

TAX COMPETITION AND IP BOXES AFTER APPLICATION OF MODIFIED NEXUS APPROACH

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Abstract

This article deals with intellectual property (IP) boxes as an important factor of tax competition and tax planning. IP payments are used for profit shifting within the group of companies to lower its tax burden. One of the newest important moments in the development of IP boxes is the attitude of OECD and its nexus approach, which application influences the way of taxation within an IP box, especially the treatment of expenditures. This paper aims situation of IP boxes after implementation of modified nexus approach with an emphasis on changing of the tax burden. These changes attack tax planning and managers need to know, how they affect overall tax burden of companies' investments. As the measure of these changes, effective average tax rate (EATR) is selected. This study focuses on countries, which have applied this attitude. Three countries were selected (Hungary, Netherlands and the United Kingdom). Results indicate that there is a new dependence after application of modified nexus approach: the structure of IP expenditures. Implementation of nexus approach makes statutory income tax rate important also for IP income and it causes higher tax burden on IP income in the case of small share of IP qualifying expenditures. Significant importance of statutory corporate tax rate for the taxation of IP income is shown by changes of EATRs related to IP income after reduction in corporate tax rates in Hungary and in the United Kingdom in 2017.

Keywords: tax planning, IP box, modified nexus approach, tax competition, effective average tax rate.

JEL Classification: H25, M29

1 INTRODUCTION

In these days, corporate taxation belongs to one of the important topics related to the management. Managers usually tend to reduce tax liabilities and use for it every available way. When it comes to the multinational companies, they use international tax planning to avoid paying taxes. International tax planning includes many different activities aimed to using tax legislation of different countries to reduce tax costs. Network of established subsidiaries is key prerequisite for successful use of tax laws.

Tax legislation of countries provides managers several ways how to optimize tax liabilities. One of the most common but also one of the newer is tax avoidance through IP boxes. Essence of this taxation is that revenues from IP (e.g. royalties for the use of the patent) are taxed in separate box. Naturally, this box brings some advantages for companies investing in IP. Typically, this benefit is represented by possibility of lower taxation. Actual situation of tax legislation in Europe demonstrates how important this solution in tax competition is, because all countries considered as tax haven have their own IP box in force. Notable countries with innovation box are Belgium, Hungary, Netherlands, the United Kingdom or Luxembourg. One of the last countries, which has implemented principles of an IP box, is Ireland (Deloitte, 2017). Tax burden within IP boxes is more important than the statutory

corporate tax rate for groups with intangible assets. When the company produce e.g. patents, by their relocation can easily lower effective tax rate of the whole group.

As for other tax planning activities, international organizations react on IP boxes using. An attitude of OECD shows how significant is tax avoiding using IP boxes because it makes a legislation, which countries have to follow in the case they have applied an IP box. Policy of this organization is represented by nexus approach, which countries apply in modified form (OECD, 2015). These regulations have significant impact on tax planning activities, therefore it is important to analyze these legislation changes. Whereas the nexus approach is a new feature of IP boxes, it is desirable to move the research about taxation of IP income taking into account the new design of IP boxes. From the perspective of manager decision-making, it requires calculation which shows effects of nexus approach on tax burden.

The goal of this paper is to find out how modified nexus approach affects tax burden on IP income. The statement of the problem with literature review is followed by the description of methods used within this study. The fourth chapter is dedicated to the results, which are further discussed with making conclusions and ideas for further research.

2 THEORETICAL BACKGROUND

Even if IP boxes are new strategies of governments, relation between taxation and location of assets representing knowledge has been researched for several years. Study from Karkinsky and Riedel (2009) focuses on relationship between taxation and location of patents. Their findings show that subsidiaries of multinationals have less patent applications when corporate tax rate is high (Karkinsky and Riedel, 2009). Based on these results, they claim that multinational companies would tend to shift profits to countries with lower tax rates (Karkinsky and Riedel, 2009). Nowadays, these thoughts are confirmed by numerous IP boxes across the European Union.

