of the 24 hours of Le Mans circuit might make us think that a track hosting major races is a good investment because of the recurring presence of a large majority of non-local spectators. This assessment is questionable in the case of a Formula 1 Grand Prix. Indeed, the current system of Formula 1 Grand Prix 1 largely annihilates the positive effects of the event: the local organizers of a Grand Prix only perceive the revenues from ticketing which hardly cover the franchise to be paid to the FOA. The others revenues (broadcasting rights, royalties,…) are captured by the FOA. In summary, the essential part of the economic impact is due to the local indirect benefits. A simple calculus let us think that such a local economic impact of an isolated Grand Prix is a little more than €20 millions, yearly (or, in other words, less than $30 millions). It seems then relevant to compare such an amount to the actualized sum of expenses incurred for building, maintenance and upgrading of a circuit. The legitimacy of the load that the taxpayers have to bear appears doubtful.

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SHOULD WE TAX THE VACANT DWELLINGS? A SEARCH EQUILIBRIUM MODEL APPLIED TO THE RENTAL HOUSING MARKET

This article examines the effects of a tax on vacant dwellings. I use a search equilibrium model in which the distribution of rent is the result of the owners' posting strategy. I show that this tax reduces the number of vacant dwellings at the tenants' expense and increases the average rent.

Key words: Housing market, rent distribution, search equilibrium, matching.

В статье рассматривается воздействие налогов на вакантное жилье. Использована модель поиска равновесия, в которой распределение ренты является результатом стратегии размещения жилья его владельцами. Показано, что этот налог уменьшает количество свободного жилья за счет арендаторов и увеличивает среднюю стоимость аренды.

Ключевые слова: рынок жилья, распределение ренты, поиск равновесия, сравнение.

У статті розглядається вплив податків на вакантне житло. Використана модель пошуку рівноваги, в якій розподіл ренти є результатом стратегії розміщення житла його власниками. Показано, що цей податок зменшує кількість вільного житла за рахунок орендарів і збільшує середню вартість оренди.

Ключові слова: ринок житла, розподіл ренти, пошук рівноваги, порівняння.

Introduction. In this article, I propose to analyze the functioning of the rental housing market by using a search equilibrium model `a *La Burdett-Mortensen*. Indeed, the meeting between a owner and a tenant always requires a delay of research. The probability of matching depends on the quantity of vacant dwellings on the market and on the number of individuals seeking a dwelling. Several theoretical studies have already attempted to model the frictions on the housing market. Rosenthal (1997) and Sonmez (1996) represent the owners' behavior by taking the existence of frictions into account. For their part, as Wheaton (1990) had done so, Desgranges and Wasmer (2000) introduce a matching function to model the functioning of the housing market. The existence of frictions implies there is not a level of rent which enables to equalize offer and demand for dwellings. A distribution of rent for each type of real estate does exist. This justifies the use of a search equilibrium model `a *La Burdett-Mortensen* which is usually applied to the labor market. The existence of such a distribution of rent can be explained this way: a owner who has a vacant dwelling can choose between (*i*) proposing a high rent and dealing with long vacancy periods or (*ii*) proposing a low rent and quickly finding a tenant. In the end, both those strategies are equivalent in terms of financial return.

A high quantity of vacant dwellings in the economy can be analyzed as an unappropriate use of available resources. Indeed, owners have dwellings that do not bring in any rent and potential tenants seek a cheap dwelling while there are empty dwellings. In the past year, a tax on vacant dwellings was implemented in the major French towns as Paris, Marseille or Lyon, in order to encourage owners to rent their vacant dwellings more easily. In this paper, I use a search equilibrium model to assess the efficiency of a tax on vacant dwellings. I show that this tax reduces the number of vacant dwellings at the tenants'expense and increases the average rent.

The model. The matching process. I analyze the rental housing market thanks to a model `a *La Burdett-Mortensen* (1998) with a matching function. The distribution of rent proposed $F(z)$ and the stock of dwellings available in the economy are the result of the owners' posting strategy. They arbitrate between profits brought in by rents and the turnover costs due to their tenant's departure towards a more affordable dwelling. The matching process of the housing market is summarized by the following matching function:

$$M(s,\upsilon) = ms^{1-\eta}\upsilon^{\eta} \tag{1}$$

where m represents the efficiency of the matching process, s the number of individuals seeking a dwelling and υ the quantity of vacant dwellings in the economy. I assume all tenants are seeking a more affordable dwelling than the one they are living in. Thus, s is equal to 1. Therefore, the number of matching per period is:

$$\lambda = m\upsilon^{\eta} \tag{2}$$

where λ is a strictly increasing function with $\lambda(0) = 0$ and $\lambda(+\infty) = +\infty$. A owner must refund the purchase of the dwelling and pay for the costs related to its maintenance whether the dwelling is rented or vacant. The owning of a dwelling costs P for all owners. I also assume a tenant leaves his dwelling once he obtains a rent z inferior to the one he is currently paying. Moreover, there exists an exogenous probability δ that a tenant can leave his dwelling because of moving out, the birth of a child, a marriage or a professional opportunity in another town. In this case, the tenant immediately finds a dwelling

again which rent is drawn in the set of distribution of offers $F(.)$. The value functions of a private vacant dwelling (V) and an occupied one ($W(z)$) are then written:

$$rV = \max_{z \le \bar{z}} \left\{ \frac{\lambda}{\upsilon} \left\{ \left[1 - G(z) \right] + \delta \right\} \left[W(z) - V \right] - P - \tau_{\upsilon} - \tau \right\} \tag{3}$$

$$rW(z) = z - P - \tau - \left[\lambda F(z) + \delta \right] \left[W(z) - V \right] \tag{4}$$

where z is the rent proposed by the owner, $G(s)$ corresponds to the distribution of tenants in the economy, τ to a tax on all dwellings and τ_{υ} a tax on vacant dwellings.

Flows on the rental housing **market**. Because the environment is stationary, a tenant's optimum strategy consists in accepting all the offers which rent is inferior to his current rent. The number of tenants who pay a rent superior to z is then deducted from inflow and outflow. Therefore, the inflow amongst the tenants paying a rent superior to z is equal to:

$$\delta(\lambda[1 - F(z)] \tag{5}$$

Moreover, the departure flow towards rents inferior to z is equal to:

$$[1 - G(z)](\delta + \lambda F(z)) \tag{6}$$

Therefore, at a stationary state, the number of tenants paying a rent superior to z is equal to:

$$[1 - G(z)] \frac{\delta\left(\lambda\left[1 - F(z)\right]\right)}{\delta + \lambda F(z)} \tag{7}$$

Investors can freely enter in the private rental housing market. This means that, at a stationary state, the value of a private vacant dwelling is $V = 0$. The equation 3 and 4 then enables us to write the equation for the creation of dwellings:

$$\frac{(P + \tau_{\upsilon} + \tau)\upsilon}{\lambda} = \max_{z \le \bar{z}} \left\{ \left[\frac{z - P - \tau}{r + \delta + \lambda F(z)} \right] \left[\frac{\delta + \lambda}{\delta + \lambda F(z)} \right] \delta \right\} \tag{8}$$

where $\frac{\upsilon}{\lambda}$ represents the average duration of the vacancy of a dwelling. I assume there exists a maximum rent $\bar{z}$ in the economy. For this rent $\bar{z}$, we have $F(\bar{z}) = 1$. We then obtain:

$$\frac{(P + \tau_{\upsilon} + \tau)\upsilon}{\lambda} = \left[\frac{\bar{z} - P - \tau}{r + \delta + \lambda} \right] \delta \tag{9}$$

At a stationary state, there also exists a minimum rent under which it will never be profitable to offer vacant dwellings. Indeed, the rent must cover the price of the dwelling P, the payment of taxes, but also costs related to periods of vacancy of the dwelling. In order to obtain the minimum amount of rents $z_{\min p}$, we can write $F(z_{\min p}) = 0$ down. Thanks to the equations 8 and 9, we obtain the value of the minimum rent:

$$z_{\min p} = P + \tau + \frac{(r + \delta)\delta}{(r + \delta + \lambda)(\delta + \lambda)} (\bar{z} - P - \tau) \tag{10}$$

The owners'offer $F(z)$ is then located between $z_{\min p}$ and $\bar{z}$. This distribution guarantees the same return to the owners whatever z is. The solving of the second degree equation given by the equality between the equations 8 and 9 enables us to obtain this optimum distribution:

$$F(z) = \frac{r+2\delta}{2\lambda}\left\{\sqrt{\frac{r^2 + 4(\delta+\lambda)(r+\delta+\lambda)\left(\frac{z-P-\tau}{\overline{z}-P-\tau}\right)}{(r+2\delta)^2}} - 1\right\} \quad (11)$$

The tax τ on dwellings is determined in order to guarantee a balanced budget. Thus, there exists a system of redistribution from vacant dwellings to occupied ones.

Calibration. In our calibration, we work with a quarterly interval. The real interest rate is set at $r = 0{,}01$, which corresponds to an annual real interest rate of about 4 %. In France, in 2008, the square meter price of an old dwelling located in a middle size town was about 1700 euros. Therefore, the value of an old 50 square meters dwelling was of 85 000 euros. I consequently normalize the cost for the maintenance of a dwelling at $P = 1050$ euros, which corresponds to the quarterly refund of a capital of 85 000 euros for 20 years. Since 1998, in France, a tax on vacant dwelling is applied in the major French towns of more than 200 000 inhabitants. This tax still remains very modest and corresponds to 15 % of the amount of the rent for dwellings which have been vacant for more than 2 years. I set the amount of this tax to 15 % of the monthly cost for the maintenance of the dwelling, that is $\tau_v = 150$ euros per dwelling. In the simulations, I set η to 0,5, $m = 3$ and $\delta = 0{,}25$ in order to reproduce a vacancy rate of 8 % observed in France in 2002.

What can we expact from a tax on vacant dwelling? The implementation of a tax on vacant dwellings aims to encourage owners to change their rent posting strategy in order to reduce the number of dwellings which are not occupied. By decreasing the rents offered, owners should find tenants more quickly and those tenants should stay in their dwelling longer. Obviously, such a policy reduces the welfare of the owners who have either to pay a tax, or accept a loss of income by decreasing their rent. However, tenants should be able to find a affordable dwelling more quickly.

Our model teaches us that a tax on vacant dwellings implies negative side effects which lead to results contrary to those that were expected. The Graphics (Fig. 1) show the effects of an increase of the tax on the stock of dwellings in the economy and on the average rent paid by individuals. We can observe that an increase of the tax from 0 to 100 euros

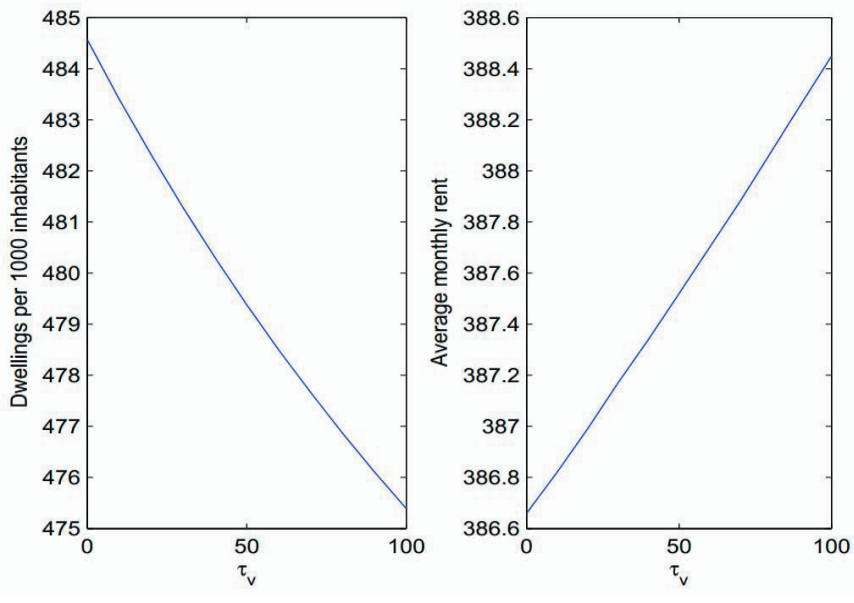

Figure 1. The effects of the tax on vacant dwellings

reduces the number of dwellings in the economy. Thus, contrarily to what was expected, this decrease of number of vacant dwellings does not imply an improvement of the offer of dwellings. In facts, the decrease of the average vacancy length comes from a contraction of a stock of dwellings in the economy. The explanation for this result is quite straightforward. The increase of the tax reduces the profitability of the rental housing market. Investors are therefore encouraged to build less and to reduce the maintenance of their existing dwellings. In the long term, this policy drastically decreases the total stock of dwellings in the economy. Therefore, the goal to reduce the number of vacant dwellings is reached, but by decreasing the stock of dwellings. Moreover, owners can also compensate for the increase of vacancy costs by increasing the rents offered. The Graphic (Fig. 2) shows the distribution of monthly rents for 2 levels of different taxes. We can clearly observe that, when a tax on vacant dwellings increases, the distribution of rents shifts to the right. When the owners reduce the number of dwellings in the economy, tightness in the rental housing market increases causing a change in the distribution $F(.)$. This strategy enables investors to maintain the profitability of their dwellings. This means that an increase of vacancy costs related to the implementation of a tax is partly paid by the tenants.

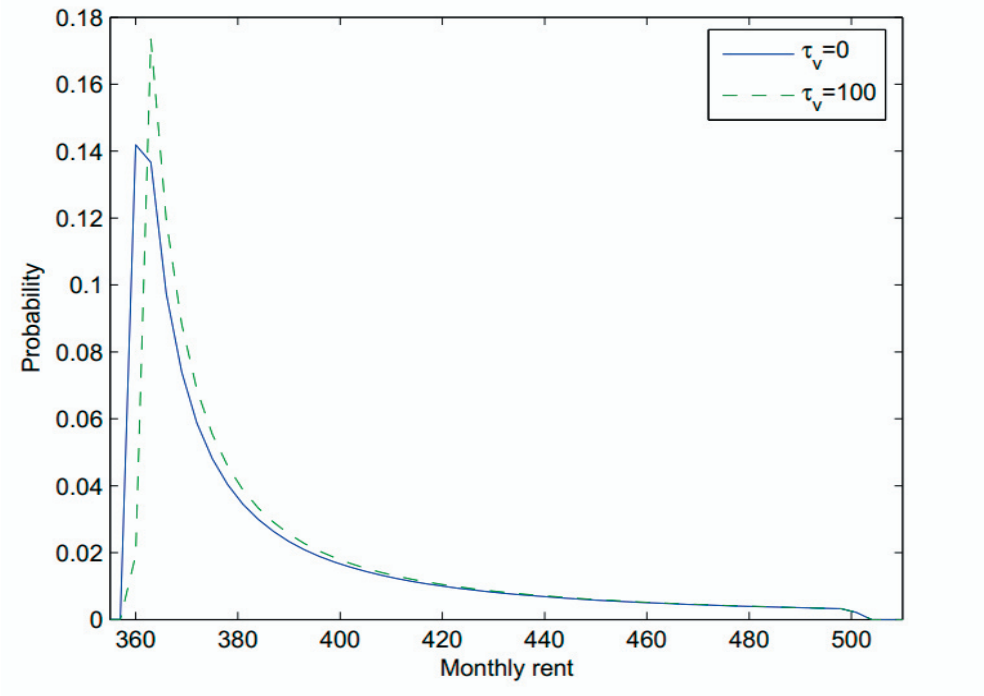

Figure 2. Tax on vacant dwellings and rent distribution

In the long term, the tax on vacant dwellings reduces the offer of dwellings in the economy and encourages the increase of rents. The effects of such a tax in the short term could be studied in the future. Indeed, short-term housing supply is relatively inelastic. Consequently, the implementation of a tax on vacant dwellings must firstly increase the level of rents, then in a longer term, it must reduce the offer of dwellings in the economy.

