

## Improving the Efficiency of Anti-Tax Base Erosion Regimes through Tax Modelling

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### ABSTRACT

This article describes ways to enhance the efficiency of anti-tax base erosion measures aimed at preventing transnational corporations (TNCs) from shifting their profits from home countries to lower-tax jurisdictions. The research methodology comprises a set of mathematical models applied for a comprehensive analysis of tax planning methods used by TNCs and the counter-methods used by national governments. The models with postulated equilibrium consider tripartite financial structures (consisting of a parent company, a subsidiary in a loyal jurisdiction and an affiliate in an offshore jurisdiction) based on the principle of economic equilibrium in the distribution of incomes of different jurisdictions. The models are parametrized by using the data on tax regimes in different jurisdictions. The computational experiment focused on the tax regimes of a parent jurisdiction (Russian Federation), a typical loyal jurisdiction (Laos) and a typical offshore jurisdiction (British Virgin Islands). Thus, we considered the most important cases in international taxation regarding TNCs' economic interests and the national welfare of the parent jurisdiction. The experiment tested the efficiency of different methods of fiscal regulation of international income and capital flows and showed that although the rules of controlled transactions are considered crucial for countering tax planning, they fail to bring the desired results in contemporary economic reality characterized by expanded international network of financial structures and accelerated growth of digital transactions. Based on our research findings, we formulated the following recommendations. The governments of parent jurisdictions are recommended to extend the rules of controlled transactions and controlled foreign corporations not only to offshores but also to loyal jurisdictions. For the Russian government, it may be effective to test and adopt the rules of secondary adjustments in combination with the rules of controlled transactions and controlled foreign corporations, to lower the rate of the tax on foreign dividends and to make the unreturned foreign dividends exempt from the additional tax should they be repatriated to Russia. Enhanced international cooperation in this sphere can maximize the efficiency of these measures.

### KEYWORDS

International taxation, mathematical modelling, transnational corporation, tax planning, controlled transaction, controlled foreign corporation, secondary adjustment

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Оригинальная статья

## Моделирование налоговых режимов, препятствующих утечке доходов и капиталов из национальной экономики

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### АННОТАЦИЯ

Целью статьи является обоснование мер налоговой политики, способных успешно противодействовать утечке доходов и капиталов за рубеж и содействовать их возврату в национальную экономику. Методика исследования базируется на комплексе математических моделей международного нало-

гообложения. Это модели с постулируемым равновесием, в которых рассматриваются трёхсторонние финансовые структуры (с участием дочерней компании в лояльной юрисдикции и аффилированной компании в офшорной юрисдикции), построенные по принципу экономического равновесия доходов территорий. Предложены авторские модели, позволяющие анализировать в комплексе, как методы налогового планирования транснациональных корпораций, так и методы противодействия им со стороны правительств, оцениваемые с позиций национального благосостояния. Для практического применения разработанного подхода выполнена параметризация моделей с использованием данных о налоговых режимах, действующих различных юрисдикциях. В вычислительном эксперименте использованы налоговые режимы материнской юрисдикции (Российская Федерация), типичной лояльной юрисдикции (Лаос), и типичной офшорной юрисдикции (Британские Виргинские острова). Эксперименты заключались в анализе наиболее важных ситуаций, возможных в международном налогообложении с позиций экономических интересов ТНК и с позиций национального благосостояния материнской юрисдикции. В рамках экспериментов были проверены эффективность и конечные результаты применения различных методов налогового регулирования международных потоков доходов и капиталов. Результаты математического моделирования, показали, что правила контролируемых сделок – фундаментальные для противодействия налоговому планированию транснациональных корпораций – плохо работают в условиях разветвлённой международной сети финансовых структур и быстрого роста цифровых транзакций. Исходя из полученных результатов, предложено: распространение правил контролируемых сделок и контролируемых иностранных компаний на лояльные юрисдикции, а не только на офшоры; апробация и введение в РФ правил вторичных корректировок в связке с правилами контролируемых сделок и контролируемых иностранных компаний; снижение ставки налога на дивиденды, получаемые из-за рубежа; освобождение от дополнительного налога на невозвращённые дивиденды в случае их возврата в РФ. Кроме того, сделан вывод о том, что повышение эффективности указанных мер требует углубления международного сотрудничества в этой сфере.