One of the EU studies has also mentioned payments for intellectual property as a frequent instrument by which corporations avoid paying taxes (European Commission, 2016). Implementation of IP boxes makes more space for this type of tax planning activities. Importance of patent boxes in tax planning confirms another study from European Commission, on which has cooperated Barrios, Nicodème, Skonieczna and Vezzani with Alstadsæter (2015). Their study is focused on effects of patent box on activities of companies. Their analyzation provides several important findings. First, patent boxes, respectively tax advantages, which patent boxes provide, attract multinationals to change locations of their patents, especially when it comes to high-quality patents (Barrios et al., 2015). Second, broadly conceived patent boxes with the possibility to include more types of rights affect patent location decisions even more. On the other hand, patent boxes do not increase research activities and multinationals use them mainly for tax planning purposes (Barrios et al., 2015).

Another study which deals with relations between tax planning and patents is from Bieltvedt Skeie et al. (2017). Their findings show that taxation is an important factor for setting location of research activities (Bieltvedt Skeie et al., 2017). Lower taxation created by implementation of IP box attracts companies to concentrate their research and innovation activities in countries with such a regime. For concrete numbers, reduction of a tax rate for IP income by 5 percentage points results in 6% higher level of patents (Bieltvedt Skeie et al., 2017). So, these regimes concentrating patents but there is a question if these IP boxes stimulate research activities. Similar results have study from Bradley et al. (2015).

Griffith et al. (2014) mention one important thing about intellectual property and its relation to tax planning: intellectual property has the greatest mobility in set of assets. Mobility as an

important factor in terms of tax planning is mentioned also by Arcalean (2017) and Bretschger and Hettish (2002). This mobility is the key factor for tax planning because multinationals can these assets easily and quickly move to another country whose legislation provides them lower effective tax rate. Tax savings from the profit shifting is also connected with innovation activities in results in the study from Klassen et al. (2017). Griffith et al. (2014) study, how taxes and other factors influence where companies locate their intellectual property assets. Their model shows that corporate tax is an important factor when it comes to location of patents. For the patent boxes, it means that they can really attract companies to change their locations of patents because of lower effective tax rates for part of income (Griffith et al., 2014). From the perspective of different types of intangible assets, Dudar and Voget (2016) show, that the relocation of trademarks are more engaged in tax planning than such an activity connected with patents.

Tab. 1 – Literature review related to the tax planning and IP. Source: author.

Authors and Year	Methods	Findings
Karkinsky and Riedel (2009)	Fixed effects OLS Random effects tobit model Fixed effects negative binomial regression model	Patents are applied in countries with lower tax burden.
Griffith et al. (2014)	Mixed logit model	Choosing location of patents is affected by patent boxes (or lower taxation).
Evers et al. (2015)	Effective average tax rate Effective marginal tax rate	Presence of IP boxes decreases significantly effective tax rates (in some cases even to negative values).
Chatagny et al. (2015)	Computable general equilibrium model	Swiss companies do not change location of patents because of the existence of patent box in the home country.
Barrios et al. (2015)	Negative binomial logit Negative binomial-mixed logit	Lower tax burden of patent boxes attracts companies when they decide about location of IP.
Bradley et al. (2015)	Fixed effects panel regression	Reduction in tax rate for IP income (within an IP box) causes more patent applications.
Stimmelmayer et al. (2016)	Difference-in-difference model	Subsidiaries from groups with IP have higher profits after applying IP box than the companies from groups without IP.
Bieltvedt Skeie et al. (2017)	Negative binomial regression model	Patens are located in countries with lower taxation.
Mohnen et al. (2017)	Difference-in-differences method	Dutch companies report more R&D activities when they use innovation box.
Bornemann et al. (2018)	OLS regression with panel data	Patent box in Belgium causes higher R&D activity and companies achieve lower effective tax rates.

There are also some studies, in which experts focus on particular IP box in certain country; Chatagny et al. (2015) in Switzerland, Mohnen et al. (2016) in Netherlands or Bornemann et al. (2018) in Belgium. Chatagny et al. (2015) deal with effects of IP License box, which was part of Swiss tax reform. Their results show that license box attracts companies to not to shift profits outside of Switzerland. On the other hand, they recognize only small effect of this IP box on output or investments (Chatagny et al., 2015).

