Journal of Economics and Business Research,
ISSN: 2068 - 3537, E – ISSN (online) 2069 – 9476, ISSN – L = 2068 – 3537
Year XXII, No. 2, 2016, pp. 7-18

Taxation of Research and Development

Z. Szeles

Zsuzsanna Szeles
Faculty of Economics, Institute of Finance and Accounting
University of West Hungary

Abstract
Research and development plays an unquestionably role in terms of long-term growth. According to Eurostat, almost half of all enterprises in the EU-28 reported innovation activity (48.9%) during the period 2010-2012. Compared with the period 2008-2010, the share of innovative enterprises decreased by 3.9 percentage points. Among the EU Member States, the highest shares of innovative enterprises during the period 2010–2012 were observed in Germany (66.9 % of all enterprises), and the lowest share was recorded in Romania (20.7%).
Keywords: R&D, innovation, taxation, corporate tax

Introduction

The EU aims to encourage the use of public funds to the private sector for innovation and research activities, and to remove the obstacles that hinder the implementation and deployment of ideas. In 2020, EUR 80 billion is available in the Horizon 2020 program grant for these activity. The research, development and innovation processes play a major role in each region, and within that improve the competitiveness of companies. The Union is encouraging Member States to increase the GDP for 2020 to 3% of research and innovation. Documentation of the

R&D projects are key for the accounting and taxation, especially the activities of R&D classification, and taking into account the amount of the related costs and the composition of the tax and the tax base off with, this regulation varies according to countries.

EU funds are not accessible for all businesses. For these businesses the state support in the form of tax base and tax benefits can be an other option. For example, in Hungary, the domestic tax laws provide some opportunity for companies to bring their own field of activity performed in connection with exploration and development projects tax base reductions and, where applicable tax benefits can also participate. The three tax discounts are the following: corporate tax, local business taxes, indirect contribution to innovation.

Methodology and Purpose of the study

The main goal of the paper is to show how important is taxation of the research & development & innovation, for companies. What are the differences between countries in case of R&D expenditures and taxation systems.

The research has been conducted on the basis of the secondary data. The research and development data was available from the EUROSTAT database. The Gross domestic expenditure on R&D (GERD) provided is as a percentage of GDP. According to Eurostat (2017), research and experimental development (R&D) comprise creative work undertaken on a systematic basis, in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications.

We have chosen some countries to show the differences between R&D expenditures and taxation system.

The analytical trend is the most often used way of the trend calculation. The permanent tendency of the time series can be expressed by certain well-fitting function (Barrow 2006). In the course of fitting the function, similarly to the regression calculation, using the least square method we search for the trend best fitting to the values of the time series. So, the analytical trend is the specific function, where the differences of the square amounts between the values of the same dates in the time series and the function's own values is the least (Szucs, 2004).

$$\sum (y_i - \hat{y}_i)^2 \Rightarrow \min .$$

where:
y_i : the i^{th} power of the time series
$\hat{y}_i$: the value of the trend with the i^{th} date (i=1,…n)

The basic tendency can be expressed by a linear function if the development of the time series is steady and the rate of the time change is permanent.
The general form of the linear function:

$$\hat{\mathbf{y}} = a + bx$$

where:
$\hat{y}$: the value of the trend
x : the values of the time changes equidistant from each other
a and b: the unknown parameters of the function

According to Szucs (2004), the aim is to estimate the parameters that can be determined with the standard equations.