Conclusion. In this paper, I propose a model of the rental housing market in the long term by using a search equilibrium model. I use this model in order to analyze the effects of a tax on vacant dwellings implemented in France in 1998. I show that this tax reduces the number of vacant dwellings in the economy. However, this policy involves two negative side effects: (*i*) The decrease of profitability encourages investors to leave

the rental housing market, which reduces the stock of dwellings in the long term. (*ii*) As the owners stop offering lower rents to maintain their profitability, a part of the increase of the tax is paid by the tenants through the increase in average rent. In the end, in the long term, the tax on vacant dwellings is inefficient to improve the offer of dwellings and to decrease the average rent.

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QUANTITATIVE METHOD OF EFFICIENCY OF TECHNOLOGY TRANSFER ESTIMATION

Approaches to estimation of technology transfer were analyzed its pros and cons were identified. Quantitative method of national technology transfer system was offered. Its algorithm was built. Offered method was approbated on national technology transfer of EU27 were approbated.

Key words: technology transfer, efficiency, estimation, method.

В данной работе были проанализованы и выявлены преимущества и недостатки подходов к оценке и передаче технологий. Предложен алгоритм метода количественной оценки трансфера технологий. Данный метод был апробирован в национальном трансфере технологий EU27.

Ключевые слова: передача технологии, эффективность, оценка, метод.

У даній роботі було проаналізовано і виявлено переваги і недоліки підходів до оцінки та передачі технологій. Запропоновано алгоритм методу кількісної оцінки

трансферу технологій. Даний метод було апробовано в національному трансферу технологій EU27.

Ключові слова: передача технологій, ефективність, оцінка, метод.

Introduction. Realization of a concept requires estimation of the effectiveness of its implementation as to make the necessary adjustments at the testing stage and for adaptation to the practical application. Creation of the concept of state management of technology transfer requires methods of effectiveness estimating of the latter, that is why relevant issues is to develop methodologies for evaluating the effectiveness of technology transfer and application of assessment tools validity of decisions.

Analytical review of scientific work shows that the problem of estimating the effectiveness of technology transfer systems actively studied in the writings of scholars and practitioners in the field of innovation business. It's necessary to mark works of Bernard J. Schroer, A. Jaffe, D. S. Siegel, R. Bessette, M. Pugatch [1; 2; 3; 4; 5; 6], in which described different approaches to technology transfer estimating. However, these approaches use as quantitative as qualitative methods and its criterial instrument is not characterized with sameness.

In particular, in [1] of Bernard J. Schroer were described methods of estimating of the effectiveness of the Technology Transfer Centre, based on comparison of „inputs" and „outputs" (Table 1). However, if the systematization and calculation of „input" parameters is simple, the parameters „output" is very difficult to integrate and evaluate.

D. S. Siegel in his paper [3] proposed a more qualitative approach in which efficiency was calculated by using of three outputs: the number of new products, quantity of patents, which obtained with two inputs: R&D expenditures and quantity of scientists.

In Table 1 shown that the most common quantitative evaluation methods, but taken individually technique uses very narrow criteria apparatus, separate figures are often quite difficult to calculate.

Some of the authors prefer to asses the effectiveness of technology transfer using patent activities of subjects of the innovation process. This technique gained prevalence due to the fact that patent statistics just formed and information is freely available, and the patent itself is evidence of successful use of the invention.

According to Gaggs, patent covers all alternative dimensions of innovation performance and reflects the success in international competition based on innovation [5].

Analysis of technology transfer, based on patent statistics, although it is simple enough, but this reflects only the quantitative characteristics of a number of patented inventions, but does not show not only the level of effort to implement the invention in a process or product, and does not describe the effect of commercialization of this invention.

There are also methods of estimating technology transfer, based on the research activities of university spin-off companies [6]. Approaches of this kind relate to quality assessment methods.

Thus, the purpose of this study is to develop quantitative method of estimating the effectiveness of technology transfer as state management policy of innovation development. Method must meet the following requirements: use public uniform statistics, describe the results in the short-term perspective.

Efficiency – the performance of the process, defined as the ratio result in costs to ensure its receipt. In this study under the term efficiency we mean the ability of a positive effect on the basis of initial conditions. State actions and institutions that create preconditions for the functioning of technology transfer will be considered as initial conditions.

Under the system of technology transfer we mean a multitude of institutions of public and private sectors interacting with the aim of technological knowledge diffusion.

Table 1

Comparison of Methods of Technology Transfer Estimation

No	Author	Source	Object of estimation	Peculiarity	Estimation criteria	Cons
1	Bernard J. Schroer	1	Activity of center of technology transfer	Quantitative method based on estimation of inputs and outputs balance	Inputs of system: – telephone calls; – personal addresses ; – visits to the company; – information bulletins Outputs of system: – quantity of created workplaces; – rising of income; – new goods production;	Difficulty of estimation of indicators of output, which determines inadequacy of results
2	A. Jaffe	2	Patent activity of public scientific institutes	Quantitative method based on estimation of results of investments to research activity	Patent on dollar indicator	The narrow focus
3	D. S. Siegel	3	Business activities of university technology transfer centers	Quantitative method based on estimation of inputs and outputs balance	System inputs: – R&D expenditures; – quantity of scientists; System outputs: – quantity of new products; – quantity of patents; – quantity of copywriters;	
4	R. Bessette	4	Innovation projects	Quantitative method that uses as an indicator of effectiveness of technology transfer the return of investments	Return on investment index as an indicator of the value of expert opinion	The long period of investments return of actual results can be assessed only after 10–20 years of implementing the commercialization of innovations

Completion of Table 1

No	Author	Source	Object of estimation	Peculiarity	Estimation criteria	Cons
5	Gaggs	5	Innovation activity at all economical levels	Quantitative method based on patent quantity analyzing	Quantity of patent application and patents	Does not include all results of technology transfer system activity
6	M. Pugatch	6	Activities of university technology transfer sentres and spin-off companies	Qualitative method that evaluates the impact of individual factors on technology transfer	Three categories of impacts: I. Institutional (organizational structure, management, business climate, the distribution of royalties) II. Factors relating to the TTC (TTC age, number of staff, qualifications of staff, facilities, staff motivation) III. Environmental factors (remoteness of science parks, the nature of regional relations, political environment)	Descriptive in nature

Each system has its own inputs and outputs, it is necessary to define them for the system of technology transfer.

Information that may relate to a particular technology directly, data on market needs and the prototype of the final product will be considered as inputs of technology transfer system.

Formalized knowledge and, in some cases, released products are outputs of the technology transfer system.

Indices of two groups will be used in calculating of the efficiency of technology transfer:

A. Parameters characterizing the result of technology transfer.

B. Parameters characterizing the conditions for innovation and development of

Table 2

Statistical Parameters Necessary for Efficiency Estimating

No	Group A			Group B		
	Name of parameter	Symbol	Weighting coeffcient	Name of parameter	Symbol	Weighting coeffcient
1	Patent applications to the EPO	A1	0,4	Gross domestic expenditure on R&D, % share in GDP	B1	0,4
2	Turnover from new or significantly improved products new to the market	A2	0,3	Governement expenditures on R&D, % of total gross expendetures on R&D	B2	0,3
3	Turnover from new servises not new to the market	A3	0,2	Researchers, pers. on 1000 FTE	B3	0,2
4	High-tech exports share in total export volume, %	A4	0,1	Science and technology graduates	B4	0,1

Efficiency calculation requires an integrated index for each group, so for each indicator were calculated weighting coefficient according to Fishburne rule with the following formula using:

$$k_i = \frac{2(N-n+1)}{N(N+1)} \quad (1)$$

where k_i – weighting coefficient of i indicator of the group;

n – weight of the indicator in the group;

N – total quantity of the indicators n the group.

Fishburne rule applied because it is impossible to determine empirically the impact of a specific index of outcome, but we can arrange them in descending order of importance.

Calculated weighting coefficient also displayed in the Table 2.

Empirical tests of method of technology transfer efficiency estimation as a research subject requires statistical data on a group of countries, which includes generally recognized leaders, and the average country. This research will use publicly available statistics from the collections of Science, Technology and in Innovation in Europe 2010 and 2011 issues published annually by Eurostat. This yearbooks show development of

EU at all necessary parameters. EU as a regional integration union includes countries with different levels of development.

Efficiency indicator calculation requires the use of homogeneous data, but the indicators selected for study are not homogeneous. Therefore, to calculate performance statistics available will result in scores. The maximum value of a single indicator will match 10 points. Statistics modified to a scores shown in Table 3.

Table 3

Scores of Used Statistical Data

	Group A indicators				Group B indicators			
	A_1	A_2	A_3	A_4	B_1	B_2	B_3	B_4
Austria	0,68	3,52	2,86	2,52	6,11	6,31	6,15	0,56
Belgium	0,74	4,59	5,71	1,40	4,72	5,83	5,75	0,79
Bulgaria	0,01	3,44	7,76	0,57	1,30	0,00	1,96	0,54
UK	4,03	2,95	6,84	4,33	4,48	6,99	2,48	7,81
Greece	0,06	5,33	5,92	1,18	1,58	3,40	4,38	0,91
Denmark	0,71	4,67	2,86	2,93	6,32	6,89	7,58	0,52
Estonia	0,02	5,66	4,80	2,03	2,90	3,88	4,07	0,13
Ireland	0,16	4,51	1,02	5,81	3,24	4,56	4,50	0,94
Spain	0,41	5,66	8,88	1,12	2,90	8,16	4,63	4,39
Italy	1,51	4,10	3,47	1,36	2,85	6,50	3,82	0,39
Cyprus	0,01	0,57	4,49	6,22	1,04	3,11	2,20	0,02
Latvia	0,00	1,72	1,53	0,63	1,97	1,94	2,86	0,02
Lithuania	0,00	5,66	1,63	0,63	1,48	3,50	3,45	0,50
Luxembourg	0,01	2,21	10,00	7,48	4,04	3,01	8,04	0,00
Malta	0,00	10,00	1,94	10,00	1,58	1,84	2,76	0,01
Netherlands	2,88	3,44	2,65	4,00	4,61	6,80	4,35	0,95
Germany	10,00	6,07	3,78	2,91	6,50	7,48	5,75	0,52
Poland	0,04	5,57	1,94	0,63	1,48	2,82	2,70	3,96
Portugal	0,04	3,85	3,67	1,34	2,10	7,09	2,70	1,04
Romania	0,01	9,43	7,35	0,61	1,01	2,14	1,40	0,20
Slovakia	0,01	4,02	2,55	1,26	1,32	2,72	3,14	0,52
Slovenia	0,01	0,00	2,14	0,85	3,16	5,83	4,13	0,16
Hungary	0,09	3,11	1,22	3,88	2,44	3,59	3,94	0,44
Finland	1,98	3,77	2,04	4,35	9,02	10,00	10,00	0,66
France	5,93	4,67	2,35	3,76	5,52	9,03	5,37	10,00
Czech Republic	0,02	7,05	3,88	2,30	3,68	5,34	4,25	0,74
Sweden	1,47	2,30	3,57	2,68	10,00	8,64	8,42	0,86

Let's calculate integrated indicators for each group basing on modified data by using the following formula:

$$K_g = \sum k_i G_i \qquad (2)$$

where K_g – integrated indicator for group of parameters;
k_i – weighting coefficient of i parameter in the group;
G_i – value of i parameter in the group.

Calculation results shown in the Table 4, in which countries sorted in descending order.

Table 4

Efficiency Indicators of Technology Transfer Systems of Studied Countries

	Group A integrated indicator	Group B integrated indicator	Efficiency indicator
Romania	4,36	1,34	3,24
Bulgaria	2,65	0,96	2,74
Malta	4,39	1,74	2,52
Germany	6,87	6,05	1,14
Greece	2,93	2,62	1,12
Cyprus	1,70	1,79	0,95
Slovakia	1,85	2,02	0,91
Estonia	2,87	3,15	0,91
Poland	2,14	2,37	0,90
Lithuania	2,09	2,38	0,88
UK	4,30	5,17	0,83
Luxemburg	3,42	4,13	0,83
Czech	3,13	4,00	0,78
Spain	3,75	4,97	0,75
Italy	2,66	3,89	0,68
France	4,62	6,99	0,66
Netherlands	3,12	4,85	0,64
Belgium	2,96	4,86	0,61
Ireland	2,20	3,66	0,60
Portugal	2,04	3,61	0,57
Hungary	1,60	2,88	0,56
Latvia	0,89	1,94	0,46
Denmark	2,55	6,16	0,41
Austria	2,15	5,62	0,38
Finland	2,77	8,67	0,32
Sweden	2,26	8,36	0,27
Slovenia	0,52	3,85	0,13

The results show that there is „highly effective“ system of technology transfer in Romania, Bulgaria and Malta. However, this figure was obtained due to the fact that in these countries indicators of group A significantly exceed the value of indicators of group B. There is the largest share of production of innovative products in total output in these countries, and figures that create conditions of technology transfer are quite small.

In our opinion the optimal functioning of technology transfer can be characterized by the indicator which slightly more than 1 or close to 1. So, there is balanced performance of two groups. So we need an additional indicator that shows the overall development of the studied criteria, as there is Greece in group of countries with an effective system of technology transfer which scores of group A and B do not exceed 3 of 10 possible.

To enter the general indicator of development of the technology transfer will use the formula (2) of the values of ki, at 0,5, and Gi, which is an integrated index for group A and in group B (Table 3), calculate the index level of development of the technology transfer each country. Display the calculated data in Table 5.

Table 5

Indicators of Development Level of Technology Transfer System of EU27

Place	Country	Group A integrated indicator	Group B integrated indicator	Development level indicator	Place	Country	Group A integrated indicator	Group B integrated indicator	Development level indicator
1	Germany	6,87	6,05	6,46	15	Estonia	2,87	3,15	3,01
2	France	4,62	6,99	5,81	16	Ireland	2,20	3,66	2,93
3	Finland	2,77	8,67	5,72	17	Romania	4,36	1,34	2,85
4	Sweden	2,26	8,36	5,31	18	Portugal	2,04	3,61	2,83
5	UK	4,30	5,17	4,73	19	Greece	2,93	2,62	2,77
6	Spain	3,75	4,97	4,36	20	Poland	2,14	2,37	2,26
7	Denmark	2,55	6,16	4,36	21	Hungary	1,60	2,88	2,24
8	Netherlands	3,12	4,85	3,98	22	Lithuania	2,09	2,38	2,23
9	Belgium	2,96	4,86	3,91	23	Slovenia	0,52	3,85	2,19
10	Austria	2,15	5,62	3,89	24	Slovakia	1,85	2,02	1,94
11	Luxembourg	3,42	4,13	3,77	25	Bulgaria	2,65	0,96	1,80
12	Czech Republic	3,13	4,00	3,56	26	Cyprus	1,70	1,79	1,74
13	Italy	2,66	3,89	3,28	27	Latvia	0,89	1,94	1,42
14	Malta	4,39	1,74	3,06					

Let's use formula (2) with k_i equal to 0,5 and G_i equal to the integrated indicator for Group A and Group B (Table 3) for the implementation of general development of technology transfer system. So, we'll calculate indicator of development level of technology transfer system for each studied country. Received data shown in Table 5.

Maximum score used for each parameter in this study is 10. Let's use scale of four states for development level indicator evaluation and calculate limit values for indicator for each value (Table 6).

Table 6

Reference Values of Development Level of Technology Transfer System

Condition	poor	satisfactory	good	excellent
Value	0–2,39	2,4–4,99	5,00–7,49	More than 7,49

Qualitative estimation of technology transfer system could be done by using reference values listed in Table 6.