Study from Mohnen et al. (2017) covers patent box implemented in the Netherlands. They find that companies using patent box in Netherlands tend to have more innovative activities because of the innovation box (Mohnen et al., 2017). From the perspective of the Dutch economy as a whole, there are not any positive significant impact on it. Overall, innovation boxes according to mentioned studies from Switzerland and from Netherlands do not significantly affect country's economy. There is a positive effect on monitored quantities (output or investments) but not significant. Although patent boxes (lower tax burden) attract companies to increase their innovation activities, the quality of them is lower than before the introduction of this preferential regime (Schwab and Todtenhaupt, 2017).

On the other hand, Bornemann et al. (2018) show that not only patent activity is higher in Belgium after application of IP box but also the effective tax rates of Belgian companies have decreased. This reduction is connected with companies which do not use profit shifting activities. There is no significant effect for multinationals with developed tax planning scheme because they are able to reduce their tax burden without using the patent box in Belgium.

For companies it is important to quantify advantages for them and their budget. Managers want to reduce tax costs by using an IP box and this sort of analyzation can be done by monitoring effective tax rates (Evers et al., 2015). They incorporate IP box into formula for effective average tax rate (EATR) developed by Devereux and Griffith (1998, 2003). Results show significant effect on tax burden of companies, which is demonstrated by reduction of effective tax rate (Evers et al., 2015). All IP boxes provide better taxation conditions than countries without implementation of an IP box. One of the key findings is fact, that there are significant differences between types of IP boxes because ones with no need to recapture expenditures can provide negative EATRs (Evers et al., 2015). It means, that it is also important to follow up every attribute of IP boxes because there can be fundamental differences with large effect on effective tax rate.

Activities of international organizations document the importance of IP boxes for international tax planning (OECD, 2017) (European Commission, 2016). OECD (2017) focuses on IP boxes in one of their actions within BEPS (Base Erosion and Profit Shifting) package. Because OECD sets these actions against harmful tax competition, its goal is to make legislation related to IP boxes transparent and focused on R&D activities (OECD, 2015). OECD has agreed on a nexus approach to the IP box, which changes the IP boxes to provide benefits to companies with real innovation activity and not to ones with artificial activities within tax planning (OECD, 2015). This approach has effect on tax legislation related to IP boxes and countries have to apply the same changes to follow this agreement. Modified nexus approach briefly means that sum of IP expenditures, which has character of an outsourcing to related companies or IP acquisition (does not matter if provider of them belongs to the company's group or not), affects income taxable within the IP box.

First papers also focus on nexus approach as an important feature of IP box legislation, for example one from Sanz-Goméz (2015). He focuses on IP boxes and nexus approach in relation with EU laws. He mentions a problem of freedom in several aspects of nexus approach, e.g. with a treatment of expenditures considered as outsourcing. On the one hand,

nexus approach targeting harmful tax competition by the same treatment of expenditures in different countries, on the other hand, it brings several issues related to respecting principles of EU legislation. Another study dealing with nexus approach shows that integration of the nexus approach tends to lower profit shifting activities (Stimmelmayer et al., 2016).

3 RESEARCH OBJECTIVE, METHODOLOGY AND DATA

Reviewed studies show that IP boxes are one of the key legislative elements which allows avoiding taxes. Then companies, which have R&D activities, use this preferential tax regime to decrease their effective tax rates. According to the nexus approach, there arise following research questions:

- How this new measure affects effective tax rate within taxation via IP box?
- Will be closer gap between effective tax rates of different countries because of the nexus approach?

The nexus approach changes the IP boxes in way, how the IP expenditures are judged. Then it is important, how its implementation affects effective tax rate because IP boxes are mainly about tax avoiding. OECD as an international organization makes their own policy after discussion between member countries. This policy creates new regulations, which member countries adopt into their legislation so there is an assumption that IP boxes can be similar. Again, for the companies it is important, how much effective tax rates of IP boxes differ after this legislative change.