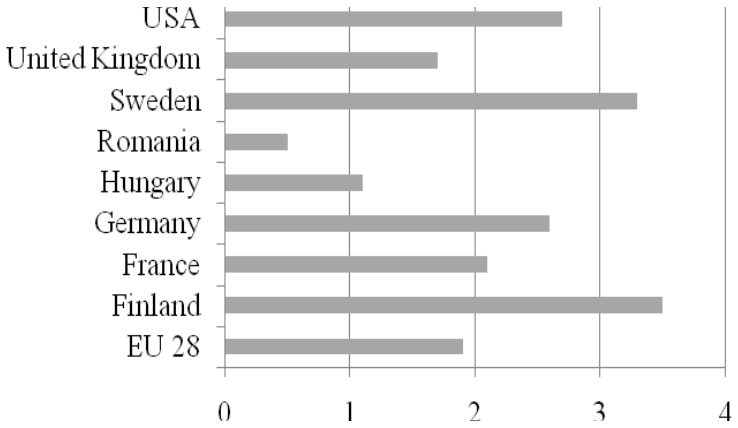
Literature review

No company can afford to rely entirely on their own ideas to advance their business anymore, and no company can restrict their innovations to a single path to market. According to Chesbourgh (2003), a new paradigm of open innovation, which can enable companies to create and profit from their ideas - and others' ideas - in today's distributed knowledge environment.

Pindado et al. (2015) opinion is that effective corporate governance allows the market to better assess a firm's R&D investments. In their research they used a single evaluation model using panel data of EU, US and Japanese companies. The findings of the research have been summarized in three main points: (1) as effectiveness of investor protection increases, the market valuation of R&D projects also increases; (2) more developed financial systems do a better job assessing R&D; (3) effective control mechanisms reinforce the positive effect of R&D on a firm's market value.

According to Vishnevskiy et al (2015), high-quality R&D is today the major driving force for economic success and progress. Rappaport (1986) argues that experts even disagree about the criteria of corporate success. The classical position accepted profit as decisive. Today, however, many consider the value of the company – the value of the owner's equity or the equity capital – and its growth to be the most important.

Fig. no. 1. R&D expenditure (expressed as a percentage of the GDP; average between 1994 and 2013)



Source: Own edition based on-Eurostat

The first figure shows the changes of R&D expenditure expressed as a percentage of the GDP in some countries between 1994 and 2013. A primary consideration in the selection of the countries involved in the study was to present the situation in Europe and compare it with US data. As the diagram shows, Finland (3.5%) and Sweden (3.3%) take the lead in terms of R&D spending. They devote the largest share of their GDP to research and development. In this respect, they surpass the United States of America, where the value under examination is 2.7%. This is much more than the average of the 28 EU Member States, which spent only 1.9% on R&D. Romania is on the last place with a ratio of 0.4%, thus it belongs to the last third of EU member states.

Investments in research and development (R&D) and innovation are central for economic growth. The global economy is not back on track. Concerns about weak future output growth and low productivity are now serious. In this light, uncovering new sources of productivity and future growth are the priority. According to Dutta et. al. (2016) more efforts are needed to return to pre-crisis R&D growth levels and to counteract an apparent R&D expenditure slowdown in 2014, which was

caused by both slower growth in emerging economies and tighter R&D budgets in high-income economies.

Table no. 1. Global innovation index 2015 and sub-indexes

	Global Innovation Index 2015 (out of 128)		Innovation Input Sub-Index		Innovation Output Sub-Index		Innovation Effenciency Ratio	
	Score 0-100 of value (hard data)	RANK	Score 0-100 of value (hard data)	RANK	Score 0-100 of value (hard data)	RANK	Score 0-100 of value (hard data)	RANK
Finland	59.9	5	51.3	10	68.5	4	0.7	32
France	54	18	45.5	19	62.6	15	0.7	44
Germany	57.9	10	54	8	61.9	18	0.9	9
Hungary	44.7	33	40.5	30	48.9	38	0.8	17
Romania	37.9	48	44.0	52	31.8	45	0.7	46
Sweden	63.6	2	58.7	2	68.5	5	0.9	10
United Kingdom	61.9	3	56.3	4	67.5	7	0.8	14
USA	61.4	4	54.1	7	68.7	3	0.8	25

Source: Own edition based on Dutta et.al. (2016)

Dutta et. al (2016) calculated different innovation indexes (Table no. 1). The Innovation Input Sub-Index score is calculated as the simple average of the scores in five pillars (Institutions, Human capital & research, Infrastructure, Market sophistication, Business sophistication), while the Innovation Output Sub-Index is calculated as the simple average of the scores in two pillars knowledge&technology outputs, creative outputs. Companies expect their innovation network to grow. Within that network, the role of customer-driven innovation, start-ups, and suppliers, as well as research institutes and academia, is especially expected to grow.