#### КЛЮЧЕВЫЕ СЛОВА

международное налогообложение, математическое моделирование, транснациональная корпорация, налоговое планирование, контролируемая сделка, контролируемая иностранная компания, вторичная корректировка

### 1. Introduction

National economic development is affected considerably by the movement of funds belonging to transnational corporations (TNCs). The Fourth Industrial Revolution, commonly described as the new era of cyberphysical systems, with augmented reality merging the digital and physical worlds, makes the struggle for profits, capitals and places of capital deployment even more severe. Developed countries seek to move their knowledge-intensive manufacturing activities back home (the so-called “reshoring”) [1], while developing countries of the “workshop of the world” try to retain and increase their productive capacities as well as their profits and capitals. Countries involved in trade wars, which often disguise deeper

rivalries in technology and innovation [3; 4], resort to fiscal policy methods.

One of the most recent examples is Donald Trump’s tax reform [4], which, among other things, included tax cuts to corporate profits with the maximum corporate income rate lowered from 35% to 21%, tax free repatriation of dividends from foreign subsidiaries and a one-time mandatory tax imposed on deferred foreign income, which wasn’t previously taxed in the US [5]. These measures are aimed at reducing the benefits of tax planning and encourage companies to bring their overseas earnings back to the United States [6].

Yet another example is the ongoing tariff war between the USA and China [7], which may have a negative impact not

only on these countries' economies but also lead to a 0.5% output decline in the world by mid-2021 [8].

Accelerated development of the digital economy intensifies cross-border activities involving intangible assets, users of computer networks and business functions, which makes companies less dependent on local staff and more flexible in terms of where they place their servers and other elements of infrastructure<sup>1</sup>. All of the above not only leads to an increased risk of tax evasion<sup>2</sup> [9] but can also significantly affect the basic principles underlying the efficiency of public finance systems in general [10].

Fiscal methods have a considerable impact on international flows of capitals and incomes [11-13] and they need to be further improved in order to deal with the problems of tax base erosion and tax avoidance, especially in developing countries and emerging markets.

The alarming recent decline in investment into the Russian economy (the current level of investment is about 20% of GDP while the required minimum is 25%<sup>3</sup>) has rendered the anti-base erosion measures particularly important.

This problem is exacerbated by the increasingly sophisticated techniques of tax planning used by TNCs. The results of TNCs' tax planning efforts, on the one hand, and governments' measures intended to curtail tax base erosion, on the other, are quite unpredictable. The methods of ex-post analysis and statistical analysis are not suitable in this situation and more complex tools of mathematical modelling are required that would enable us to make ex-ante calculations and work out the possible scenarios in this sphere of economic relations [12; 14-18].

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<sup>1</sup> OECD. BEPS Action 1: Address the Tax Challenges of the Digital Economy. Public Discussion Draft / OECD. 2014. 24 March-14 April, pp. 33-34.

<sup>2</sup> France Stratégie. Taxation and the digital economy: A survey of theoretical models. Final report. 2015. February 26. 56 p.

<sup>3</sup> President of Russia. President's Address to the Federal Assembly. 2018. Available at: <http://kremlin.ru/events/president/news/56957>

One of the seminal works in this field is the fundamental study of the impact of taxes on direct foreign investment conducted by W.S. Clark for the OECD [12]. This study presents a set of mathematical models based on the average and marginal effective tax rates. These models describe various tax planning strategies used by TNCs and show the outcomes of different corporate income reform scenarios, in particular their impact on the flows of direct foreign investment. American economist Harry Grubert, one of the world's foremost experts in the area of international taxation [14; 15], applied mathematical models to show how multinational corporations used intellectual property to avoid taxes through tax planning schemes. He also assessed the impact of royalties on effective tax rates. M. P. Devereux and R. G. Hubbard [16] proposed enhanced versions of the traditional models of taxation of capital income on foreign direct investment, based on the analysis of marginal investment projects and marginal effective tax rates. Q. Hong and M. Smart [18] discuss optimal taxation in the context of tax havens and describe a general equilibrium model to assess the impact of TNCs' tax planning on optimal corporate tax rates and direct foreign investment. Nevertheless, as the OECD experts point out, the problem is so complex that "more work should be done to investigate the implications of tax planning to forward-looking effective tax rate analysis used to infer tax reform effects on FDI, in particular, by developing the ideas of H. Grubert" [12, p. 23].

The currently used tools of mathematical modelling require further development and improvement in order to keep up with the rapid transformations of international economic relations and tax regimes, which is particularly important if we want to handle the problem of TNCs' tax planning practices in the digital economy. Therefore, the aim of this article is to identify the tax regimes capable of efficiently countering tax avoidance and tax base erosion by applying methods of mathematical modelling specially adjusted to account for this new economic reality.

The article is structured as follows. The next section presents the research methodology and shows the difference between the proposed approach and those applied in previous studies. The third section contains the statement of the research problem and describes the implementation of the proposed set of mathematical models. The fourth section describes the results of mathematical modelling and provides the economic interpretation of the computational experiments. The fifth section is devoted to the discussion of the research results. In the final section of the paper, some recommendations are provided concerning the necessary adjustments to the national fiscal policy in order to maximize its efficiency in countering tax base erosion and profit shifting.