Analyzing the calculations using the proposed in this study criteria can make a reasonable conclusion that Germany has the most developed and most effective technology transfer system.

We can build algorithm of efficiency of technology transfer system estimating based on results of this research (Table 7).

Conclusions. Method of estimating of technology transfer system efficiency, proposed in this research, has the following advantages:

– sufficient flexibility to use: not only opportunity of assessment of territorial group of units, but also the possibility of evaluation of the dynamics of a particular region using the appropriate parameters for time periods;

– uses criteria apparatus that fully describes the state of the studied system of technology transfer;

Table 7

Algorithm of Efficiency of Technology Transfer System Estimating

<table>
<tr><th>No</th><th>The name of the stage</th><th colspan="6">Actions</th></tr>
<tr><td rowspan="10">1</td><td rowspan="10">Collection and systematization of statistical data</td><td colspan="6">List of necessary parameters</td></tr>
<tr><td>Indicators group</td><td colspan="4">Parameter</td><td>Weighting coefficient</td></tr>
<tr><td rowspan="4">A</td><td colspan="4">Patent applications to the EPO</td><td>0,40</td></tr>
<tr><td colspan="4">Turnover from new or significantly improved products new to the market</td><td>0,30</td></tr>
<tr><td colspan="4">Turnover from new servises not new to the market</td><td>0,20</td></tr>
<tr><td colspan="4">High-tech exports share in total export volume, %</td><td>0,10</td></tr>
<tr><td rowspan="4">B</td><td colspan="4">Gross domestic expenditure on R&D, % share in GDP</td><td>0,40</td></tr>
<tr><td colspan="4">Governement expenditures on R&D, % of total gross expendetures on R&D</td><td>0,30</td></tr>
<tr><td colspan="4">Researchers, pers. on 1000 FTE</td><td>0,20</td></tr>
<tr><td colspan="4">Science and technology graduates</td><td>0,10</td></tr>
<tr><td>2</td><td>Modifying of statistical data to scores</td><td colspan="6">Proportional distribution of scores for parameters taking into account that maximum value of parameter is equal to 10</td></tr>
<tr><td>3</td><td>Calculation of integral indicators for each group</td><td colspan="6">Calculated by using the formula: $K_g = \sum k_i G_i$, where K_g – integral indicator for the group; k_i – weighting coefficient of i parameter of the group, G_i – value of i parameter of the group</td></tr>
<tr><td>4</td><td>Calculation of efficiency indicator</td><td colspan="6">Calculated as a relation of integral indicator of Group A and integral indicator of Group B</td></tr>
<tr><td>5</td><td>Calculation of development level indicator</td><td colspan="6">Calculated by using the formula: $K_D = 0{,}5(K_a + K_b)$, where K_a – Group A integral indicator, K_b – Group B integral indicator</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Evaluation of condition of development of technology transfer system</td><td colspan="6">Comparing of received value of K_D with the following reference values</td></tr>
<tr><td>Condition</td><td>poor</td><td>satisfactory</td><td>good</td><td colspan="2">excellent</td></tr>
<tr><td>Value</td><td>0–2,39</td><td>2,4–4,99</td><td>5,00–7,49</td><td colspan="2">More than 7,49</td></tr>
<tr><td>7</td><td colspan="7">Making of expert conclusions about efficiency of technology transfer system with taking into account its development level</td></tr>
</table>

– statistical data used in the assessment, information is in free access;

– the use of ballroom indicators in giving of expert assessments provides a clear picture of the situation in the investigated area.

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GEL: G2

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SOCIALLY RESPONSIBLE FINANCE – A FAST-EXPANDING MARKET

Society is increasingly sensitive to the principles of corporate social responsibility, a fact that has been thoroughly taken on board by equity asset managers, who have addressed this need by proposing SRI or Socially Responsible Investment products. SRI has witnessed a rapid surge in interest over the last few years: many financial institutions have secured a positioning in this market by backing growth in volume and stabilisation in methodological content. In this paper, on the one hand we study the development of asset volumes involved in socially responsible financing and, on the other, we discuss the methodological difficulties that the new finance niche will be required to tackle successfully over the next few years.

Key words: socially responsible financing, CSR, ethical funds.

Общество становится все более чувствительным к принципам корпоративной социальной ответственности – факт, который тщательно учитывается менеджерами по удовлетворению прав по части имущества, которые исследовали этот фактор, предлагая НИИ или социально ответственные инвестиционные продукты. НИИ засвидетельствовали стремительный всплеск интереса за последние несколько лет: много финансовых учреждений обеспечивают позиционирование на этом рынке, поддерживая рост в объеме и стабилизации в методологическом значении. В данной работе, с одной стороны, мы изучаем развитие объемов активов, вовлеченных в социально ответственное финансирование и, с другой стороны, рассматриваем методологические трудности, с которыми, новая финансовая ниша должна будет успешно справляться на протяжении нескольких последующих лет.

Ключевые слова: социально ответственное финансирование, представитель службы по работе с клиентами, этические фонды.

Суспільство стає все більш чутливим до принципів корпоративної соціальної відповідальності – факт, який ретельно враховується менеджерами по задоволенню прав щодо майна, які досліджували цей фактор, пропонуючи НДІ або соціально відповідальні інвестиційні продукти. НДІ засвідчують стрімкий сплеск інтересу за останні декілька років: багато фінансових закладів забезпечують позиціювання на цьому ринку, підтримуючи ріст в обсязі та стабілізації в методологічному значенні. У даній роботі, з одного боку, ми вивчаємо розвиток обсягів активів, залучених у соціально відповідальне фінансування та, з іншого боку, ми розглядаємо методологічні труднощі, з якими, нова фінансова ніша повинна буде успішно справлятися на впродовж наступних декількох років.

Ключові слова: соціально відповідальне фінансування, представник служби щодо співпраці з клієнтами, етичні фонди.

Socially responsible finance – a fast-expanding market

Introduction. To invest in a „socially responsible" manner is to integrate ethical, social, environmental and/or governance criteria into investment decisions, or to ensure good use of the voting rights attached to any holder of securities. For investors, these criteria do not substitute for those governing financial performance, but instead complement them in an attempt to objectivate a number of new risks linked to economic activity.

Socially Responsible Investment, known as SRI, has witnessed a rapid surge in interest in the last few years: many financial institutions have secured a positioning in this market based on volume growth and a stabilisation in methodological content. In this paper, on the one hand we study the development of asset volumes involved in socially responsible financing and, on the other, we discuss the methodological difficulties that the new finance niche will be required to tackle successfully over the next few years.

1. Socially responsible finance

While SRI definitions and practices are constantly developing and varying from one country to the next, responsible finance currently comprises five main families: the positive screening or „Best-in-Class" approach, the negative screening or exclusion approach, shareholder activism, the thematic approach, supportive approach and „shared" approach. As we shall see in this section, these sometimes divergent concepts of SRI have given rise, in the last few years, to an explosion in volumes of assets going under the label of socially responsible finance.

1.1. Definitions

The SRI typology is almost certainly steered by methodological guidelines, but also by principles linked to the notion of corporate social responsible, referred to as CSR: the normative approach versus the utilitarian approach to the CSR concept.

The normative approach to CSR rests on an ethical and moral conception of the company. A firm has responsibilities towards society. Compliance with a minimum number of norms and attitudes is a pre-requisite in any quest for profit. According to this vision, Man is not a means, but an end, as per the Kantian dictum [Evan, Freeman, 1988; Gibson, 2000]. In practice, investors will seek to exclude from their portfolio those companies likely to transgress certain rules, according to a value of scales, which may relate to ethics, morals, or rule-of-law. The most common practice is derived from a selection mode based on *negative screening*, in other words a methodology that excludes:

– companies in sensitive sectors from a morality and ethical point of view: tobacco, alcohol, arms, pornography, fur, etc.,

– companies who do not comply with international norms or conventions, such as the ILO, or those holding stakes in countries not respecting human rights,

– industries belonging to highly polluting sectors, or sensitive from an environmental point of view: nuclear, petroleum, chemical, etc.

Funds having arisen more recently include those excluding any sectors of activity surrounded by public controversy, such as GMO, animal experimentation and loans –

cf. Islamic finance. Finally, aside from working to a certain number of moral principles, ethical funds are also founded on a legal reality: the excessive exposure of some sectors of activity to risks of class action suits. For example, currently in the US, tobacco producers and activities linked to asbestos are two legally exposed subjects.

The utilitarian approach to CSR, however, seeks to establish a link of causality between the good practices of a company and its economic and financial performance. Thus, for example, T. M. Jones (1995) attempted to explain the economic interest for a company in complying with rules of good conduct towards its stakeholders: in terms of transaction costs, control and monitoring procedures, etc.

Defendants of the utilitarian approach to the CSR concept have developed a series of totally unique selection methodologies. From a schematic point of view, these consist in evaluating the extra-financial performance of the company, by means of specific indicators, in order to complete the analysis generally conducted by asset managers. Consequently, we speak of *positive screening*. In this case, asset managers do not aim to penalise the company for its ethical behaviour, or sectoral activity, but instead to identify and promote the extra-financial fields that are likely to secure an economic, social, or environmental advantage, etc.

According to this approach, management funds build their investment universe by selecting those firms that show the best extra-financial performance and not those belonging to such-and-such a sector of activity – as in the negative screening approach. In effect, rather than confining the investment universe to a few sectors on the basis of ethical criteria – the direct consequence of which is a less diverse range of investment possibilities, and therefore a level of profitability adjusted by a more reliable risk of investment than that of a so-called traditional portfolio – it was considered wiser to take an interest in the virtue of a company rather than that of the activity sector to which it belongs – hence the so-called *Best in Class* methodology.

Added to this raft of financial products are the supportive and shared funds. The common point of each of these supports is that they offer the saver the chance to indulge in sponsorship, while increasing the value of his assets: in the case of supportive funds, a part of the capital, generally speaking 5 % to 10 %, may be used to finance solidarity projects, such as reintegration, local development, microcredit, etc.; as for shared funds, part of the profits are forwarded to NGOs in the form of donations.

For its part, shareholder activism consists in the strict, systematic use of the voting rights attached to all holders of securities in order to assist or compel a company in acquiring greater social responsibility.

Finally, on the sidelines, funds are developing whose thematic approach concerns only those companies in the same sphere of activity, particularly those focused on renewable energies, or operating on the same thematic issues, such as the ageing population, fight against world famine, respect for human rights, social progress, etc. This approach is beginning to acquire increasing importance, especially in the French market.

1.2. Volumes involved in socially responsible finance

The world SRI market was valued at more than 10,000 billion US Dollars at end 2009: i. e. a growth of 50 % for the 2007–2009 period. Table 1, notably adapted from reports by the Social Investment Forum (2010) and EuroSIF (2010), reveal an extraordinary fact: the end of US predominance over the socially responsible finance market. While the share of assets managed in the US stood at 65 % of the world market in 2005, it settled at 40 % in 2007 and finally less than 30 % at end 2009. This may be partly explained by the exponential growth in SRI volumes in Europe and partly by the drop in the USD over the same period. Caution is nevertheless advised in the face of such figures, for, according to the geographical location, the perimeter defining SRI can vary tremendously, as apparent from the distinction made between *Core SRI and Broad SRI* (cf. Eurosif, 2010).

Thus, according to the Social Investment Forum (SIF), the American SRI market witnessed strong growth in 1995–2010 and a rise in assets from 639 billion to 3069 billion USD (Table 2), which is estimated to represent 12,2 % of asset management in the US. The dynamism of this market was sustained by the explosion in screened funds, either positive or negative (*Top Down Approach*), which grew fivefold in thirteen years.

Table 1

World SRI assets at end 2009

Zone	Assets (billion $)
Australia/New Zealand	58
Canada	553
United States	3,069
Europe	7,151
Asia	20
Total	10,851

Source: RIAA, AIR, SIF, Eurosif, ASrIA.

Table 2

Development in SRI assets in the US (stated in billion $US)

In billion USD	1997	1999	2001	2003	2005	2007	2010
Screening	529	1,497	2,010	2,143	1,685	2,098	2,512
Activism	736	922	897	448	703	739	1,497
S&A[31]	(84)	(265)	(592)	(441)	(117)	(151)	(981)
Supportive	4	5	8	14	20	26	42
Total	1,185	2,159	2,323	2,164	2,291	2,712	3,069

Source: SIF.

Nevertheless, these volumes no longer make the United States the driving force behind world socially responsible finance. The country's predominance had until then been linked, firstly to a favourable historic context, i. e. the creation of the first ethical funds in the US [Wolff, 2007], and to the existence of some powerful pension funds, such as CalPERS, which, by dint of the very asset volumes involved, were rapidly able to structure American SRI. Secondly, the American political-legal context sustained growth in this market. The rise in class actions against certain business sectors, and the financial risks inherent in such actions, had a huge democratising effect on *negative screening* among asset managers. Thirdly, the series of financial scandals in the early 2000s, as well as the application of the Sarbanes-Oxley Act (2002) on financial transparency injected new life into shareholder activism and encouraged new funds to use their voting rights more systematically in order to develop business governance modes further: the SRI asset volumes linked to activism having doubled between 1995 and 2010 (see Table 2).

Europe, however, which had begun slowly to indulge in responsible investing, has now caught up and is today the leading economic zone in terms of volumes. The amounts of SRI assets managed in Europe stood at some 5,000 billion Euros at end 2009, representing a growth of over 87 % between 2007 and end 2009. This increase may be explained by the intensified interest in this type of financial instrument among corporate investors, as well as the rise in stock market prices over the period and, finally, by changes made to the geographic perimeter of the Eurosif study, which originally only focused

[31] The S&A entry refers to Screening and Activism combined and is therefore deducted from asset amounts.

on 8 countries as against 14 at end 2009. Moreover, this increasing interest in SRI also owes much to different political decisions aimed at promoting sustainable development within European financial markets and companies. For example, the United Kingdom, which, under the *Trustee Act* (2000), obliges pension fund managers to announce whether they use ethical, environmental or social criteria to reach their investment decisions.

2. The profitability of socially responsible finance

Given the importance of monetary issues, SRI is also accountable for its financial performance. Due to the avant-garde nature of this type of investment, analysts must be able to clearly define the degree or rather the level of social responsibility of their portfolio, thus rendering the search for reference standards all the more complex. Several socially responsible indices thus came into being. In this section, we present the methodology used to build two internationally recognised indices, the DSI 400 and DJSI, and we also discuss the performance perspectives offered by SRI.

2.1. Stock market indices: vital criteria for benchmarking the market

The DSI 400 is historically the first socially responsible index. Launched by KLD in May 1990, it sets out to serve as a benchmark for investors and to determine how ethical filters affect financial performances. The methodology employed relies on exclusion filters and a rating system peculiar to KLD (Figure 1). The index thus comprises 250 companies. The investment universe is then completed by 150 firms not included in Standard & Poor 500. This new selection is aimed at a sectorial rebalancing and promoting companies with a renowned SD strategy.

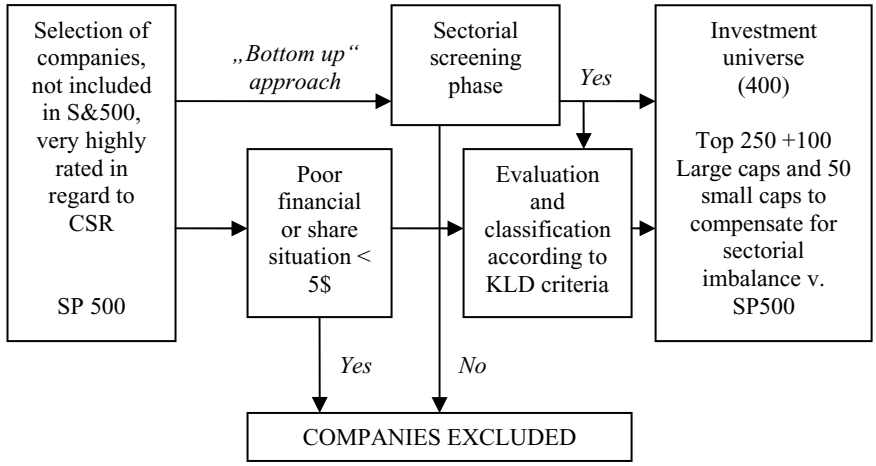

Figure 1. Construction of the DSI 400 index

Source: ORSE (2001).