Application of this OECD approach is relatively new feature of legislation because first countries introduced it in 2016, therefore there are not available relevant data from companies. Identification of an influence of this application can be analyzed by specific model for calculation of effective tax rate. Selected method for measuring of effective tax burden is Devereux and Griffith (2003) calculation of effective tax rate. They have developed a formula for effective average tax rate (EATR). Their model has a character of a “*forward-looking measure*” (Devereux and Griffith, 2003). This metric is based on situation of “*hypothetical potential investment*” (Devereux and Griffith, 2003). The essence of this model lies in the calculation of the difference between net present value (NPV) assuming taxation and NPV in the situation without taxation (Devereux and Griffith, 2003). The measure of EATR has following formula:

$$EATR = \frac{R^* - R}{\frac{p}{1+r}} \quad (1)$$

In mentioned formula: R^* is NPV of the investment when there is no taxation; R is NPV assuming taxation; p stands for real financial return and r real interest rate. For this article, formula 1 is important as the main measure of effective tax burden. Calculation of NPVs (R^* and R) are presented further.

This model has been modified for taxation via IP box by Evers (2015). Especially, there are several changes in calculation due to different approach focused on taxation of IP. Evers (2015) has used this model assuming that the income as the subject of taxation is generated by the “*self-developed patent*” financing by equity. For this situation, NPV with presence of taxes is following:

$$R = -(1 - A) + \frac{(p + \delta)(1 + \pi)}{1 + i} (1 - \tau_{IP\ Box}) + \frac{(1 - \delta)(1 + \pi)}{1 + i} (1 - A) \quad (2)$$

In formula 2: A stands for NPV of tax allowances; δ represents the economic depreciation rate; π is inflation and $\tau_{IP\ Box}$ reflects profit tax rate related to IP income and i is nominal interest rate.

The country's legislation determines the way how the NPV of tax allowance calculation is calculated. For Hungary A is substituted by corporate tax rate ($A=\tau$) because there is no recapture requirement of expenditures related to IP income (Evers, 2015). For the United Kingdom, it assumes "an investment project that is undertaken after the IP box regime was first opted for." (Evers, 2015) NPV of tax allowance (A) is set up $\tau_{IP\ Box}$. Dutch legislation requires that IP expenditures have to be recaptured with mechanism based on threshold. For this mechanism Evers (2015) has selected the same substitution as for UK paten box ($A= \tau_{IP\ Box}$).

One more formula from Devereux and Griffith (2003) model is needed to calculate EATR of IP box regimes. This formula 3 calculates the NPV of the investment with no taxation. This value is the same for all selected countries:

$$R^* = \frac{p - r}{1 + r} \quad (3)$$

Whereas the article deals with modified nexus approach, there arises one problem related to calculation of EATR: how the nexus approach affects the calculation. First, there must be stated, which part of Deveraux & Griffith model is influenced by the nexus approach. For solving this problem, there helps formula 4 from OECD (2015), which represents the nexus approach itself:

$$IP\ Box\ income = \frac{Qualifying\ IP\ expenditures}{Overall\ IP\ expenditures} * Overall\ IP\ income \quad (4)$$

There can be applicable an uplift of qualifying expenditures by 30 % (OECD, 2015), which is an important attribute of legislation. When there is not much outsourcing within the group and it corresponds to a small part of IP expenses, there is no effect of this approach on IP box income. Formula indicates that application of nexus approach affects the income, which can be included in IP box. This can also affects a tax rate, by which is IP income taxed because part of the income can be taxed as standard income by corporate income tax rate in some cases. As the IP box brings better taxation condition, this nexus ratio can increase tax burden in some cases. Acquisition costs and expenditures for activities undertaken by related parties are not qualifying IP expenditures and their share affects real tax rate connected with IP income.

For inclusion of the modified nexus approach into model, there is important to mention that $\tau_{IP\ Box}$ cannot be put into equation in every possible situation. Several formulas have to be stated for calculating tax rates of IP income. There has to be modified this tax rate in case of higher share of outsourced activities within the group or IP asset purchase. For the purposes of this article there is set new variable, which substitutes $\tau_{IP\ Box}$ in all occurrences in the previous equations: τ_{NA} which stands for tax rate after application of the nexus approach.