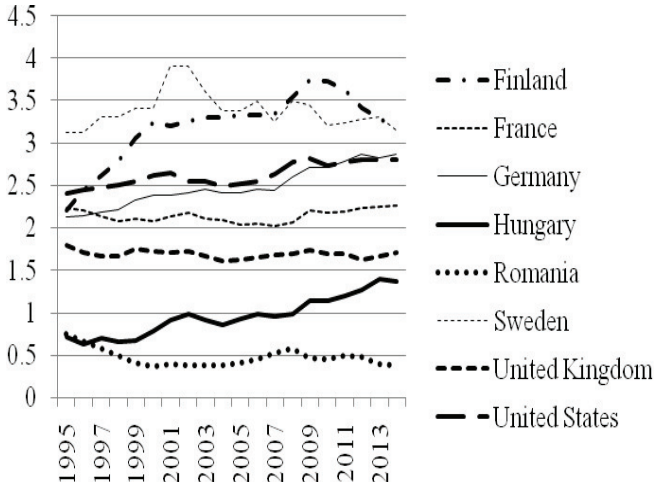
An evaluation of the data for the EU Member States also confirms that those countries with relatively high ratios of business enterprise expenditure on R&D relative to GDP — namely, Sweden (2.27 %), Austria (2.18 %), Germany (1.95 %), Finland (1.94 %) and

Denmark (1.87 %) — also reported relatively high overall R&D intensities (2.87 % or above) by Eurostat (2017). Apart from Germany, the other four of these Member States also featured at the top of the ranking of expenditure by the higher education sector, where the Netherlands and Estonia also had a relatively high ratio of R&D expenditure to GDP. Government R&D expenditure relative to GDP was highest in Germany, Luxembourg and the Czech Republic, while private non-profit sector R&D expenditure relative to GDP was very low in each of the Member States, peaking at 0.07 % in Cyprus.

Results of the study

While the first figure showed the R&D expenditure expressed as a percentage of the GDP and we just obtained a mean value, let us now see the individual values from 1995 to 2013. It is not necessary to construct the trend, as the diagram shows clearly that there are significant differences in some countries in the investigated years. The two frontrunners started from a very different point in 1995: the rate of R&D expenditure was 2.3% in Finland and 3.5% in Sweden, but this large difference disappeared by 2013 and reached 3.2% in both countries.

Fig. no. 2. R&D expenditure expressed as a percentage of the GDP (between 1995 and 2013)



Source: Eurostat

We have tried to fit a linear trend for R&D expenditure, expressed as a percentage of the GDP (shown in Figure no. 2.). The fitting of the linear trends are close in case of Hungary, Germany and USA.

The Hungarian linear trend equation is

$y = 0.0379x + 0.5638$

$R^2 = 0.9144$

The Hungarian average yearly R&D expenditure is 0.0379%.

The German linear trend equation is

$y = 0.0394x + 2.0754$

$R^2 = 0.9418$

The American linear trend equation is

$y = 0.0211x + 2.3998$

$R^2 = 0.785$

The increase is the greatest in Germany if we compare these 3 countries.

Taxation system of the analysed countries

Based upon Deloitte (2015) survey and national taxation law, we would like to introduce the place of research and development in the specific countries tax system.