The *Dow Jones Sustainable Group Index* (DJSGI) is the result of an initial collaboration (1999) between the *Dow Jones* index supplier and the Swiss rating company, SAM. The index is based on a global integrated vision of sustainable investments. Thus, when selecting companies included in the index calculation, every aspect of sustainable entrepreneurship is taken into consideration proportionally according to a pre-defined rule. The SAM agency therefore identified 5 priority areas: the capacity for technological innovation and long-term efficiency of use of resources; corporate governance; relations with shareholders; professional leadership and competitiveness, and relations with civil society. The final selection, based on the *best in class* approach, is obtained according to the algorithm shown in Figure 2:

– initial universe- *DJSI World* – Dow Jones Global Index;

– elimination of sectors whose best rated company earns less than 20 % of the maximum score;

– elimination of those companies earning less than 33 % of the maximum score in each sector;

– selection of 10 % of the best rated companies in each sector;

– for those sectors in which the above-mentioned selection results in a representativeness score of less than 20 % of the DJSI capitalisation, in the sector in question, a selection of complementary companies is added until the 20 % threshold is reached.

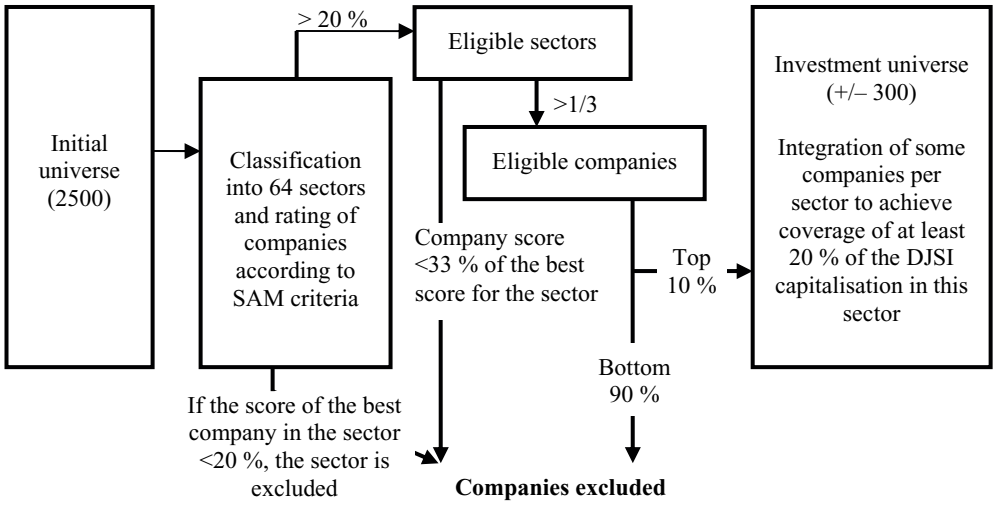

Figure 2. Construction of the DJSI World index

Source: ORSE (2001).

2.2. The profitability of SR finance

From a theoretical point of view, SRI can only underperform traditional investments. In effect, adding constraints in the portfolio optimisation process and reducing the size of the investment universe can only lead to fewer diversification possibilities and therefore lower the efficiency boundary between profitability and risk. Table 3 summarises the various results obtained in literature on the subject [Le Saout, 2005]. These studies concern both the performance of SRI funds and the development of SRI indices and focus on different periods and different geographical areas. Aside from the Gompers, Ishii and Metrick study (2003), which confines itself to the effect of governance on stock market performance, all other studies use environmental, social and governance factors as extra-financial criteria for selection.

Contrary to expectations, we note that a vast majority of studies tend to demonstrate that SRI performance is on a par with traditional investments. Several arguments may be advanced to explain these results.

For some authors, extra-financial rating may be seen to reflect a certain control over the risks facing the company [Kurtz, 2002]. Those companies in best control of their extra-financial issues minimise the risks of social, or even industrial, conflicts that might undermine their image, and are thus ultimately called upon to outperform their competitors. In effect, intangible assets, such as patents and brand image are a key element of the balance sheet. Companies who do not adopt a socially responsible stance are subject to a higher risk of bankruptcy and to having capital withdrawal by investors. The selection of securities based on extra-financial criteria might therefore help to generate added value.

Table 3

Review of literature on performance and SRI

Authors	Region	Nature	Period	Results
Altedia (2008)	World	Funds	2007–2008	+
Bauer, Otten & Rad (2006)	Australia	Funds	1992–2003	=
Bello (2005)	USA	Funds	1994–2001	=
Burlacu, Dupré and Girerd-Pottin (2004)	USA	Indices, Funds	1997–2002	=
Edhec (2008)	Europe, France	Funds	2002–2007	=
Férone, d'Arcimoles, Bello and Sassenou (2001)	Europe, USA	Indices	1996–2001 1990–2000	=
Geczy, Stambaugh & Levin (2005)	USA	Funds	1963–2001	—
Gompers, Ishii & Metrick (2003)	USA	Actions	1990–1999	+
Hamilton, Jo and Statman (1993)	USA	Funds	1981–1990	=
Le Saout (2005)	Europe, World, UK, USA	Indices	1997–2003	=

For other authors, the performance of SRI assets can only be analysed in the long-term, although the market is not yet mature enough nor is its perimeter yet clearly defined enough to be able to draw any ultimate conclusions about the capacity of SRI assets to outperform traditional markets.

Thus, according to this line of thinking, the performances currently observed may be transitory and/or contextual. In effect, SRI has benefited by the move of financial flows from companies deemed non-ethical towards those deemed ethical. There would appear to be a liquidity effect in operation, enhanced by a deadweight effect due to advertising devoted to SRI and companies who are more respectful towards the different stakeholders. The current context, which is favourable to sustainable development, appears to be conducive to the development of a virtuous circle in favour of SRI. According to Jo (2003), financial analysts are prompted to follow those companies showing evidence of good corporate practices due to public enthusiasm for SRI.

As a direct consequence of this latter point, we have noticed an increase in the offering in past years, entailing a larger number of funds on offer and far larger asset volumes. As a result, faced with the rise in volumes, managers have had to restructure their portfolios in order to be able to offer far more capital-intensive asset lines. Consequently, they have been indirectly obliged to incorporate liquidity filters, thus eliminating the poorest capital contributions, in order to satisfy the growth in demand for SRI assets. This therefore resulted in a reduction in the screening effect of extra-financial selection and ultimately led to the management of products differing very little from „traditional" funds in their composition [Le Saout, 2005].

Conclusion. Thus, in this paper, SRI would appear to be a fast-expanding finance niche. Moreover, investing in SRI assets appears to be no less profitable than traditional investments.

In effect, there is a strong presumption that SR finance creates value. In all likelihood, both regarding risk and yield, investing in this type of product does not reduce shareholder wealth and it permits socially responsible saving behaviour. Many studies have shown this to be the case.

However, this market is still aimed at portfolio management professionals. As laid out, the consequences of the weak marketing of this type of product among small shareholders is the sheer number of methodologies and their lack of visibility. In effect, it is still difficult to be able to call a fund socially responsible with any certainty. To this end, the introduction of international labelling for SRI assets would appear to be crucial.

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THE STRUCTURAL IMBALANCES OF UKRANIANE FOREIGN TRADE OF GOODS IN THE CONTEXT OF FORMATION OF THE FTA WITH THE EU

The structure and the set imbalances of foreign trade of Ukraine with the EU are analysed. The positive structural effects from creation of a deep free trade area are established.

Key words: foreign trade, structural imbalances, free trade area (FTA), structural effects, Ukraine, the EU.

Проанализирована структура и установлены диспропорции внешней торговли товарами Украины с ЕС. Обоснованы позитивные структурные эффекты от создания расширенной зоны свободной торговли Украины с ЕС.

Ключевые слова: внешняя торговля товарами, структурные диспропорции, зона свободной торговли (ЗВТ), структурные эффекты, Украина, ЕС.

Проаналізовано структуру та встановлені диспропорції зовнішньої торгівлі товарами України з ЄС. Встановлено позитивні структурні ефекти від створення поглибленої зони вільної торгівлі України з ЄС.

Ключові слова: зовнішня торгівля товарами, структурні диспропорції, зона вільної торгівлі (ЗВТ), структурні ефекти, Україна, ЄС.

Introduction. The globalization of the world economy development is accompanied by formation of a new one, by the expansion of existing trade blocs, integration, by the deepening of regional integration through the signing of bilateral and multilateral preferential trade agreements, which are considered by the countries as an additional factor of foreign economic development during the dominance of protectionist tendencies in the WTO. The regionalization of international trade, at least raises concerns among the leading international institutions, because there are no basic research on whether regional preferential agreements promote the welfare of the global dimension and whether regionalism can accelerate the completion of the Doha round negotiations.

In a recent WTO report is stated that the strengthening of regionalism is recorded with developing countries, their share accounts for 22 % preferential signed agreements, 69 % – between developed countries and developing countries, 9 % – between the developed countries [21]. The activity in signing preferential agreements is not accompanied by the increasing of trade flows. According to research of T. Carpenter and A. Lendle among 20 world importers of whose share of the world trade in 2008 was 90 %, only 16 % felt under the trade preferences, i. e. 84 % of world trade was in the mode MFN [16].

Neoclassical followers point to the mutually positive impact of trade liberalization among WTO member states by improving terms of trade and increasing their well-being [15]. Against the background of discussions about the feasibility and advisability of preferential trade between WTO members, the question of the structural imbalance of foreign trade seems minor or not treated at all.

The proponents of structuralism in the early 60's indicated a need for developing countries to consider their production structure for substantiation of models of interaction with the outside world. R. Prebish and H. Singer found that, because of the income elasticity of demand for commodities – the main group of exports of developing countries is low, comparing with industrial goods, the terms of trade for countries with raw-oriented export constantly deteriorate, so in the long run they will import the limited amount of industrial goods. According to M. Todaro, the worsening of the conditions of trade for developing countries is equal to 2,5 billion dollars a year and is due to reduced trade surplus of manufactured goods of 55 billion dollars in 1981 to negative (42 billion dollars) in 1993 [19].

The deformation of the production and export structure of the economy not only makes developing countries dependent on industrialized countries, but also reproduces the inequality of the world system. The recent studies of A. K. Datt, J. Ross, S. Bitar, M. Kaletsky, L. Taylor, J. Palm, D. Coleman, F. Nixon, J. Laurie, E. S. Raynert, S. Furtado determine the factors and conditions, when the countries with exported resources can effectively interact with the outside world and receive the positive effects of trade liberalization, accelerate the pace of economic development. Significant contribution to the study of regional patterns of international trade did Mr. Krugman. The supporters of the principles of economic geography believe that the strategy of regional integration should be built taking into account the size, location and openness of the country to interact with major markets in every part of the report [17]. Among the Ukrainian scientists the question of the dynamics and structural changes in Ukraine's foreign trade with the EU investigated V. Sidenko, O. Shnyrkov, Y. Makogon, V. Pyatnytskiy, I. Sofischenko,

theoretical and practical aspects of the global regionalistics are represented in the works of V. Chuzhikov [11–13]. The consequences of signing a free trade zone agreement for Ukraine and it's leading sectors were evaluated by the group of authors led by I. Burakovsky, V. I. Movchan, O. Shumylo, M. Emerson, and the experts of CTA and ECORYS companies [2; 4; 7], but without changes in the structure of foreign trade of Ukraine.

Formulation of the problem. The purpose of the article is to set disparities and to simulate trends of the structural changes in foreign trade after the establishment of free trade between Ukraine and the EU the fact that the analysis of statistical data and information. To achieve the objective methods, the structural and comparative analysis, synthesis, induction and deduction, time series are used.

Results. The strategic partner of Ukraine's foreign trade has been and remains the EU. Paying attention on the different levels of economic development partners, the population and the availability of resources there is a significant asymmetry in trade. The share of Ukraine in total EU exports is 1,3 % in 2010, imports – 0,8 %, foreign trade – 1 %. At the same time, the EU-27 accounted for 28,7 % of foreign trade turnover of Ukraine, while exports amounted to 25,4 %, imports – 31,4 % of the total. The volume of trade between the countries is gradually increasing, in 2010 amounted to 32,2 billion dollars [6]. Since 2005, Ukraine in the trade with the EU had a negative trade balance, which reached its peak in 2008 (–10 509,4 million.), but under the influence of the global crisis it has reduced (–5,914,4 million) in 2009 by reducing the demand for Ukrainian products, rapid growth in exports because of the currency devaluation. The products whose share were 72,7 % in 2010 dominate in the export structure, among which black and non-ferrous metals were dominated, and articles thereof (33,2 %), mineral products (17,6 %), foodstuffs and raw materials for their manufacturing (14,9 %) as indicated by the data of Table 1.

Table 1

The change of the commodity structure of export and import of Ukraine and the EU in 2008–2010, %*

Industry / Year	2008		2009		2010	
	Export	Import	Export	Import	Export	Import
Foodstuffs and raw materials for their production	17,6	8,7	21,9	11,9	14,9	11,1
Mineral products	15,9	6,9	12,7	5,1	17,6	6,4
Wood and wooden products	3,6	5,5	5,6	7,5	4,5	6,9
Ferrous and nonferrous metals and articles thereof	34,6	6,4	22,9	6,5	33,2	6,9
Industrial goods	5,3	5,0	7,8	5,9	5,9	5,6
Chemical and related industries	7,9	21,4	7,5	29,3	6,9	29,0
Machinery and equipment, vehicles, instruments	11,7	42,1	17,4	30,7	14,2	30,7
Other	3,5	4,0	3,9	3,1	2,8	3,4

* Compiled according to the author [8, 58, 60].

Since Ukraine joined the WTO structure of exports to the EU did not make significant changes: 1,7 % in 2010 compared to 2008 year increased share of mineral products decreased by 1,4 % share of ferrous and nonferrous metals and products from them and 2,7 % – food.

Among the EU countries leading trade partners of Ukraine were Germany (19 %), Poland (14 %), Italy (12 %), Hungary (6,5 %) and France (5 %) in 2010. The main items of exports to Germany were manufactured goods (34,4 %), base metals and products

(25,5 %), machinery and equipment (21,3 %). The commodity structure of exports to Germany looks more progressive than that one to the EU, because a smaller share of the supply is formed by ferrous metals, including industrial products represented by the textiles industry, where manufacturers are working on tolling schemes. In the largest share of imports were machinery and equipment, transport equipment (37,3 %), industrial products (23 %), chemicals and related industries (20,3 %). The structure of exports to Poland and Italy are also dominated by commodities.

Indicative trend in trade is the dominance of inter-sectoral flows, as indicated by the data Table 2.