Two basic types of patent box determine an approach to the tax rate after application of nexus approach (τ_{NA}). Patent box like the Dutch one with a tax rate for IP income stated in legislation means that whole IP income can be taxed by this tax rate. A condition, when this tax rate is applicable on whole income, is set by the nexus approach. For the Dutch like IP box the formula for calculating a tax liability considering the nexus approach is following:

$$TAX = \tau_{IP\ Box} \frac{1,3\ QE\ I_{IP}}{TE} + \tau(P_{ip} - \frac{1,3\ QE\ I_{IP}}{TE}) \quad (5)$$

QE stands for qualifying expenditures on IP asset; TE for total expenditures on IP asset and I_{IP} for profit from IP asset. The formula 5 is applicable under the condition: $\frac{1,3 QE}{TE} \leq 1$, 1 is entered in the case of higher value. There can be applied only limited uplift of qualifying expenditures with a maximum at the level of TE .

After mathematic operations, the formula for the tax rate after application of nexus approach is following:

$$\tau_{NA} = \left[\frac{1,3 QE}{TE} (\tau_{IP\ Box} - \tau) \right] + \tau \tag{6}$$

Formula 6 is adopted for the tax rate in Netherlands and the United Kingdom. Whereas the study focuses on effects of nexus approach, for better detection of them one key important assumption has to be stated: it is assessed a situation only in the first interval of progressive taxation. For Netherlands it means, that the corporate tax rate is 20%, respectively it is assumed an income lower than EUR 200,000. Current corporate tax rate in the United Kingdom is at the level of 19%.

For the second type of an IP box (for Hungary), the formula has to be formulated in a different way. There is no statutory specific tax rate because IP box has basic principle in a partly tax deduction. The formula 7 for tax liability in Hungary:

$$TAX = \tau \left(I_{IP} - \frac{1,3 QE I_{IP}}{TE} \right) + \left[\tau(1 - d) \left(\frac{1,3 QE I_{IP}}{TE} \right) \right] \tag{7}$$

In the previous formula, d is rate of the tax deduction. The condition mentioned with formula 5 stays unchanged.

Formula for tax rate after application of the nexus approach with tax deduction is also different:

$$\tau_{NA} = \left[\tau \left(1 - \frac{1,3 QE}{TE} \right) \right] + \left[\tau(1 - d) \left(\frac{1,3 QE}{TE} \right) \right] \tag{8}$$

All above mentioned formulas are used to calculation of results in following chapter.

Data used within these calculations are based on the legislation of selected countries and on the study from Evers (2015). Using the same assumptions as this previous study allows more complex comparison of the results and then the differences in EATRs after implementation of nexus approach into IP boxes can be demonstrated.

Tab. 2 – Basic features of IP boxes in selected countries. Source: (Deloitte, 2017); (Koka et al, 2016); (Government Digital Services, 2015); (PWC, 2016); (KPMG, 2017)

Country	Benefit	Assets	Corporate tax rate
Hungary	50% tax deduction	Patents and software copyrights	9% (19% in 2016)
Netherlands	Tax rate at 5%	Patents, utility models, plant breeders' rights, and pharmaceutical certifications	20% up to EUR 200,000 (above 25%)
United Kingdom	Tax rate at 10%	Patents	19% (20% in 2016)

Differences between IP boxes are in several areas of taxation. The first important feature is outlined in used methods. How much an IP box is profitable, indicate not only tax rate but

also other special advantages, which differs from one country to another. One of the key attributes is provision which profits can be included in this special regime. Therefore, when it comes to comparison of IP boxes, it is important which profits particular company generate. Statutory corporate tax rates are not only important for countries with deduction system but also for calculation with application of nexus approach therefore there are also mentioned in the following table. Basic comparison of IP boxes in selected countries is shown in the Table 2.

This article is focused on quantitative characteristics of IP boxes. Therefore, it is important to calculate tax rates within IP boxes with application of the nexus approach and then EATRs for selected cases. These cases differ from each other by the proportion of qualifying expenses. For better comparison of results with values of EATRs before application of the nexus approach, there have been selected the same assumptions as it was in the study from Evers (2015): p (real financial return) is 20%, r (real interest rate) is 5%, δ (the economic depreciation rate) is 15.35%, π (inflation rate) has value of 2% and i (nominal interest rate) is 7.1%.