Hungary

In Hungary, the corporate tax rate was 10% for taxable income up to HUF 500M, and 19% on income exceeding that limit, until 2017. From 2017, the corporate tax rate is linear 9%. The nature of incentives are as follows:

- *Super deduction:* A 200% super deduction is granted for qualifying expenditure if the related R&D activities, and are carried out within the scope of the taxpayer's own business activities or with respect to cooperative R&D activities performed based on an agreement with another party.
- *Patent box:* If intellectual property is created as a result of the R&D, 50% of the gross amount of the royalty received may be deducted from the corporate income tax at the taxpayer's election. A tax exemption, effective 1 January 2012, is available for capital gains derived from the transfer (sale or in-kind contribution) of qualifying intellectual property, which provided: (1) The company makes an election with the tax authorities within 60 days following the date of the

intellectual property acquisition; (2) The company holds the assets for at least one year before any subsequent sale.

Local business tax base reduction: The R&D costs can be deducted when computing the local business tax base. Corporations employing researchers with academic degrees or titles are relieved from paying social tax (27% on gross wages) and the training fund contribution (1.5% on gross wages). R&D-related expenses may be deducted from the corporate income tax base by any associated entity of the taxpayer.

In Hungary, eligible expenditure typically includes:

- Gross wage costs of new or existing R&D and/or marketing staff;
- Cost of new equipment;
- Cost of certain goods/materials/R&D services purchased from third parties.

Germany

The generally corporate tax rate is 15%, in addition to a 5.5% solidarity surcharge levied on corporate income tax (i.e., effective tax rate of approximately 15.8%). Municipal trade tax is imposed at rates usually between 7% and 17% (an average of 14%), with rates determined by the municipalities. The effective combined income rate averages is 30%.

The nature of incentives are: R&D incentives, mainly in the form of non-repayable cash grants, are awarded on a “per project” basis, usually for collaborative projects. There is no legal claim for R&D funding. Grant rates average at 50% of eligible project costs, although higher rates may be possible for SMEs. The selection criteria for eligible projects include: extent of innovation, extent of technical risk and extent of economic risk.

R&D loans are an alternative to R&D grants. R&D loans are not contingent on conducting R&D activities in a specific technology field and there are no application deadlines. R&D loans are provided under different governmental programs. R&D tax incentives are not yet offered, but the introduction of such incentives is on the political agenda.

Eligibility is not limited to particular industries. Companies in the following industries typically seek cash grants: biotech and life

sciences; information and communication technology; manufacturing, including automotive; energy and utilities.

United States of America

Federal corporate taxable income is subject to graduated tax rates, ranging from 15% to 35%. Most states also impose an income tax with rates ranging from 4.6% to 12%. The average combined federal/state corporate tax rate is 39.1%. The US offers a non-refundable research tax credit. Forty-five states offer a research tax credit that is similar to the federal tax credit, but at a lower credit rate. There are, however, a few states that offer refundable credits.

Nature of incentives are the taxpayers, who can elect to report an Alternative Simplified Credit or a Traditional Research Tax Credit, as follows:

- Traditional research tax credit (20%): The "traditional credit" is equal to 20% of the amount of the qualified research expenses (QREs) exceeding a "base amount";
- Alternative Simplified Credit (14%): The alternative simplified credit (ASC) is equal to 14% of the excess of the QREs over 50% of the average of the previous three years' QREs. The ASC base amount is therefore much easier to determine than under the traditional method and most taxpayers elect the ASC.

In the USA, all industries are eligible for the research credit and all the industries conducting qualified research have incentives. Qualifying costs include:

- wages for in-house labour, 65% of contract research;
- supplies used in the research process;
- overhead and capital expenditure are excluded.

Romania

The general corporate income tax is 16%. The legislative framework for the R&D tax incentive is in the Fiscal Code. Specific Norms providing guidance in the application of the law relating to research tax incentives have been jointly issued by the Ministry of Public Finance and the Ministry of Education Research and Innovation. A new order was issued in March 2015 modifying the specific Norms applicable to the incentive.