Table 2

The dynamics of Hrubel-Lloyd index for trade between Ukraine and its trading partners based on three-numeral Standard International Trade Classification, % [3]

Countries	2005	2006	2007	2008	Change in the index
World	39,63	42,06	43,38	38,65	–0,98
Russia	38,45	37,18	36,04	38,42	–0,03
EU	15,58	19,74	14,77	16,19	0,61

The index of Hrubel-Lloyd at 19,74 % in 2006 declined to 16,19 % in 2008, indicating a downward low level of competition between producers and the conservation of the inefficient structure of commodity exports in the long term can lead to the growth of pressure on export-oriented industries of European imports and a slowdown in foreign trade, the strengthen of lobbying protection market sentiment among domestic producers. „Complementary" nature of Ukraine's exports to the EU confirms the index of trade complementarity calculated by us by the method of the UN Commission on Trade (UN Comtrade) based on one-numeral Standard International Trade Classification (1-digit SITC 4th revision) [22]. The calculations showed that the level of complementarity to the structure of European exports and Ukrainian imports in 2008 amounted to 83,51 %, i. e., under certain conditions of the Ukraine's imports from other countries may be replaced by EU products. The index of complementarity of Ukrainian exports to the EU imports is 52,28 %. The greatest discrepancy is observed on the item „Manufactured goods classified chiefly by material" (Article 6 SITC), which includes ferrous metals and products, steel, representing almost 40 % of Ukrainian exports, but only 11 % of EU imports. In the EU the largest share of imports forms the fuel (Article 3 of the SITC) – 27,1 %, machinery and transport equipment (section 7 SITC) – 26,6 % and a variety of finished products with a significant part of added value (Article 8 of the SITC) – 12,6 %. The output of these industries in exporting is small and Ukraine were at 6 %, 9,8 % and 2,6 % respectively. The positive effect of trade creation would occur in mechanical engineering with a significant part of value added and production of transport equipment, but according to the commitments in the WTO since 2008, Ukraine has reduced customs tariffs in the automotive industry from 25 % to 10 %. The reduction in demand for products due to global financial crisis reduced the low competitiveness of Ukrainian goods on foreign markets.

The theories of international trade integration suggest that the formation of foreign trade effects of the introduction of simple forms of integration is based on the change in trade regime between the countries. The analysis of foreign trade regime of Ukraine indicates that a simple bound tariff rate on all tariff lines in Ukraine was 5,8 % in 2010, while in the EU, this figure was at 4,2 % [23, 348–350]. As a WTO member, the country tariff rate applied MFN. According to CARIS, the share of trade in the RNS between Ukraine and the EU accounted for 80,85 % in 2010, including a zero rate – 73,11 %.

In relations with the EU, Ukraine is using the Generalized System of Preferences (GSP) trade in more than 6 thousand items of goods since 1993, exceptions are so-called „sensitive" goods. The share of trade with the EU in terms of preferences for Ukraine was 18,41 %, including a zero rate tax – 9,54 % in 2010, while the use of preferences – about 85 % [20]. After Ukraine's accession to the WTO metal production excluded from a list of „sensitive" – a leading item of Ukrainian exports and EU markets for agricultural products, food products remain closed due to both tariff and nontariff barriers. As it is pointed in the data Table 3, the import duties exceed the EU for Ukraine Ukrainian for agricultural products, fishery products, light, wood and paper industry.

Table 3

Comparison of rates of import duty on some goods in Ukraine and the EU in 2010, % [5, 15]

Types of products	Import duties of Ukraine	EU import duties for Ukraine
Agriculture	5,5	6,1
Forestry	0,6	0,2
Fishing	1,6	6,0
Extraction of non-energy materials	2,7	0,0
Food Industry	10,7	0,3
Light Industry	8,8	14,3
Wood and Paper Industry	0,4	6,6
Coke Industry	1,0	0,3
Chemical Industry	5,5	0,7
Production of construction materials	7,0	1,0
Metallurgy	0,7	0,7
Engineering	2,5	1,2
Power production	2,0	0,0

At the end of 2010 only about 25 % of national technical standards were harmonized according to international and European ones, the exports of agricultural and food products remains problematic because of non-compliance with sanitary, veterinary and phyto-sanitary standards. Thus, we can assume that in the case of creating a simple free trade area, it is possible that the abolition of customs restrictions at other conditions being equal, will not significantly affect the amount and structure of Ukrainian exports.

Ukraine's negotiations on association and formation of free trade with the EU began immediately after the decision on Ukraine's accession to the WTO. On the EU side this sequence was a requirement, and harmonized with international trade law legislation and regulatory acts of Ukraine formed a legal framework for negotiating positions within the regional integration of the FTA. Due to the formation of a simple free trade area by definition involves a waiver of preferential customs duties on MFN and non-application of import duties between Member States of the free trade area, the areas of structural changes at the initial stage could be examined by changing the growth rate of exports of certain export industries after WTO accession (Table 4).

According to the Institute for Economic Research and Policy Consulting, the effects of WTO accession of export-oriented industries only metallurgical, chemical and petrochemical industries oriented to European markets have a positive impact on the export growth. According to the data table 4, exports will grow by 27,9 % in the steel industry, by improving access to foreign markets – 17,6 %. Similarly, in the chemical and petrochemical industry export growth may be 13,7 %, 6,5 % – by improving access to foreign markets. The calculated dynamic effects for industries, focused on the effect of

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Table 4

The average MFN import duty rate at the time of Ukraine's accession to WTO and bound rates in certain sectors of the economy of Ukraine, % *

Branch	Agricul-ture	Food Industry	Wood and paper industry	Metallurgy and manufacture of fabricated metal products	Manufacture of other non-metallic mineral products	Chemical and petrochemical	Engineering
Average rate for RNS, %							
The rate of import duty by RNS at the time of accession to the WTO	21,9	38,0	3,2	2,9	8,0	10,0	4,5
Bound rate of import duty on MFN at the time of accession to the WTO	8,8	15,4	0,6	3,0	8,6	5,5	5,1
Final bound rate of import duty on MFN at the time of WTO accession	8,7	12,7	0,6	3,0	8,5	5,4	4,9
Change in exports, %							
Accession to WTO	9,4	–19,2	–8,6	27,9	–3,8	13,7	–11,3
Only the reform of barriers to FDI	0,0	0,2	0,1	0,2	0,7	0,4	3,6
Only the reform of tariffs	–2,9	–12,3	1,3	8,1	2,0	6,1	4,8
Only improved access to foreign markets	12,6	–7,1	–9,6	17,6	–6,3	6,2	–17,4
Accession to the WTO (dynamic change)	18,9	–15,9	–9,4	29,6	–1,8	16,6	–12,5

* Compiled by the author [1, 12, 112–113].

increasing economies of scale were 29,6 % and 16,6 % respectively. Improving the access for food market, timber industries, mechanical engineering is not only not happened, and vice versa – worsened.

According to V. Piatnytskyi, the government commissioner for the European integration of Ukraine, the average rate after the FTA for the EU will reduce twice, and in ten years – to 0,32 %. Average rates on agricultural products in the EU will reduce from 19,8 % to 0,6 % (for 10 years – to 0,24 %) and in Ukraine – from 9,24 % to 6,77 % (for ten years – to 1,38 %). The tariffs on industrial goods in the EU will reduce nearly in 8 times, in Ukraine – in three times, and in ten years will be zero [9]. It is likely that the vector of structural changes will continue, that the liberalization of tariff regime will stimulate the exports of semi-processed goods and the import of high-tech goods from the EU.

Trading partners are interested in creation of a deep and comprehensive free trade area (FTA+), and Ukraine relies on the dynamic positive effects of the welfare of citizens, a duty-free access to the largest – the European market and the improvement of the access to markets of third countries, the improvement of the investment climate. EU seems Ukraine as geographically close, capacious consumer market with relatively cheap skilled labor, a large investment and innovation potential, rich land resources developed transport and communications infrastructure.

Among the developed countries the EU takes an active stance in favor of signing agreements on free trade, despite the considerable distance and lack of common borders between the individual countries such as Chile, Mexico, South Africa, and South Korea. If, according to the WTO in 2010, there were 300 preferential agreements among countries, and on average each had 13, the EU has signed and implemented the 24 agreements, three of which – the customs union (with Turkey, Andorra and San Marino). Using the results of G. Horn, A. Sapir and P. Mavroidis the survey of 14 preferential agreements of the EU in ten areas, each of the agreements contained the questions on customs cooperation (in 13 cases, legally enshrined), the technical barriers to trade (in 5 cases, legally enshrined), competition (in 13 cases, legally enshrined), protection of intellectual property rights (in 11 cases, legally enshrined). One of the latest agreements on free trade with Chile, the EU includes all the issues listed above, as well as the provision of sanitary and phytosanitary standards, state aid, investment, services and environmental legislation does not include the issue of regulating of the labor market [18]. The proposed format of the agreement with Ukraine is different from the signed and implemented in the EU with other countries.

The findings of the Center for European Policy Studies (CEPS) in conjunction with the Institute of World Economics (IWE), International Centre for Policy Studies (ICPS) and the draft ECORYS indicate the conflicting structural implications for some sectors, such as for agriculture because of low adaptability to international and European legislation on non-tariff regulation of production and trade, as evidenced by the data Table 5.

Significant production growth and a positive trade balance forecast for metallurgical and heavy industries (mechanical engineering and electronics).

Conclusions. The regionalization of trade between Ukraine and the EU is accompanied by increasing interdependence and simplification the structure of Ukrainian exports to the EU market due to the dominance of products with a low degree of processing. Structuring effects of trade depend on factors of economic and political nature, the role of the external sector in the economic structure. The positive effects include the increasing in the share of the leading countries among the EU's foreign trade partners of Ukraine, high rates of complementarity, the proximity to markets, close cultural and historical ties between the countries of Eastern Europe. In our opinion, the increase of trade turnover between the observed rapid growth of commercial high-tech imports to

Table 5

Implications for specific sectors of Ukraine FTA+ with the EU, % [4, 1.4]

Industries, products	Calculations ECORYS		Calculations CEPS	
	The growth of production in Ukraine, %	The trade balance with the EU, %	The growth of production in Ukraine, %	The trade balance with the EU, %
Agriculture and fisheries, forestry	+1,1	–43,0	–2,34	+20,4
Production of grain / Oilseed	+1,1	–6,0		
Meat	+2,2	–8,0		
Sugar / Confectionery	–4,7	–259,0		
Animal / Vegetable Fats	+5,5	–58,0		
Fruits and nuts	+3,8	–12,0		
Heavy industry, including			+2,58	+5,9
Machinery and electronics	+7,4	+30,0		
Automobiles and parts thereof	+4,7	–9,0		
Transport equipment	+3,3	–2,0		
Food, including			+24,6	+13,0
Beverages	–0,2	–3,0		
Metals, including			+6,81	+3,6
Ferrous metals	+2,6	+8,0		
Production of metallurgy	+5,8	+14,0		
Minerals	—	—	–2,17	–27,2

Ukraine, in the absence of protective mechanisms for trade will be accompanied by juggernaut effect of uncompetitive domestic producers that compete with imports and encourage the conservation of raw structure of the economy. Price effects of the abolition of import duties and non-tariff barriers to trade after Ukraine's accession to the WTO stimulated the growth of economies of scale in export-oriented sectors of the economy of Ukraine on the basis of the cheap raw materials in the absence of appropriate mechanisms for redistribution of income in high-tech sectors also retain the raw material orientation of the country foreign markets, which in the long run will worsen the terms of trade, reflecting the conditions of „Dutch disease". As the analysis shows, a simple free trade area through the further cancellation of customs restrictions hardly improve the structure of trade between Ukraine and stimulate „pushing" domestic producers of high-yield market segments of high technology products will result in the loss of scientific and innovative potential of the country.

Unlike a simple free trade area deep and comprehensive free trade area can be considered as an external factor of profound structural changes in the economy, accompanied by significant institutional and regulatory changes. Structural changes initiated by the FTA agreement should be supported by the structural system, innovative investment policy that will provide synergies and accelerate the pace of economic development.

As stated in the new edition of the compilation of the World Bank on preferential trade policy for development, trade integration is moving to a new set of tools related to trade policy, which government circles and economic actors should be optimized for creating their own advantages in international trade. The agreement about the deep free trade opens the new opportunities for economic development and structural changes through approximation of national legislation to European one, and the reproduction of the environment for business to competition and public procurement, the receiving benefits from preferential trade under conditions of free access to the markets seem unfulfilled without them, the introduction of effective measures to protect investment and

competition rules of adaptation of international technical standards and rules of food safety, technical standards and intellectual property rights, environmental standards and labor standards, the definition of effective rules and regulations to promote regional public goods, further liberalization of trade in services.

Based on the analysis of classical theories of international trade, the representatives of modern structuralism argue that increasing returns of scale, technological progress and synergy – the leading factors that act together to recreate the chain reaction and lead to structural changes that are called economic development [10, 66]. For agriculture, with decreasing scale of efficiency, FTA+ agreement provided for substantial quota and duty-free export of certain products (including dairy products, cereals, grains, sugar), the refusal of EU export subsidies in trade with Ukraine, that, on the one hand, maintains the country's export specialization and increases competition among manufacturers, on the other, will contribute to the improvement of industrial structure through duty-free imports of most agricultural products from the EU.

According to preliminary information, FTA+ agreement contains provisions on duty-free exports to the EU industrial output and transition periods for liberalization of import duties in Ukraine, which will positively affect the volume and dynamics export-oriented industries with increasing economies of scale (metallurgy, chemical industry), but probably not improve the commodity structure of exports. As international experience shows, the strategy of emulation (simulation to compare and ahead) was successful in industrialized countries and Asian developing countries. In our opinion, the agreement provided for instruments of trade policy should be supplemented by mechanisms for redistribution of foreign exchange earnings to enhance dynamic competitive advantages based on imported high-tech innovations in export-oriented areas and encourage diversification of exports through the establishment of new industries. The prospects for further research will be linked with economic and mathematical modeling of structural changes in Ukraine's foreign trade with the EU after the establishment of free trade area between countries.

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THE USAGE OF SOCIAL RESPONSIBLE INVESTMENT IN THE PROCESS OF MODERN CORPORATE GOVERNANCE

In the issue studied the genesis of socially responsible investing in global corporate governance practices, identified the benefits of socially responsible investing, made classification of socially responsible investments and their methods, identified problems that prevent the formation and development of social responsibility and socially responsible investment of corporations in Ukraine, proposed directions the state encouragement of social responsibility.

Key words: social responsibility of corporations, socially responsible investment, social investment of the business, stakeholders, screening, impact shareholders.

Исследован генезис социально ответственного инвестирования в мировой практике корпоративного управления, определены преимущества социально-ответственного инвестирования, предложена классификация социально-ответственных инвестиций, приведены методы социально ответственного инвестирования. Определены проблемы, препятствующие формированию и развитию социальной ответственности и социально ответственного инвестирования корпораций в Украине, предложены действия государственного стимулирования социальной ответственности.

Ключевые слова: социальная ответственность корпораций, социально ответственное инвестирование, социальные инвестиции бизнеса, стейкхолдеры, скрининг, влияние акционеров.

Досліджено генезис соціально відповідального інвестування в світовій практиці корпоративного управління, визначено переваги соціально-відповідального інвестування, запропоновано класифікацію соціально-відповідальних інвестицій, наведено методи соціально відповідального інвестування, визначено проблеми, що перешкоджають формуванню та розвитку соціальної відповідальності та соціально відповідального інвестування корпорацій в Україні, запропоновано напрями державного стимулювання соціальної відповідальності.

Ключові слова: соціальна відповідальність корпорацій, соціально відповідальне інвестування, соціальні інвестиції бізнесу, стейкхолдери, скринінг, вплив акціонерів.

Introduction. With realizing the current situation complexity, which consists in presence of broad spectrum of economic, social and ecological problems, the solution of which requires active participation of governmental and local authorities, business and citizens, world community came up to constant development conception, which expects the unification of negative impact on environment minimization, economic growth and providing the population with social security system.

Social responsibility of corporations (SRC) became the big business' contribution to the constant development – their responsibility for the impact of their decisions, and their activity on the society and environment, that also means, that the stakeholders receive full and reliable information.

