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TAX INCENTIVES FOR R&D OF LARGE COMPANIES: EMPIRICAL ANALYSIS ON CROATIA

The paper provides empirical insights about the existing practice and the effects of using tax incentives for R&D in Croatia's large companies. In order to determine the current situation and analyze the effects from applying tax incentives for R&D, a survey was developed. The research methodology includes descriptive methods of statistical analysis of the data from the survey conducted in 85 Croatian large companies.

Keywords: tax incentives; research and development; Croatia; large companies.

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ПОДАТКОВІ ПРЕФЕРЕНЦІЇ ДЛЯ НАУКОВИХ РОЗРОБОК ВЕЛИКИХ ПІДПРИЄМСТВ: ЗА ДАНИМИ ХОРВАТІЇ

У статті емпірично досліджено актуальну ситуацію з податковими преференціями у Хорватії та її вплив на стан наукових розробок великих підприємств країни. Розроблено опитування, в якому взяли участь 85 великих хорватських підприємств. Результати опитування було піддано статистичному аналізу.

Ключові слова: податкові преференції; наукові розробки; Хорватія; великі підприємства.

Табл. 3. Літ. 26.

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НАЛОГОВЫЕ ПРЕФЕРЕНЦИИ ДЛЯ НАУЧНЫХ РАЗРАБОТОК БОЛЬШИХ ПРЕДПРИЯТИЙ: ПО ДАННЫМ ХОРВАТИИ

В статье эмпирически исследована актуальная ситуация с налоговыми преференциями в Хорватии и её влияние на состояние научных разработок больших предприятий страны. Разработан опрос, в котором приняли участие 85 больших хорватских предприятий. Результаты опроса были подвергнуты статистическому анализу.

Ключевые слова: налоговые преференции; научные разработки; Хорватия; большие предприятия.

Introduction. Globalization and new technologies pose new challenges for the economy of the 21st century. New systemic approaches and understanding of innovation processes encourage greater competitiveness of companies. EU Member States use fiscal policies and fiscal support measures in encouraging R&D to achieve objectives in terms of growth, productivity and competitiveness. Investments in R&D are extremely important to countries which, like Croatia, face transition and privatization problems. They enable these countries create a national research market characterized by high level of competitiveness and research excellence. Compared to some other EU Members, Croatia is still lagging behind in terms of investments in R&D. This is in part due to inadequate funds being allocated by business to R&D as well as due to unclear role of industrial policies in economic growth; to some extent it can also be explained by poor relationships between scientific sector and companies and low rate of investments in higher education. R&D activities are an important factor when it comes to increasing economic efficiency and long-term economic growth. One of the reasons why policy makers make huge efforts to stimulate R&D expenditures of companies is to improve standards of living for citizens.

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The paramount importance of tax incentives for R&D depends on economic policy of a particular state. States tend to use more resources to stimulate R&D in the hope to encourage economic growth. These measures include cooperation of public research centers and private sector, direct budget financing and tax incentives. Using tax incentives for R&D enables the state to control strategic objectives and influence the direction in which companies develop. Fiscal measures provide an opportunity to determine the degree and the category of investment. Most OECD countries nowadays use a combination of tax incentives and direct subsidies for R&D (OECD 2010, 2012, 2014). The European Commission is focusing more on tax incentives for R&D than in the previous years, trying to increase their efficiency and coherence. More developed economies use both direct and indirect incentives for R&D. Contribution of R&D depends, inter alia, on the growth of productivity, economic efficiency and achieving social justice. Different national factors determine countries' preferences regarding tax incentives, subsidies, preferential rights or other instruments encouraging research. According to the European Commission (EC, 2014: 5), "interest in the effectiveness of tax incentives for research and development has spurred in the aftermath of the financial crisis – and for two different reasons. First, the financial crisis obliged many governments to introduce tough fiscal consolidation measures. This has increased the urgency to balance expenditure on innovation policy against expenditure on other policies. Another reason is that the drop in economic activity put even more emphasis on the need to find new sources of growth".