4 RESULTS AND DISCUSSION

Comparison of IP boxes EATRs after application of the nexus approach in late 2016 is shown by following graph – Figure 1. Selected countries did not implement any other changes beside nexus approach in taxation related to IP income in 2016 (for example Belgium has adopted different amount of deduction). This is the reason, why it monitors situation in the second half of 2016.

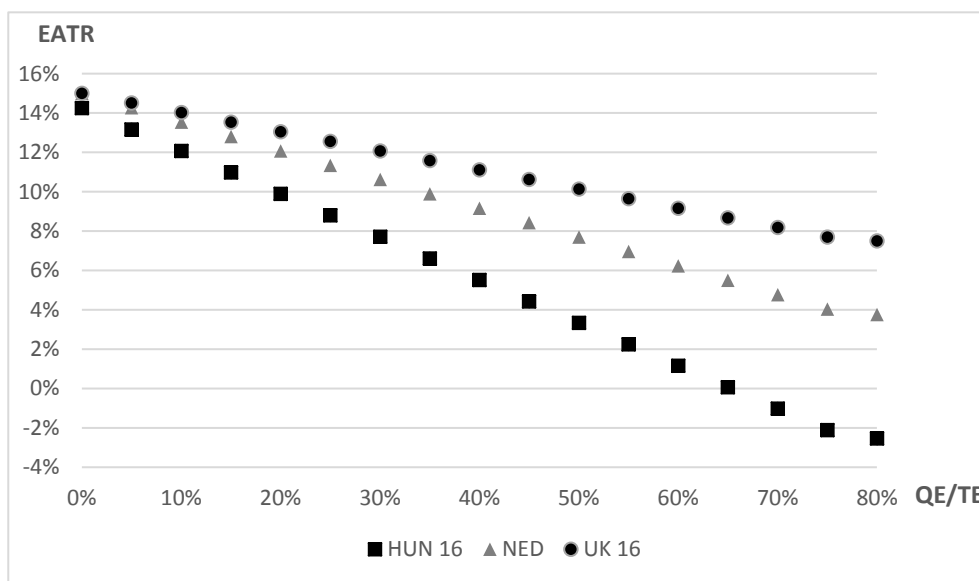


Fig. 1 – EATR dependence on structure of IP expenditures in late 2016. Source: author

The dependence of EATR on structure of IP expenditures has linear character in all countries because of the nexus approach, which implementation has to be the same in all countries. On the other hand, this dependence has different degree in every country. For the degree of dependence, two following factors are important: specific calculation of EATR caused by different types of IP boxes and statutory corporate tax rate. The strongest dependency has the EATR in Hungary and it is caused by the fact that there is no recapture requirement of expenditures. Hungary’s EATR for a large share of qualifying expenses even drops to negative value. Different degree of dependency in the Netherlands and the United Kingdom

creates 5 percentage points differential of IP box tax rate because there was statutory corporate tax rate at the same level of 20% in 2016.

OECD's application causes, that the tax burden rises below 77% share of qualifying expenditures. EATR has same value for every possible structure of expenditures above share of 77%. Concrete values for selected share of qualifying expenditures are shown in Table 3. There are also values of EATRs for 2017 in this table.

The comparison of the results to Evers (2015) values can show, how much the EATRs have been changed after application of nexus approach. In 2014, tax rate of an IP box was applicable for whole IP income in case of meeting all legislative conditions. With adoption of the nexus approach, part of IP income is taxed by statutory corporate tax rate in certain cases. EATR for self-developed patent financed by equity were at the level of -2.54% (Hungary), 3.75% (Netherlands) and 7.50% (the United Kingdom) (Evers, 2015). These values remain unchanged after application of nexus approach for at least 77% share of qualifying expenditures. Below this share, The EATRs increase up to tax burden of regular corporate taxation, bigger gap is related to smaller share of qualifying expenditures. For 50% share of qualifying expenses, EATR increases by 5.88 percentage points for Hungary, by 3.94 percentage points for Netherlands and by 2.63 percentage points in the United Kingdom. The nexus approach has the biggest impact on EATR in Hungary, which represents country with the best conditions for IP income in selected countries. This comparison answer the first research question, the tax burden is higher than before in the case of low level of qualifying expenditures.