Problem definition. The entity and practicability of social responsibility of corporations (SRC) institution implementing, as the instrument of cooperation and partnership of the state and business environment and as the method of social and labour relations systems improving, during economic system transformation is the subject of active discussion in scientific and business circles. The leading international agencies (United Nations, International Standardization Organization, World Bank, UNESCO and other) carry out varied research projects in this sphere. Problems of corporate governance functioning totally and social responsibility of corporations in particular are on the top place in the researches of foreign (Y. Blagov, A. Berli, G. Bowen, M. Van Marreviyk, N. Jacob, K. Devis, T. Donaldson, P. Draker, A. Carroll, G. Minz, J. Moon, D. Matten, L. Preston, G. Fitch, W. Frederick, M. Friedman, R. Freeman, V. N. Yakimets and other) and national scientists: A. I. Amosha, V. A. Yevtushevskii, D. G. Lukianenko, A. S. Povazhnii, V. S. Ponomorenko, I. L. Sazonets, M. G. Chumatchenko, O. M. Yastremska and other.

Today a growing number of corporations come to understanding, that giving attention only to financial aspects of the activities is not enough for successful business dealing. The increasing of social funds and pro-active attitude of the company in the sphere of corporative social responsibility not only form their positive image, but also change the confidence of the shareholders, investors and other stakeholders.

Social Responsibility of corporations – is socioeconomic institution, which operates as open system of corporation and stakeholders teamwork and contributes to transac-

tional expenses reduction, finding the solution to the conflict of interest and obtaining stable competitive positions by the corporation by means of social responsible investment, social reporting, social partnership, dividend policy and corporate communication usage. Study, generalization and adaptation of progressive world experience are quite important for building up this institution in Ukraine. Against this background it is reasonable to consider the first of the instruments of corporate social responsibility – social responsible investment, by adapting the best world practice of such activity to native business environment and by offering the fundamentals of its improvement and development.

Results of study. Recently, investors more and more understand the significance of nonfinancial factors in forming capitalization. However, they have an opportunity to make a contribution to stable development through social responsible investment (SRI), the purpose of which is not only to receive profit from money invested, but also create positive social changes, to reduce negative impact on the environment and to correspond to social etiquette.

SRI – is a process of social responsibility return line execution, made by the company, which is hold on the ground of the appropriated social investment usage, mainly in favor of the main stakeholders groups, and also local community in the region of companies activity.

Social investments of the business – are material, technological, administrative or other resources, and also financial funds of the corporation, which by decision of the management, are directed to social programs realization, developed according to the interests of main internal and external interested parties, with a view to receive certain social and economic strategic effect [14].

SRI on the stock markets began to develop in 1960th and during next 20 years it was in congruence with the term „ethical investing“ in a greater or lesser degree. Later it became only one of social responsible investment directions. The reaction of the civil society to the ethical problems became an impulse for SRI development in the USA. The establishment of PAX World Fund in 1971, which refused to invest money in companies, which received profit from the Vietnam War became a momentous event. At that time there were Sullivan Principles developed in the USA, which agitated against the investments to the companies, which acted in Republic of South Africa, supporting existing apartheid regime therethrough.

The concernment of the civil society of European nations about the problems related to human rights and labour practices had determined social criteria integration during the process of making investment decisions. As a result, in 1980th the conversion of „ethical investing“ into „social responsible investment“ was started. In 1990th the conception of stable development and climate change hypothesis received international fame. In view of that, the concept SRI also has included an environmental aspect.

After high-profile corporal scandals in the beginning of 2000th, such as the crash of Enron and WorldCom, the governors of the stock markets began to pay special attention to the questions of corporate governance. In particular, in 2002 in the USA the Sarbanes-Oxley law was adopted. It laid down demands to the emitters, about internal audit, administration and information disclosure. The investors also began to treat emitters corporate government with more attention. It was accomplished by turning it into one of SRI's directions.

During the last 40 years SRI has evolved from individual practices of ethical investing to the separate segment of stock market with its participants and substructure.

The world volume of SRI in the beginning of 2010 was rated as about 10,9 trln USD, 50 % more, than in 2007 – before the world economic crisis (Figure 1).

From the date of PAX World Funds establishment in 1971 the investors base, which uses SRI methods has considerably increased. There have been groups of institu-

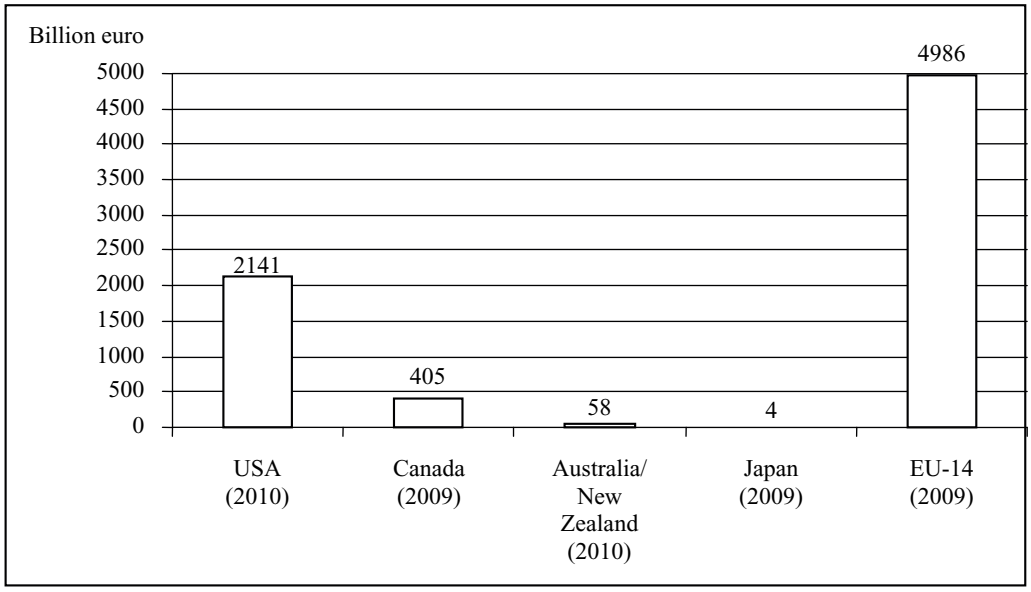

Figure 1. Volume of social responsible investments in the world

* Composed according to [12].

tional and individual investors formed in developed countries, which follow the established directions, criteria and methods of the SRI.

To the institutional investors in segment of social responsible investment belong pecuniary institutions, which invest their own funds, insurance companies and retirement funds, and also investment banks (companies), which exercise administration of legal bodies' holdings, including churches, public and education institutions.

Retirement funds appeared in the quality of SRI development catalysts. Thus, there were some changes in pension legislation made in Great Britain, and then in other countries of the EU and the USA in 2000, according to which the retirement funds were obligated to open the degree of their participation in the SRI (for example, Norwegian State Fund has to „avoid the investment, which is bound with an unacceptable risk of assisting unethical conduct, particularly the violation of the fundamental humanitarian principles, serious human right violation, corruption or essentially negative environmental impact") [9].

Individual investors in SRI segment are investment companies, which represent the interests of private persons or the private persons themselves, who are professional participants of the stock market.

The most popular form of the SRI realization for the individual investors is unit (mutual) investment funds. In 2010 there were 879 mutual SRI funds in Europe, volume of which accounted for about 75 bln. euro, in the USA – 250 mutual funds, volume of which accounted for about 316 bln. USD [15, 17]. From 2002 till 2009 the number of countries of the EU, which also put their records concerning the volume of social responsible investment into the list of necessary statistical accounting had grown: if in 2002 – it was 8 countries, then in accordance with the results of 2009 the SRI statistics of already 14 EU countries is available, besides the volume of social investment for this period had grown almost in 14,83 times (Figure 2).

There are couple forms of social programs realization, thus the popular are traditional charity and social investment or venture philanthropy. The advantages of the social responsible investment in comparison with traditional charity lie in that fact, that social investment – is a persistent interest, which expects:

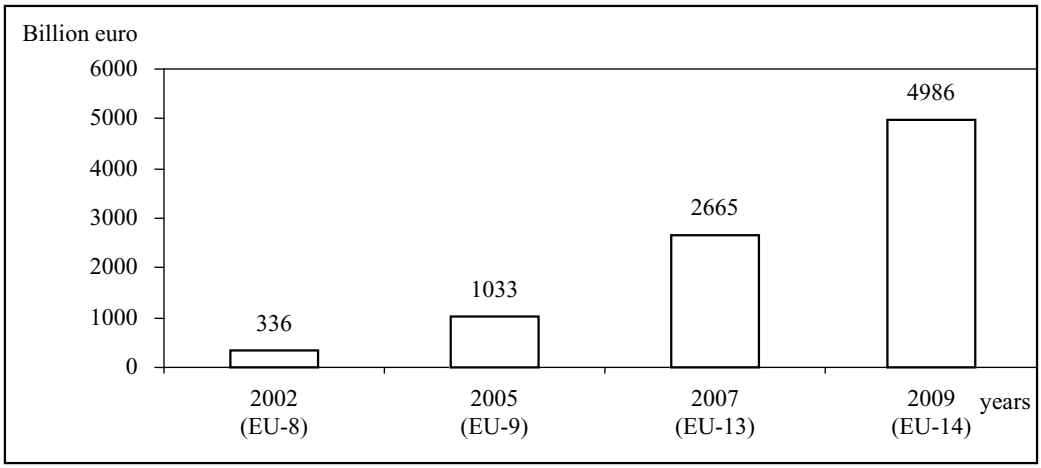

Figure 2. Volumes of social investments in EU countries

* Composed according to [12].

– main activities goals integration and social programs strategies;

– social programs realization and development strategies;

– corporation advanced initiative of social programs realization and development;

– Investment is not only monetary and in-kind aid, voluntary work and financial participation of the corporation employees, but also partners resources (government and self-governing authorities, noncommercial organizations, other companies etc.);

– the motive force is the interests of the partners taken into account granting the observance of the corporation business boon;

– the programs of social investment are stable and economic grounded just as any other business ventures;

– program package is formed on the basis of indirect investment principles, that allows to combine different community activities.

Social investment, classified according to investment objects and impact level on the corporation and society can be divided into three groups: the first group – social investment, which affects directly on the income of the corporation and indirectly – on society, the second group – is the investment which in medium- and long-term period affects directly on both corporation income and society, the third one – is the investment, which affects directly on the corporation and certain focus-groups (Table 1).

The formation of SRI portfolio is based on the same approaches, as the formation of the traditional investment portfolios, including determination of the investment policy, short- and long-term goals, tolerance and risk, and also understanding of the tasks during the process of portfolio management.

The task of the traditional portfolio management is achieving the optimal balance between risk and profit during certain period of time. During the process of the SRI portfolio management the task of social, ecological, ethical investment aspects considering, and also emitters corporate governance practices is added.

It is reasonable to divide the SRI methods into two groups: screening (selection) of the investment object and influence of the shareholders. They supplement each other, allowing to take SRI issues on different stages of investment cycle into consideration. The investment objects election takes place before paper holdings obtaining. And influence of the shareholders is used by already formed portfolio.

Basic method of the SRI is negative screening or discarding. Generally, investors

Table 1

Social investment kinds and their impact on interrelation „corporation- society“

Level of impact	Kinds of investment
Direct profit of the corporation Indirect (through commodity and services market) on the society	investment in quality goods production and quality services provision
	investment in development of production (including modern and sufficient investment in basic methods), growth of economical efficiency and competitiveness, innovation management
	investment in staff development
	investment in support and development of honest business custom; punctual and full-scale payment of the taxes and charges
Direct on the corporation and society (mainly in medium- and long-term period)	growth of the dividend yield and punctual distribution
	investment in local community development within the territory of the residence
	investment in environmental defense
	rendering of monetary, financial and other kind of aid to the authorities completing complex social tasks (poverty, unemployment) and other in extraordinary circumstances
Direct on the corporation and certain focus-groups, projects	investment in programs of corporative philanthropy and charity realization

with a foundation of ethical consideration remove emitters' paper holdings of the companies of such sectors as alcoholic products and tobacco industry, gaming and nuclear power from their portfolios.

To negative also belongs screening, based on the principles (standards), which consists in exclusion of the companies. These companies do not use systemic approach in process of SRI principles following, mentioned in the United Nations Global Compact, „the Millennium Development Goals“, basic International Progress Organization's conventions, OECD for global companies leadership. In other words they follow determined in these documents rules and standards only partly or from time to time, unsystematically [16].

From the beginning of 1990th investors began to use positive screening – the selection of the companies, which adopt an active social policy or deploy programs, which minimize their business activities impact on the environment. The most common kind of positive screening is the choice of the papers, which belong to „the best“ companies in their sector (best-in-class). This allows to guarantee portfolio diversification.

Institutional investors also use reciprocity procedure, which consists in the usage of the shareholders rights for the authority over emitters activity in SRI. The reciprocal action expects the meetings with the corporate management, voting during the general meeting of shareholders, signing shareholders' resolutions and interaction with MSM. The difference between this method and screening lies in that fact, that the reciprocal action has the influence not on the security selection, but on the emitters' behavior with formed portfolio.

The group of the companies „System Capital Management“ (SCM) is leading domestic corporation in sphere of social responsibility. In 2011 it has taken the first place in „Guards of the social responsible companies“ rating for the forth time, (held by the „Gvardia“ magazine of the „Galician Contracts“ publishing house). SCP was founded in 2000. It possesses majority share holdings of over than 100 domestic enterprises. Their staff accounts for about 130 ths. employees. The activity of the company is focused on 6 main business areas: mining and steel industry, power production, finance, telecommunications, MSM and fixes assets. The main investments volume of the SCM is concen-

trated in the industrial sector of the economics. Power, mining and smelting companies, which are the members of Metinvest and DTEK's branch holdings (the companies of SCM Group), are the main source of the Groups income. Most of the Group's employees work in particular for them, however the investments in nonindustrial economic sectors are also quite round. To provide business stable development the company took decision on further investment portfolio diversification and business development in new areas. According to the plan, parts of the postindustrial directions – financial, telecommunication, media, fixed assets are to be brought from current 10 % to 30 % till 2015. The main consolidated finance indicators of the SCM are presented in the Table 2.

Table 2

Dynamics of the main consolidated finance indicators of the SCM

Index, bln. UAH	2005	2006	2007	2008	2009	Growth rate, in % of previous year			
						2006	2007	2008	2009
Assets	36,54	57,43	100,51	91,28	148,31	157,18	175,02	90,82	162,48
Gross revenue	28,57	33,93	48,29	80,72	65,21	118,75	142,33	167,15	80,79
Profit	3,39	5,32	8,81	15,15	5,06	156,93	165,72	171,92	33,40
Profits and other taxes expenses	1,49	1,76	1,91	4,07	5,23	117,91	108,60	212,40	128,50

* Composed according to [3–6].

From 2005 the management of the company began business restructurisation with the aim of clear, obvious and effective corporate governance structure creation, which must suit the world standards. They also created supervisory boards for all branch holding, and special-purpose organizations by it (for example, social responsibility, auditing, assignment and compensation, strategy and investment committees), likewise internal auditing and risk management. The company understands the stable development as a necessity of not only developing independently, but also building up relations with participants of social processes, considering their interests. Local expert evaluation was held in the SCM and essential stakeholders membership was determined. It includes: work collectives of the firms, territorial communities, local authorities of the companies Group regions, state government bodies, MSM. Relative to these groups, the SCM undertook following obligations:

– determination and understanding of their activity's social aspects, the same as convictions and interests of the stakeholders;

– consideration and reaction to stakeholders' needs;

– reporting about the decisions, internal and external activities of the company to the stakeholders.