The aim of this paper is to present the existing practice and analyze the effects of using tax incentives for R&D in Croatia's large companies. The paper is structured in the following way. The first chapter introduces understanding and conceptualization of tax incentives as well as support measures for stimulation and acceleration of certain activities in the public interest. The chapter also discusses the evolution of tax incentives in different socioeconomic environments. The second chapter reviews literature on R&D tax incentives. Chapter three presents the methodology. Chapter four, Data and Results, presents the empirical study on the perception and understanding of tax incentives as government fiscal support measures for R&D (in the conceptual sense), conducted on a sample of Croatian companies. The paper concludes with recommendations and improvements supporting R&D in the business sector of Croatia.

Literature review. Fiscal incentives to stimulate business R&D have emerged as a policy tool over the past decade. This chapter reviews taxation literature to assess the state of knowledge about tax incentives for R&D, as well as the use of tax incentives to increase private investment in R&D and innovations. According to K.J. McKenzie (2008: 565) "tax treatment of R&D is often quite complex and substantially across jurisdictions". "Companies invest in research and development (R&D) in order to lower their costs of production or to develop new products, thereby enhancing productivity and boosting economic growth" (Dahlby, 2005: 45).

For R. Griffith et al. (1995: 22) "tax incentives are only one way of how the government can affect the amount of R&D undertaken and its economic impact. As they see it, there are solid reasons to subsidize R&D. More domestic R&D could also generate employment and higher wages. These benefits are likely to affect skilled workers disproportionately. Skilled workers are generally in short supply, and it is

doubtful whether increasing their demand through increased R&D is desirable without first addressing the apparent failures in the training and education systems".

B.H. Hall (2002: 63) considers that, "from an investment theory point of view, research and development have numerous features that differentiate them from ordinary investments. The first and most important feature is the fact that, in practice, 50% or more of research and development costs is spent on remuneration and salaries of highly educated scientists and engineers. Their effort and work within a company creates knowledge-based intangible assets from which the company will profit in the future. The second feature is the fact that research and development carry a certain degree of insecurity in relation to the provision of new products/services".

Studies conducted by (Bloom et al., 2002; Griffith et al., 2001) showed that tax incentives for R&D cause an increase in corporate expenditures by an amount equal to or even greater than foreseen fiscal revenues, thereby creating long-term benefits for the economy.

A. Klemm (2010: 315) considers that tax incentives are defined as measures which expressly provide favourable tax treatment for certain activities or sectors". R. Baghana and P. Mohnen (2009: 91) maintain that, "in terms of types of companies and financed projects, tax incentives are more neutral than direct support measures for research and development, i.e. subsidies and loan; thus they enable the private sector to determine the projects and amount of research and development to be carried out".

According to G. Hutschenreiter (2002), choosing tax incentives for R&D depends on the degree of innovation, perceived market irregularities in research and development, industrial structure, company's size and the nature of the system within a company and its country.

According to M. Falk (2006: 534) "factors determining the intensity of research and development in the business sector are direct research and development incentives, tax incentives for research and development, research and development in the public sector, industrial structure, consistency of research and development, GDP per capita, openness of research and development, patent protection, investments and human capital". His research shows that tax incentives for research and development have significant positive influence on business expenditure on R&D in the OECD countries. It also revealed a notable positive link between university expenditures on research and development and expenditure of the business sector on the same. Therefore, when it comes to R&D, public and private sectors complement each other.

Research related to the use and effectiveness of tax incentives for research and development can be attributed to such authors as W.M. Cohen and D.A. Levinthal (1989), N. Bloom et al. (2002), K. Aerts and D. Czartnitzki (2004), C. Elschner et al. (2011). The studies were mostly conducted in developed multinational companies and organizations. Based on their research, C. Elschner et al. (2011) present several reasons why effectiveness of R&D tax incentives depend on the characteristics of a specific company and the taxation system in which it is embedded. Firstly, the main reason for not undertaking R&D is lack of liquidity. Thus, tax incentive should raise cash flow in the period when R&D is undertaken by reducing tax due in a specific period. Secondly, limitations of R&D tax incentives, such as maximum tax credit or allowances, have different effects depending on a company's size. Thirdly, company-

specific structure of expenditures and R&D intensity are decisive in terms of the extent to which tax incentive can be used within a given period.