Tab. 3 – EATRs in selected countries after application of nexus approach. Source: author

% QE	Hungary		Netherlands	United Kingdom	
	2016	2017	Since 2016	2016	2017
80	-2.54	-1.20	3.75	7.50	7.50
75	-2.12	-1.00	4.03	7.69	7.67
50	3.34	1.58	7.69	10.13	9.86
25	8.79	4.17	11.34	12.56	12.06
0	14.25	6.75	15.00	15.00	14.25

Figure 1 and Table 3 after comparison with the results from Evers (2015) also show that the gap between EATRs in different countries were closer after application of the nexus approach in 2016. For small share of qualifying expenditures, effective tax rates are nearly the same according to the results presented in the Table 3. In these cases, the effects of different IP boxes are smaller than the effect of relatively similar corporate tax rate (valid for year 2016). This is the second important result because nexus approach move closer the tax burden of different countries in some cases. When the company has not own research activities, the IP income is taxed by regular corporate tax rate and when they are similar (in 2016) the tax burden are relatively close too.

Situation became even more interesting in 2017, when the government in Hungary and the United Kingdom decreased statutory corporate tax rate. Nowadays, corporate income tax rate is at the level of 9% in Hungary and at 19% in the United Kingdom. This reduction has different effects in selected countries. In Hungary, EATR for greater share of qualifying expenditures increases to -1.20%. The tax burden on IP income has increased due to NPV calculation. NPV of tax allowances (A) is lower than in 2016 because lower corporate tax rate does not provide such a benefit in case of taxation within IP box. On the other hand, different

structure of expenses from the nexus approach perspective can lead to lower EATR. In these cases, part of income is taxed by reduced corporate tax rate and lower statutory corporate tax rate has larger impact than change of NPV of tax allowances e.g. in the situation of 50% share of qualifying expenditures. Above mentioned effects do not can be applied for the United Kingdom. Reduction of statutory corporate tax rate has impact only on calculation of τ_{NA} therefore it affects EATR only in the case of smaller share than 77% of qualifying expenditures.

Implementation of modified nexus approach brings dependence of EATR on the structure of expenditures. Overall, the formula for the tax rate with application of modified nexus approach brings new variable, which can be called as a share of own expenditure on developing IP asset. Effects of this approach on the companies will be dependent on the corporations' flexibility to convert the structure of expenditures, so there is one new important activity related to managing IP activities.

Above mentioned dependence has negative character and smaller share of qualifying expenditures increases EATR. Whereas the qualifying expenditures do not include outsourcing activities within group and IP acquisition, it disadvantages mainly tax planning activities within the group. After all, this is the purpose of nexus approach application. On the other hand, it can negatively affect also companies without their own resources. These companies have to use know-how from parent company or buy IP assets from third parties and this legislative increases their tax burden. Overall, the advantage of preferential tax regime for IP income is lower in the case of many outsourced activities within the group or many IP acquisitions.

Results also show that modified nexus approach causes higher importance of corporate income tax rate for IP income. Previously, the advantage of IP box used to be applicable on whole qualified income. Nowadays, the part of IP profit, which does not meet the condition of modified nexus approach, is taxed by corporate tax rate. This change increases effective tax rates for IP income and this difference is even bigger in countries with higher corporate tax rate. Results after reduction of corporate tax rate in Hungary and in the United Kingdom are notable because similar legislative change has different effect because of type of IP box.

In this case, OECD regulation creates similar effective tax rates in selected countries (for situation of smaller share of qualifying expenditures). Modified nexus approach results in more space for tax planning activities because there is a new manageable variable affecting EATRs. On the one hand, it sets profit shifting activities less attractive because of treatment of payments within the group. On the other hand, this profit shifting can be replaced by changing location of R&D activities and then it does not affect EATR for the future. Capital mobility is an important factor related to the tax planning whose importance is shown by recent studies (Arcalean, 2017) (Bretschger and Hettish, 2002).