The SCM and companies of the Group determine themselves as social responsible business, which strives for contribution to construction of strong and successful Ukraine – equal in rights member of world community. The SCM proclaimed following SRC directions: responsibility for the employees, environmental defense, local communities development, social investment, sponsorship and charity. From 2005 the company publishes social responsible reports, from 2007 they are made according to GRI standard (21 indexes of social activity effectiveness is being used) Priority guidelines of the company's social investment are: investment in operations area development, labour and industrial safety, environmental defense, targeted assistance (Table 3). According to social investment volume, investment in environmental defense is on the first place. It's primarily caused because of Group's branch structure main activities (mining and processing industry, production and distribution of the electric power, gas and water). Investment in labour and industrial safety are on the second place (Table 4).

Table 3

SCM investment in different areas of the SRC

(mln. UAH)

Index	2005	2006	2007	2008	2009
Investment in development of the operations areas	115,06	92,43[2]	33,64	55,05	50,5
Investment in labour and industrial safety	54,00[1]	250,70	281,50	572,20	490,40
Investment in environmental defense	73,00[3]	767,57	997,10	1704,00	1527,00
Sponsorship and charity	14,84	14,00	1,83[4]	1,17[4]	d/v[4]
Other social investment	14,84	24,61	38,88[4]	64,31[4]	26,90[5]
Social investments, total	271,7424	1149,299	1352,96	2396,74	2094,8

*Composed according to [3–6].

Notes:

[1] – the presented in SCM report data concerns only two company's enterprises (Kryvyi Rih Southern Mining and Enrichment Combine and „Azovstal" iron & steel works);

[2] – the presented data concerns only three biggest company's enterprises;

[3] – the presented data concerns only one company's enterprise („Yenakiieve" iron & steel works);

[4] – for the purpose of data comparability and in view of foundation in 2007 „Ukraine Development" fund with such areas of activity: sponsorship, charity, patronship, targeted assistance, this kind of social responsible investment was excluded from genereal SRC report. The Fund's volume of investment during 2007–2009 in previously mentioned directions was about 70 % of total social investment value, noted in the table;

[5] – investment in personnel training and development.

The special feature of the Group's approach to SRC is that targeted assistance from 2007 has been considered as separated kind of social responsibility, individual project and Group's fund [5].

The Group respects the right of its employees to found and to join trade unions and other communities in order to represent their labour and socioeconomic rights and interests. It also forms long-term partnership with trade unions, employees, pensioners, retired workers and other persons involved. Protection of the employees' labour law and their professional bodies, employment terms improvement, and social protection coverage are regulated by collective agreement, concluded in all enterprises of the SRC Group.

Table 4

Dynamics and structure of all main social investment kinds of SRC Group

Index	Structure, %					Growth rate in comparison with previous year, %			
	2005	2006	2007	2008	2009	2006	2007	2008	2009
Investment in development of the operations areas	42,34	8,04	2,49	2,30	2,41	80,33	36,40	163,64	91,73
Investment in labour and industrial safety	19,87	21,81	20,81	23,87	23,41	464,26	112,29	203,27	85,70
Investment in environmental defense	26,86	66,79	73,70	71,10	72,89	1051,46	129,90	170,89	89,61
Sponsorship and charity	5,46	1,22	0,14	0,05	0	94,34	13,05	63,83	0
Other social investment	5,46	2,14	2,87	2,68	1,28	165,81	158,03	165,39	41,83
Social investments, total	100	100	100	100	100	422,94	117,72	177,15	87,40

*Composed according to [3–6].

Objective and subjective problems of social investment are related with institutional reasons both external for the corporation (the public is not yet ready for an adequate perception of such kind of information, and the state tries to use it in their interests. Experts, partners and investors need it only occasionally, that's why the management of the corporation mainly discloses only general information about social responsible investing, without going into „risky" for their work details of the relevant financial flows processes. These disadvantages are associated primarily with the imperfection of the existing collaboration model between business, society and state) and internal (lack of common social investment idea and SRI, combination of social investment and expenses, associated with main activity; mainly unsystematic approach to social responsible investment as a result of differences in goals, facing different centers of corporation's power; the presence of different, sometimes conflicting, accountancy requirement of internal and external programs; the lack of generally accepted standards of domestic companies' public social reporting, etc.)

On the other hand, modern business environment forms principles, which stimulate corporations to arrange and disclose information about social investment, among which: urgent need for disclosure of business problems to find common solution, formation of a positive image of corporations and loyal public opinion, achievement of high degree of transparency of the corporation with a view of further entering international stock markets and cooperation with foreign partners, investors, experts, and expansion of activities etc.

One of the main reasons, which prevents degree of transparency increase in sphere of social responsible investment is presence of potential conflicts [2; 7; 8; 10], which can take place after social investment information disclosure. The conflicts can come up between such stakeholders' groups: managers and investors, producers and consumers; corporation and tax authorities, employees of the corporation and population with low income; corporation, government and society; recipients and distributors of social investments (including senior executives and employees of corporations; distributors and recipients of social investments, a group of social investment recipients).

There is a number of possible ways in resolving this conflict, which are successfully used in business environment, including:

– establishment on noncommercial funds with social tasks at majority stakeholders' cost (for example „System Capital Management" group of companies with its „Ukraine Development" fund);

– board of trustees foundation with broad participation of the public and experts;

– formation of the constructive partnerships with state in order to establish effective standards and social duties discharging control by all market entity.

As for directions and measures of state stimulation by SRC and social responsible investment it is reasonable to offer them divided into short-term (till 2012), medium-term (till 2017) and long-term (till 2020), Table 5.

Conclusions. Thus, social responsible investment as SRC's instrument, by means of its regularity, consistency and close link with main activity of the corporation allows to increase benefits for society and for itself, unlike spontaneous manifestation of sponsorship and charity.

Economical effect from social responsible investment is growing with high level of corporation communicative activity, which is directed to explanation of this activity aspect. Nevertheless, only little number of corporations displays high level of transparency in this question today. The main reasons for that are the absence of institutional premises, different stakeholders groups conflicts of interests. Both active ideas about SRC promotion and social responsible investment, and effective strategies of stakeholders relationship management are required in order to solve this problem.

Table 5

Measures of state SRC stimulation

Directions/ measures	Short-term 2011–2012	Medium-term till 2017	Long-term till 2020
Directions	**Upgrade of mechanisms of charity tax concession**	**Increase of social responsible investment appeal**	**Development of National Program SRC stimulation**
Measures	Simplification of VAT procedure calculation in charity area	Expansion in the quantity and weightage of social advertising	Adoption of the best SRC world practice
	Adoption of the law on the decrease of the tax base by the charity expenses volume	Cooperation with MSM to publish SRC's programs (partial publication quota transfer, antitrust legislation correction)	Inspection and agreement of measures of the stimulation, determination of upgrading directions
Directions	**Informational partnership and SRC transparency growth**	**Legal regulations improvement**	**Development of the co-financing with business project**
Measures	Establishment of the best practices competition and SRC programs, rating publishing	Inclusion SRC in necessary requirements for participation in privatization and tender competitions, capital investment projects etc.	Development and adoption of the social partnership projects between state, business, local community of environmental defense financing, local community in operations areas development
	Conduction of conferences together with business and communities	Establishment of determination and formalization of parties rights and obligations necessity (employer and work collective, employees) in internal corporate papers (statute, collective and employment agreement, contract)	

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THE USAGE OF „MACD" INDICATOR TO MANAGE THE PROCESS OF INVESTING IN INTERNATIONAL FINANCIAL MARKETS

The article summarizes basic facts about the Moving Average Convergence-Divergence indicator and peculiarities of its application in practice. Much attention is paid to comparing the MACD of the different time periods and the indicator's divergences with the price charts. An indicator's application model for raising investment efficiency on the international financial markets is proposed.

Key words: Moving Average Convergence-Divergence indicator, time periods, market trend, divergences, international financial markets, efficiency of investment.

В статье подытожены основные сведения об индикаторе схождения-расхождения скользящих средних, рассмотрены особенности его применения в практической деятельности. Большое внимание уделено сопоставлению сигналов MACD различных временных периодов и дивергенциям индикатора с ценовыми графиками. Предложена модель применения индикатора для повышения эффективности инвестирования на международных финансовых рынках.

Ключевые слова: индикатор MACD, временне периоды, рыночная тенденція, расхождения, международные финансовые рынки, эффективность инвестирования.

У статті підсумовано основні відомості про індикатор сходження-розходження ковзних середніх, розглянуто особливості його застосування у практичній діяльності. Велику увагу приділено зпівставленню сигналів MACD різних часових періодів

[32] I am very grateful to **Ms. Olga Didenko**, the student of University of applied sciences (Mittweida, Germany) for the great technical assistance provided to me during the preparation of this paperwork.

та дивергенціям індикатора з ціновими графіками. Запропоновано модель застосування індикатора для підвищення ефективності інвестування на міжнародних фінансових ринках.

Ключові слова: індикатор MACD, часові періоди, ринкова тенденція, розбіжності, міжнародні фінансові ринки, ефективність інвестування.

Background. MACD indicator (Moving Average Convergence-Divergence) is one of the most commonly used technical analysis indicators. As is known, the author of this tool is Gerald Appel, who proposed the following formula for its calculation:

$$MACD = EMA_{12} - EMA_{26}, \quad (1)$$

where EMA_{12} and EMA_{26} are 12 and 26-period exponential moving averages respectively [1, p. 287].

So, the MACD indicator is the difference between values of the short-term exponential moving average (EMA_{12}) and long-term exponential moving average (EMA_{26}); and the calculated values of the indicator (the indicator line) fluctuate around a central, zero line, reflecting the dominant trend in the market. Within the bullish market trend short-term averages will increase faster than the long-term ones, and thereafter, the indicator line will be situated in the positive territory, that is, higher than the zero-line. When the market declines or trends down, the short-term moving averages will tend to stabilization, gradually falling below the long-term moving averages. Thus, the MACD indicator line moves in the negative territory, that is, below the zero-line.

The crossover of MACD line with signal line are used the most often with forecast objectives. Sell signals are generated when the MACD falls through the signal line, and correspondingly buy signals when MACD crosses from down to up-side over the signal line and rises up through it [2, p. 253].

Latest research analysis. The papers of John J. Murphy [2], Steven B. Achelis [3], Jack D. Schwager [4], Michael N. Kahn [5], B. Babcock [6], Y. Zhvakoliyuk [7] and others are devoted to the investigation of this aspect.

However, there exist data derived from numerous systems tests, which are based on MACD [8, p. 147–149; 9, p. 146, 151], showing that the MACD crossovers by themselves are not significant, until they occur in combination with other signals, for example the divergences of MACD. As the best, the trade based only on the crossover signals will be break-even, but not profitable. Thus, while testing a system based only on the MACD and signal line crossovers, and investing in the exchange-traded fund ***SPDR Trust*** (SPY) in the period from 15.04.1993 till 03.08.2004 a profit of 92,9 % was achieved. 79 complete transactions were conducted during that period. In the same period the simple system „buy-and-hold“, where the position was opened in April 1993 and closed in August 2004, would have brought a profit of 151,10 % [9, p. 146, 151].

The transaction costs were not taken into account during the tests. If they had been taken into account, the investment based only on crossovers, would have brought an even smaller profit with 79 complete transactions (and in fact, with 158 transactions). Thus, it is obvious that the investment system, based only on the crossovers of the MACD line and signal line is not effective.

It is believed that the trade decisions are best to be made when several signals are appearing at the same time and trading only in the direction of dominating trend.

The aim of this article is to study the peculiarities of the MACD indicator using for raising the efficiency of investing in international stock market.

Summary of the study. Dominant market trend can be identified using MACD of higher time periods to confirm the short-term trend. Some researchers of the MACD indicator properties are convinced that this indicator should be used primarily as an indicator of trends [10, p. 183]. So, to confirm the day-charts, for example, the weekly or monthly MACD can be used. Herewith it should be traded according to the short-term

signals only in the direction determined by the longer period MACD. Thus, the short-term buys are more likely to bring profits in case if the long-terms tendencies are indicating the uptrends.

Figures 1 and 2 show the stock prices charts of the ***Analog Devices Inc. company*** (ADI) and the corresponding to them MACD indicators. The charts are calculated in the different time scales.

The Figure 1 represents a graph calculated in the day-period, the Figure 2 – in a week-period. For the visibility the certain area was shaded in Figure 2.

That area is corresponding to the time-period covered by the whole charts of Figure 1 (the period from first decade of August 2010 to the first decade of February 2011). Both figures were constructed using the technical capabilities of the Internet site http://www. http://bigcharts.marketwatch.com [11].

As it is evident from the Figure 1, in case of using for investing only the system that based on the MACD crossovers with its signal line, then at least 9 trading transactions should have been made (bold points on the graph). Herein, the transactions in October, November 2010 and in February 2011 would have led to losses, because the buy-signals were formed at higher price levels than those, where the sell-signals appeared. That is, it would be necessary to buy at higher prices, than sells was made several days before.

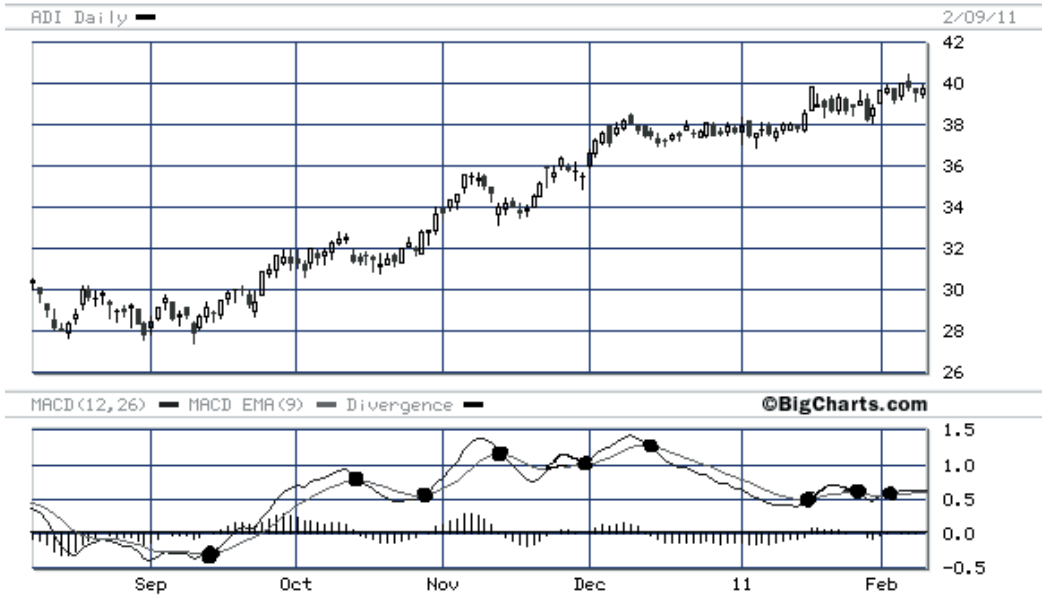

Figure 1. Daily price chart of the Analog Devices Inc. (ADI) and MACD indicator chart for the period from August 2010 to early February 2011. The bold points on the graph mark signals for conducting the possible trading operations, that based only on the indicator and signal lines crossovers

If we consider the Figure 2 together with the Figure 1, the trade transactions plan will change significantly.

The Figure 2 shows the price chart of the same company Analog Devices Inc., but the one constructed in the weekly time interval, that is in the time period of a higher scale, than the chart on Figure 1. If we follow the rule, that trading transactions should be conducted according to the short-term signals and only in the direction, marked by the long-term MACD, the number of tradings will reduce from 9 to 1. On the MACD indicator chart in the shaded area of the Figure 2 there is only one buy-signal formed in the

mid-September 2010. This signal completely corresponds to the buy-signal, marked on the Figure 1 (also mid-September 2010). This is the only trade transaction signal that can be seen on the Figure 2.