Using tax incentives for R&D is a relatively new practice in Croatia. Therefore, only a few Croatian authors have thus far examined the factors that influence R&D intensity in the business sector as well as the influence of R&D tax incentives on competitiveness and innovative capabilities of companies. L. Bozic and S. Radas (2006) examine company-specific factors that impact on innovation results. They found that the most significant predictor of positive innovation effects is the market orientation index and that companies with a strong market orientation have much better effects from innovation activities. Z. Aralica et al. (2007) explore the role of R&D as a factor of innovation and growth of foreign-owned SMEs in Croatia. E. Becic and M. Dabic (2008) analyze changes of R&D in the business sector in comparison with the trends in EU-25 countries. S. Svaljek (2012) explored a number of companies' benefits from R&D tax incentives, what are the characteristics of those companies and to what extent R&D tax incentives reduced companies' tax liabilities in the period 2008–2009 in Croatia. S. Hodzic (2012) examined the importance of R&D tax incentives in the EU, with special emphasis on Croatia. S. Hodzic (2013) presented tax incentives for R&D and the calculation of B-index to compare relative importance of R&D tax support in Austria and Croatia. Z. Aralica and V. Botric (2013) analyzed the results of the existing R&D tax scheme in Croatia. They confirmed a positive effect of subsidies on R&D expenditure as well on product innovation. Evaluation of government support measures for R&D in the private sector implemented through tax incentive schemes was conducted in Croatia for the first time in 2011 under the project "Evaluation of the Tax Incentives Aimed at Stimulating R&D Projects in the Business Sector (Institute of Economics Zagreb, 2011). The project's objective then was to assess the effect of tax incentives on corporate decisions to invest or the amount of investment in R&D.

Methodology. In order to determine the current situation and analyze the effects of applying tax incentives for R&D, a survey was created for continuous system of monitoring the application of R&D tax incentives in Croatian large companies. The research was conducted in the companies of the following sectors: manufacturing; wholesale and retail trade, repair of motor vehicles and motorcycles; electricity, gas, steam and air conditioning supply; accommodation and food service activities; information and communication; agriculture, forestry and fishing; real estate activities; construction; professional, scientific and technical activities; art, entertainment and recreation; water supply, transportation and storage.

The research methodology includes statistical analyses of available national data on R&D tax incentives, based mostly on micro-data for R&D investments in Croatia's companies, and available international data; moreover, it includes a critical exploration of public policies and support measures. Bivariate statistical analysis was used to process data from the sample-based survey.

The following was included in the research:

- Analyses of the state of the art of fiscal incentives development practices as such.
- Assessment of public policy measures aimed at entrepreneurship, research and administrative capacities.

- Assessments of the expected effects from R&D projects for companies with and without an R&D department. It is also examined opinions and predictions of companies from the sample regarding "What would happen in these companies, as well as in those with no R&D department, in the event that the government abolishes tax incentives for R&D activities".

- The problems that companies face when applying for R&D tax incentives.
- The degree of impact on the efficiency of R&D investments.

Data and results. The survey was conducted in 85 large companies performing R&D activities in the period 2008–2012. A similar analysis was carried out by (Aralica and Botric, 2013) who compared the datasets from the Community Innovation Survey and from the Ministry of Science, Education and Sports of the Republic of Croatia.

The results of the survey showed that majority of large companies in Croatia (57%) had no knowledge of the possibility of obtaining tax breaks for R&D (in accordance with the Rule book on State Aid for Research and Development Projects), while the other 43% were aware of it.

According to the sample results, some large companies in Croatia have a R&D department proven to be very effective in operation and utilization of tax incentives for R&D. If the state is to abolish R&D incentives the question arises as to what would happen in those companies as well as in those without such a department. The respondents were given a choice of two or more answers to this question. These answers can be seen in Table 1.

Table 1. Reaction in case of tax incentives abolishment for research and development, results of the authors' survey

Variants of reaction	% of the answers
Continue with R&D activities with the same intensity	39.30
Decrease the intensity of R&D activities	50.00
Stop undertaking R&D activities	14.30
Change economic activity as such	21.40
Move business operations to another country	7.10

Based on the survey results, 50% of the respondents' companies would reduce the intensity of R&D activities, while 39.3% would make no changes in R&D intensity. 7.1% of the respondents' companies would transfer their corporate activities to another country. Thus, it seems likely that the abolition of tax incentives for R&D would lead to a reduction in the intensity of business R&D in Croatia. Their negative reaction to the idea of tax incentives abolition suggests that companies recognize the importance of R&D. This adds strength to the argument that R&D tax incentives are effective in Croatian companies.