Comparison of IP boxes (more precisely effective tax rates within IP boxes) is relatively complicated because the nexus approach has different impacts on each of them. It depends on the type of IP box in the particular country. The treatment of income, the construction of taxation, everything is important on how the nexus approach works. Moreover, the nexus approach has also different effects after changes of the other related tax legislation, in studying cases, statutory corporate tax rates. From these reasons, there cannot be specified results for the nexus approach as a one measure but also the differences between IP boxes should be considered as a key factor of these changes. This study has also the limitation resting in forward looking EATR. This method provides first information about the nexus approach and its effect on effective tax rates. On the other hand, further studies should use

real economic data from companies (e.g. company databases) to analyze real effects of the nexus approach implementation.

Results of this study show significant impact of the nexus approach on effective tax rates in some cases but only analysis of companies' dataset reveals how frequent these effects are and how many groups suffer from this OECD requirement. Therefore there arises one question for further studying of IP boxes after making this study: how much modified nexus approach affects real corporate's tax liabilities. Then it can be quantified if mentioned different treatment of expenditures affects significantly real effective tax rates or managers are able to avoid paying taxes despite application of this legislation, for example with using above mentioned capital mobility. The importance of IP activities in tax planning is shown by several mentioned studies and reviewed modified nexus approach, as one of the main policy of OECD related to IP boxes, creates new challenge in the tax planning activities for managers. As the international organizations play an important role in assessment of the tax planning, further studies have to take into account other changes which comes from OECD or EU.

5 CONCLUSION

This article shows how relatively small change of legislation can largely affect tax burden. IP payments are popular way how groups can shift their profits to avoid paying taxes therefore this new regulation is even more important for managers. This is the reason why the nexus approach is crucial thing for companies. IP boxes are used for tax planning and the nexus approach by influencing the effective tax rate can lower the advantages from these special tax regimes.

First, this paper shows that nexus approach increases the tax burden in the case of use of low level of qualifying expenditures by company. This regulation does not influence companies with own research activities because it has no effect on EATR with high level of qualifying expenditures. On the other hand, this new regulation affects not only companies, which purposefully outsourced IP activities within own group, but also companies without their own resources. These companies buy IP assets from third parties when they are active in IP activities. For the case of 50% of qualifying expenditures after application of the nexus approach, the EATR has increased by 5.88 percentage points for Hungary, 3.94 for Netherlands, 2.63 for the United Kingdom. Interestingly, some governments have reduced statutory corporate tax rates after application the new regulation, concretely in Hungary and in the United Kingdom. From the perspective of the IP box, it increases the value of EATR for high level of qualifying expenditures in Hungary. The companies with own research activities have worst taxation conditions than it used to be. However it is worth to mention that this reduction of corporate tax rate is not the direct impact of the nexus approach.

For the second research question, the nexus approach moves closer EATR values for the companies which using IP boxes for tax planning or do not have own research activities. On the other hand, this new measure has no effect on the tax burden when the company has high share of own real expenditures on new e.g. patents. Significant differences remain in these cases and IP box e.g. in Hungary is more advantageous than in the two other countries. Similar values in some cases are caused by not much difference in corporate tax rates but the reduction of it in Hungary causes specific position for this country because its taxation seems to be the lowest within the selected countries.

Overall, managers face a new problem consisting of controlling of IP expenditure structure. Another important thing, which is newly important for IP boxes, is the level of corporate income tax rate which is relatively high in some countries. Nowadays, the benefits of the IP

box are indicated not only by directly connected legislation but also statutory corporate tax rate and the structure of company's IP expenditures. Modified nexus approach creates IP boxes less attractive in some cases and tax planning activities more complicated but it has no potential to stop tax planning activities. Only the way, how companies avoid paying taxes, will be different. Whereas the patents and other intangible assets have high mobility and the real innovative activity can be easily relocated, the managers should consider the location changes of R&D to gain the tax advantages and to lower group's effective tax rate.

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