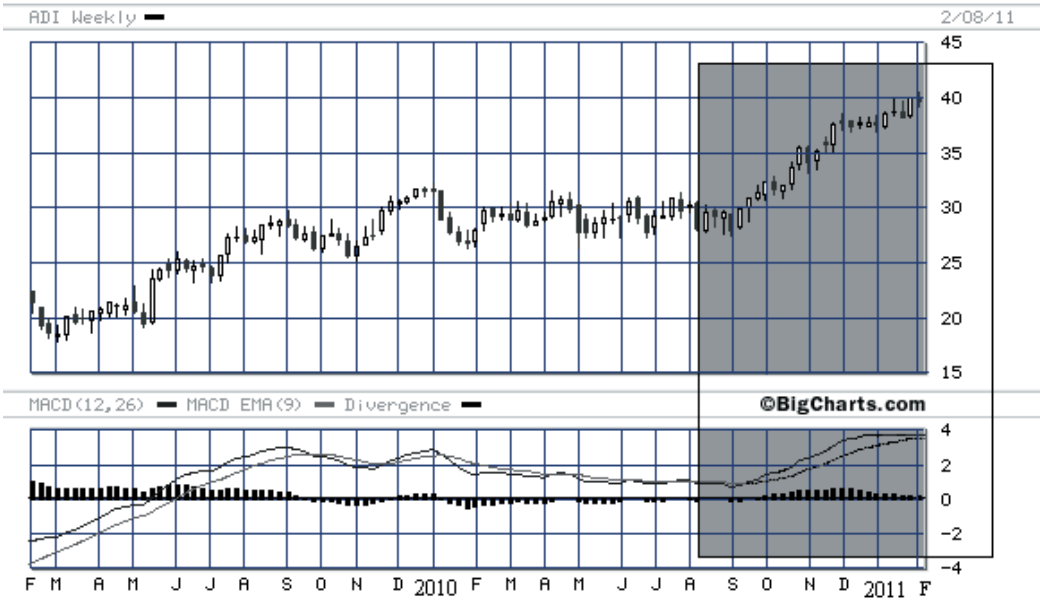

Figure 2. Weekly chart of the Analog Devices Inc. (ADI) and MACD indicator chart. The shaded area on the chart corresponds to the time period covered by the daily price chart, shown in the Fig. 1, that is, from August 2010 to early February 2011

As clearly seen on the chart, no crossovers of the MACD indicator with its signal line have been noticed thereafter: from the second half of September 2010 to early February 2011. At times the lines moved away from each other considerably (November, December 2010), sometimes converged to a very small distance and moved in parallel (late December – early February 2011), but never crossed. That is, as far as no sell-signal was fixed, it means that the uptrend is leading on the market and it is expedient to follow only the buy-signals on the daily chart. In the given example there are two options possible. The first is, opening a long position in the middle of September 2010 and not taking any actions furthermore. The second option is opening a position in the mid-September and buying every time, when the corresponding signal is registered on the daily chart, that is, in the late October, in the first trading-day of December 2010, in the mid-January and in early February 2011 (Fig. 1). That is, to make 1 or 5 trading transactions, but not 9 as is shown on the Figure 1. And in this case there will be no loss-making transactions.

It is also possible to determine the leading market trend the other way. Thus, the presence or absence of a trend can be measured by the ADX of Wilder (Average Directional Movement Index). One may for example use the 18-day ADX, and if the ADX is rising, the trend is strong enough and MACD-signals-following system will show a good performance. If the ADX is falling, that means that the market lacks the necessary strength and the MACD trade methods, based only on crossovers, will obviously be working not so effectively [8, p. 150, 151].

The main trend can be defined in an even more simple way, for example, using moving averages and receiving MACD signals only in the direction of trend, determined in this way. The type of the moving average (simple, exponential, weighted etc.) and its

calculation period are not very important in this case. It is necessary to determine the investment period (short, long or middle term) and depending on that, to choose the calculation period of the moving average. So, for the middle-term investments investors usually choose the 50-day simple moving average. The leading market trend can be considered as rising or horizontal if the 50-day simple moving average is either rising or is showing a horizontal movement. But if the 50-day simple moving average is falling, it is considered to be the evidence of the downtrend leading in the market.

As already mentioned above, the trading method based on the MACD-signals will show a better performance in combination with other signals, in particular those of divergence. As is known, the divergences itself are a very effective form of the most technical studies and MACD as well. As with any divergences, it is better not to run before the hounds, but to wait until the position-opening, when the divergence will be completely formed.

It is considered that a negative divergence takes place, when the price graph of the asset reaches its new maximum, and the indicator graph fails to reach the level of the preceding peak. The positive divergence occurs in the opposite case, i. e. when the price graph of the asset falls down to the new minimum at the time when the indicator chart does not reach any new minimum values. So, the divergence appearance indicates the high probability of market reversal [12; 13, p. 360, 391–395].

Figure 3, which was also created using the technical capabilities of the Internet site http://www.bigcharts.marketwatch.com [11], shows the formed negative and positive divergences on the graph of Euro/US Dollar currency pair.

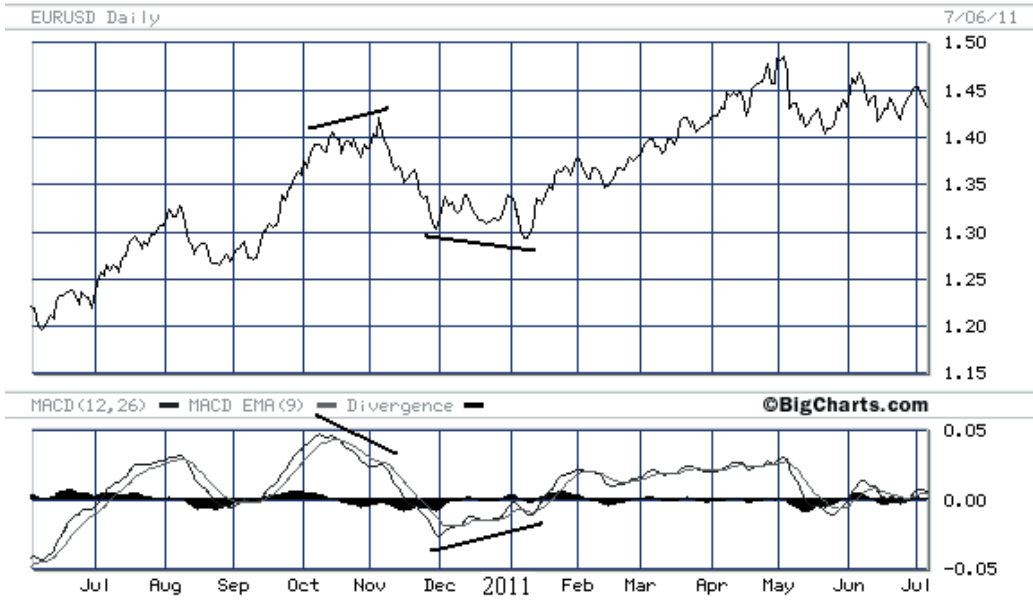

Figure 3. Divergence between market dynamics and the MACD indicator on the example of the price movement of the „Euro/US Dollar“ currency Pair in the period from 02.06.2010 to 06.07.2011. Divergences are marked by the inclined segments

The Euro/US Dollar exchange rate reached its new maximum in the first half of October 2010 (1,4–1,41). The MACD indicator, which is also an index of market movement, confirmed this maximum with its own next maximum formation. Then, after a short small correction and horizontal movement, the currency Pair reached the new maximum (1,425) in early November 2010. But this maximum was not confirmed by the

MACD indicator chart, which did not manage to reach its new high as the currency Pair did. This inability of MACD to confirm the new price high meant a negative divergence of „A" class, predicting a significant market correction, which as clearly shown in the Figure, happened in November 2010 and made almost 9 % down, and that is a significant value for the exchange rate fluctuations.

The correction, as it clearly seen on the graph, came to an end in the late November 2010, reaching its local minimum (1,3), whereupon the rate increased slightly and fluctuated at the level of 1,32–1,34 during one month. In the first decade of January 2011 the euro exchange rate sank to a deeper minimum (1,28), but the MACD indicator graph did not reach its new low, thus forming a positive divergence of „A"-class with the price graph, i. e. forming the signal preceding the possible market reverse. As it can be seen on the chart, such reverse started immediately after the price minimum range in the first decade of January 2011 marked out. Within three weeks the euro-US dollar exchange rate rose by almost 8 %, and by early May of 2011 reached 1,47–1,48, i. e. increased by 15 % (!) comparing to the levels of the early January 2011.

Thus, as follows from the written above, when using the MACD indicator it is necessary to take into account all the peculiarities of its application. Otherwise the investment can be ineffective. That is why, the investment decision concerning opening of a new long position can be made, if the following conditions are met:

1. The trend must be defined by 50-day simple moving average. If the measured trend is rising or neutral, it is possible to start exploring the following condition.

2. The market of the studied asset should be checked for the presence of the positive divergences between the price chart and the MACD indicator line. The positive divergences increase the probability of the investment profitability.

3. It is necessary to measure the prevailing market trend by using MACD of the higher time periods for confirming the short-term trend. Thus, when operating within a day-scale, it is necessary to check the chart in a week-scale as well. If the MACD on the weekly chart is clearly upward, then it is also possible to follow the signals for opening the long positions on the day-chart.

4. Only after fulfilling of all the conditions mentioned above, the crossing by MACD indicator of its signal line bottom-up can be detect as a buy-signal and a long position can be opened.

In order to close the position and to maximize the profits the following conditions must be met:

1. The asset market must have an upward trend, which should be defined by means of the 50-day simple moving average.

2. When the first downward crossover of the MACD indicator and its signal line is happened it is necessary to check the presence of negative divergences between the price chart and the indicator chart. If divergences exist, the position can be closed. If there are no divergences, the fulfillment of the third condition is required.

3. If there are no divergences, and price chart and the MACD move unidirectional, whereas prices are higher than the 50-day simple moving average, then the first signal appearing with the crossover of MACD and its buy-signal line (i. 2) may be ignored. However, with the appearance of such second signal the position should be closed.

4. If the steady trends moving in a narrow channel are to be seen on the market, the MACD indicator may not always generate clear signals. In such situation the top-down crossover of the price chart and 50-day moving average can be accepted as a sell-signal.

The mentioned rules for opening and closing a position are illustrated on the Figures 4 and 5.

As seen from the chart on the Figure 4, the favorable conditions for opening a long position on the Coca-Cola Co (KO) were formed in the early July 2010. Firstly, the

50-day simple moving average stopped declining and started moving horizontally from the first days of July. Secondly, in the late June – early July the positive divergence between the price chart and MACD indicator chart was formed (this divergence is marked with two inclined segments on the Figure 4). The first minimum was formed in the late May, and the second and the deeper asset price minimum finished its formation in the first days of July 2010.

Besides, at the same time a bottom-up crossover of MACD indicator and its signal line is seen on the chart constructed in a weekly scale (in this case – of the higher time period), that is, a buy-signal was registered (Fig. 5).

Finally, a bottom-up crossover of MACD indicator and its signal line is also to be seen on the daily chart. Thus, all the conditions that are necessary for the long position opening were met, and the position can be opened at the moment, marked by a vertical arrow on the Fig. 4.

Figure 4. The day price chart of the Coca-Cola CO (KO) and MACD indicator chart from May 2010 to the 10th February 2011. The divergence between price chart and MACD indicator is marked by the two inclined segments. The arrow indicates the moment of opening the position

About a month later, in the first half of August 2010 a downward crossover of the MACD indicator and its signal line was recorded, which was a sell-signal. At this, no negative divergence was formed and the prices did not fall below their 50-day simple moving average. Therefore, this sell-signal can be ignored. Furthermore, as the prices rose, the indicator lines interlaced and stopped showing more or less clear signals. In such conditions it is impossible to record a clear signal for the position closing. In addition, on the weekly chart (Fig. 5) it can be clearly seen that during the whole time from the position opening in early June 2010 to the end of December the MACD indicator and signal line are moving in parallel, with a considerable distance between them. That also means an upward trend, and therefore, it is not advisable to close the position in these conditions.

The first clear sell-signal appeared only in the end of December 2010. As it seen in Figure 4, a negative divergence between the price chart and MACD indicator had been recorded up to that time as well. These conditions are sufficient for the position closing. Thus, the position can be closed in the end of December 2010.

If we look at the weekly chart (Fig. 5), it can be clearly seen that no MACD-signal line crossover, that is no sell-condition has been recorded up to the end of December. This crossover occurred only in the early January 2011. Besides, the prices started falling sharply at this time and crossed their 50-day simple moving average.

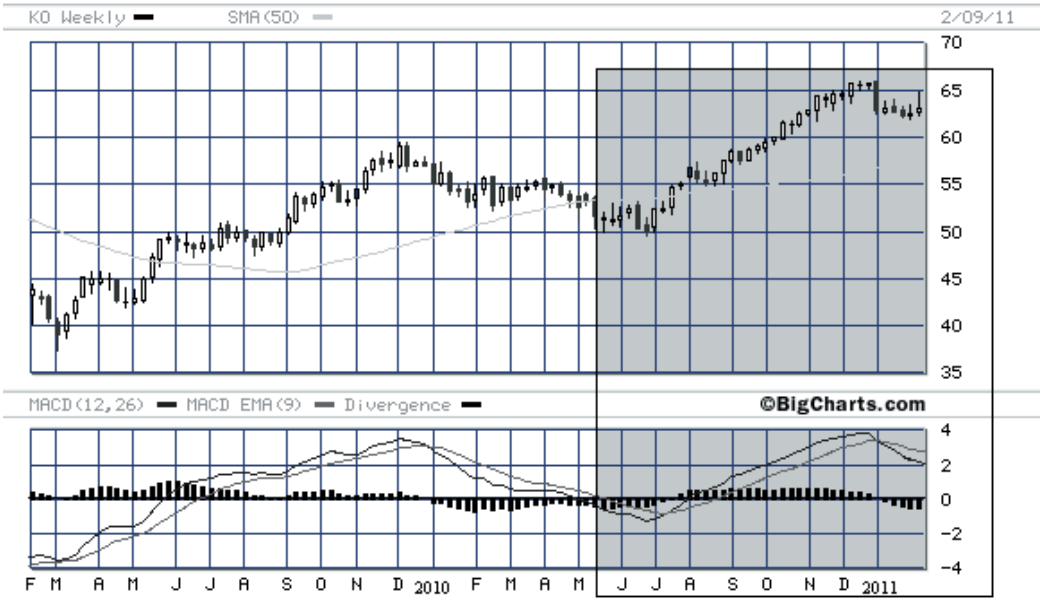

Figure 5. Weekly price chart of the Coca-Cola Co (KO) and MACD indicator chart. The shaded area on the chart corresponds to the time period, covered by the daily price chart on the Fig. 4, that is, from middle-May 2010 to the 10th February 2011

Thus, all the conditions were technically met only in early January. But as clearly seen on the chart, the both sells were profitable enough. The one in December was slightly more profitable (the position could be closed at price of 65–65,5 USD), and the sell in January – slightly less profitable (63–63,5 USD). In this case, everything would depend on a chosen strategy and profit taking.

Summary:

1. The trade systems, based only on the MACD and signal line crossovers are not effective. Therefore, additional signals, conditions or limitations should be introduced in such systems.

2. It is expedient to use the MACD indicator for determination of the prevailing market trends. The MACD indicator of the higher time periods should be used for that purpose.

3. The divergences between price dynamics and MACD indicator line generate exact signals concerning the further market movement direction.

4. Effectiveness of the trade systems using MACD indicator and based on its crossovers with the signal line can be considerably improved by introducing limitation on signals registration. The crossover signal can be recorded just in that case if it signals a transaction made only within a trend, marked by the MACD indicator of the higher time periods.

5. When using the MACD indicator in trade systems, indicators of the following technical analysis tools should be considered: 50-day simple moving average, divergences between price dynamics and MACD indicator line and MACD of higher time periods.

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