Reduced intensity of R&D activities over a longer period of time could lead to low productivity and inefficiency, possibly to company closures and at the macro-level – to increased unemployment and economic decline overall is the fact that the state failed to develop a monitoring system to follow-up on whether tax incentives, after being granted as fiscal instruments for encouraging R&D, affect the growth of companies and, ultimately, the economy.

"Bureaucracy and overregulation" was mentioned by 39.3% of the respondents as the main problem they face when applying for tax incentives for R&D, while 28.6% mentioned "unclear legislation and rules". Further problems included difficult access to incentives for companies (10.7%) and some other. The answers' statistics can be seen in Table 2.

Table 2. Problems when applying for R&D tax incentives, results of the authors' survey

Variable	%
Unclear legislation and rules	28.6
Difficult access to incentives for companies	10.7
Bureaucracy and overregulation	39.3
Other	21.4
TOTAL	100

As noted above, "bureaucracy and overregulation" was the most common problem faced by the responding companies when applying for tax incentives by the state. This is clearly an important obstacle to the effectiveness of tax incentives for R&D.

Certain economic and financial influences affect the effectiveness of corporate investments in research and development. The results of the analysis of these influences can be seen in Table 3.

Table 3. The degree of impact on the efficiency of R&D investments, results of the authors' survey

Variable	Arithmetic mean	Mode	Median	Standard deviation
Service and product quality	4.04	4	4	0.96
Financial stability	4.00	4	4	1.02
Flexibility, i.e. adaptability of company to market conditions	3.96	4	4	0.92
Development strategy	3.96	4	4	1.04
Reputation of the company at the market	3.79	4	4	1.07
Technology and technological processes	3.79	4	4	0.99
Quality of business contacts	3.71	4	4	0.85
Diversity of products and services offered by the company	3.71	3	4	1.01
Legislation on corporate activities	3.68	4	4	1.09
Competitive environment	3.68	4	4	0.86
Level of demand	3.57	4	4	1.10
Public infrastructure	3.32	3	3	1.09

The degree of impact on investments in R&D was evaluated on the scale from 1 to 5, with 1 for "completely irrelevant" and 5 for "extremely relevant".

The respondents' answers suggest that the quality of services and products has the greatest impact. Financial stability of the company can also have great impact. The least important impacts have the level of demand and public infrastructure.

Conclusion. The Republic of Croatia makes tax incentives for R&D available to companies, but to a much lesser extent than other EU countries. Based on the results

of the survey of large companies in Croatia regarding R&D tax incentives, generally speaking we can conclude that these incentives are effective in terms of encouraging private sector investment in R&D, increasing companies' expenditure on R&D. The abolition of R&D tax incentives would, in general, force companies reduce the intensity of research activities, but few would completely stop them. The survey showed that the fiscal instrument is still effective and that Croatian companies use it although not sufficiently. At the same time, the analysis of responses to questions related to limitations in using government incentives shows are significant obstacles for companies applying for tax incentives. It would be desirable at the government level to reduce or eliminate many of these obstacles at minimal cost by: 1) improving the information flow to the private sector on government fiscal incentive measures for promoting corporate investments in R&D; 2) reduction of bureaucratic restrictions and administrative procedures while applying for tax incentives for R&D, particularly in terms of documentation required; 3) continuously monitoring R&D tax incentives and evaluation of their effects on the government budget and companies' productivity. The implementation of the first two of these recommendations would widen the take-up of the tax incentive scheme to a greater range of Croatian companies, notably smaller, but more innovative companies and those in rapidly evolving technology-intensive sectors.

Our recommendations are the following: in addition to improving the information flow to the whole private sector, Croatian government should review the relevant legislation in order to eliminate the obstacles created by bureaucracy and overregulation in the process of applying for tax incentives for R&D, used as a means for reducing income tax base, and thus enable easier and more transparent application and effectiveness of tax incentives for R&D in all companies regardless their size, activities and location. Croatia needs to establish a monitoring system, based on the experience of other EU Member States, which would have certain parameters to follow and determine as precisely as possible the effects of these fiscal instruments on economic growth and development. Moreover, it would enable precise determination of the activities and sectors in which investments in R&D should be increased thus ensuing produced growth. Young innovative Croatian companies would be among the main beneficiaries of reforming the R&D tax incentive scheme thus further encouraging the production of new goods and services, new jobs creation and stimulation of economic growth.

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