Natures of incentives are:

- Romania offers a 150% super deduction for eligible R&D expenditure. In light of the corporate income tax rate of 16%, the R&D tax incentive provides tax savings of 8% of the qualifying costs;

- Accelerated depreciation for equipment and devices used in R&D activity of up to 50% of the fiscal value of the asset may be deducted during the first year of use. The remaining fiscal value of the asset is depreciated over the remaining useful life.

Eligible types of R&D activities are:

- Applied research undertaken to acquire new knowledge for the development of new products, processes or services or for the significant improvement of existing products, processes or services.

- Technological development work, drawing on existing knowledge gained from research and/or practical experience, which is directed to obtain new materials, products, processes, systems and services, or to improve substantially those which already exist.

Expenses eligible for the R&D incentives are the following:

- Depreciation and rental expenses of new tangible and intangible fixed assets that are used by taxpayers in R&D activities (accelerated depreciation also may be applied for the equipment used for R&D activities);

- Salaries of personnel directly involved in R&D activities and related expenses;

- Maintenance and repair costs for tangible and intangible assets used for the R&D activities;

- Operating expenses, including expenses for contractor fees, costs of consumables, expenses for materials that are included in inventory, raw materials expenses, expenses for animals used in experiments, and similar products used in R&D activities;

- Overhead expenses that can be allocated directly or proportionally to the results of an R&D activity.

Conclusion

Academic researchers, product and technology developers and managers work together with previously inconceivable efficiency to explore and implement new product ideas in the centers of development. In recent centuries, the opportunities offered by innovation explored by R&D have mainly been exploited by large companies. Nowadays, the identification of such opportunities for

innovation offers the greatest chances of SMEs success. As a result of accelerating progress, flexibility and quick adaptation have become the key factors of corporate competitiveness.

We examined the R&D expenditure expressed as a percentage of the GDP in some countries between 1994 and 2013. A primary consideration in the selection of the countries involved in the study was to present the situation in Europe and to compare it with US data. Investments in research and development (R&D) and innovation are central for economic growth.

We tried to fit a linear trend for R&D expenditure expressed as a percentage of the GDP. The fitting of the linear trends are close in case of Hungary, Germany and USA. The increase is greatest in Germany if we compare these 3 countries and Romania. We analyzed these countries taxation system (corporate tax, nature of incentives, eligible industries and qualifying costs). Different countries have different R&D "support systems", but the aim to stimulate the R&D is the same for all countries.

Bibliography

Barrow, M. (2006). "Statistics for Economics Accounting and Business Studies", FT Prentice Hall (Pearson Edition), Harlow, England

Chesbourgh, H. W. (2003). „Open Innovation. The New Imperative for Creating and Profiting from Technology", *Harvard Business School Press*, Boston, Massachushetts, p. 1-7

Deloitte (2015). 2015 Global survey of R&D incentives

Dutta, S., Lanvin, B., Wunsch-Vincent, S. (2016). "The Global Innovation Index 2016" *Winning with Global Innovation. Cornell University,* INSEAD, and the World Intellectual Property Organization, p. 213-297

EUROSTAT (2017). R&D expenditure Data extracted in February 2017. http://ec.europa.eu/eurostat/statisticsexplained/index.php/R_%26D_expenditure

Rappaport, A. (1986). „Creating Shareholder Value" *Free Press*, New York

Szucs, I. (ed.) (2004). Alkalmazott statisztika (Applied Statistics), Agroinform Kiadó, Budapest

Vishnevskiy, K., Meissner, D., Egorova, O. (2015). "Foresight for SMEs: How to overcome the Limitations in small firms?" *National Research University Higher School of Economics, Basic Research Program Working Papers.* 45/STI/2015, p. 1-18

***** 1990. evi C. torveny a helyi adokrol (Law about Hungarian Local Tax)

***** 1996. evi LXXXI. torveny a tarsasagi adorol es az osztalekadorol (Law about Hungarian Corporate Tax)