## 2. Research methodology

There is a variety of mathematical models to choose from depending on the research question one needs to address: for instance, to evaluate the efficiency of different alternatives of economic policy.

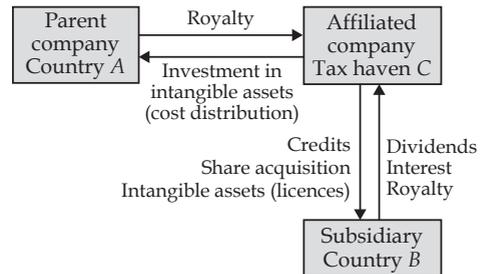
For the purpose of this study, mathematical models can be divided into the following categories:

- according to the way of approaching economic equilibrium – models with computable<sup>4</sup> [12, pp. 155–181; 16; 19] and postulated equilibrium [14; 17; 20; 21];
- according to the types of financial structures – models of bipartite or direct, non-intermediated holding structures [12, p. 123; 20; 21]; models of tripartite structures (involving intermediaries, usually registered in a tax haven)<sup>5</sup> [12, p. 129];
- according to the types of economic equilibrium – models of tax rate equilibrium [20; 21], models of corporate income equilibrium [14; 19]; and models of equilibrium in jurisdictions' incomes [19].

<sup>4</sup> OECD. Addressing Base Erosion and Profit Shifting (Russian version). OECD. OECD Publishing; 2013. DOI: [10.1787/9789264201262-ru](https://doi.org/10.1787/9789264201262-ru)

<sup>5</sup> OECD. Addressing Base Erosion and Profit Shifting (Russian version). OECD. OECD Publishing; 2013, pp. 91–100. DOI: [10.1787/9789264201262-ru](https://doi.org/10.1787/9789264201262-ru)

In order to solve our research problem – to describe the national taxation regime which will be able to deal efficiently with the problem of tax planning and the tax base erosion – we are going to use the models with postulated equilibrium that consider tripartite financial structures, that is, the structures including affiliates in offshores (Fig. 1), and equilibrium in the distribution of incomes across different jurisdictions.



**Figure 1. Illustration of a tripartite TNC structure with a subsidiary and a tax haven affiliate**

Source: OECD (2007). *Tax Effects on Foreign Direct Investment. Recent Evidence and Policy Analysis*. OECD Tax Policy Studies, No. 17, p. 129.

We have chosen this model type because in this study we don't aim to justify investment decisions and tax optimization from the standpoint of economic entities. Otherwise we would have to take into account such factors as time and place, which are crucial for their decision-making. This study focuses on the general principles of national policy-making in the sphere of international taxation of TNCs and thus is aimed at tackling the problem of tax base erosion and profit shifting. The new tax regime should be well adapted to the "new normalcy" of international economic relations, that is, increased competition for capitals and a wider range of ways of tax avoidance due to the proliferation of cross-border transactions involving digital goods and services.

The proposed approach draws from the ideas and mathematical models developed by renowned specialists in this sphere (D.W. Jorgenson [22; 23], J. Whalley [20; 24], M.P. Devereux [16; 25], and H. Grubert [14; 15; 26; 27]). The main difference between the proposed approach

and its counterparts (see, for example, [14; 20; 21]) is that it considers not only the methods of tax planning applied by TNCs but also the methods of counteracting tax planning applied by national governments (including secondary adjustments)<sup>6</sup> [25]). Furthermore, the outcomes of different policies are assessed not only regarding the interests of economic entities and tax authorities but also the interests of national economies in general (by taking into account the movement of capitals and revenues) and national welfare.

### 3. Description of the models

To realize the above-described methodological approach, we propose a set of models ranging from the simple to complex ones: we shall start from the mathematical description of the economic relations of ordinary companies belonging to two jurisdictions and finish with complex schemes of interactions of resident companies belonging to jurisdictions of three different types (ordinary, loyal and offshore). In doing this, we are going to take into account the diverse methods of tax planning applied by TNCs and the methods of counteracting tax planning applied by national governments. Tax evasion schemes involving corruption, smuggling and other criminal offences are not going to be considered or modelled in this study.

#### 3.1. Statement of the research problem

There are three tax jurisdictions (three countries): a parent jurisdiction,  $A$ ; a loyal jurisdiction (with liberal anti-offshore legislation),  $B$ ; and a tax haven (offshore jurisdiction),  $C$ .

There is also a certain TNC - a parent company and a resident of territory  $A$  ( $rA$ ) (which is, by default, the territory of the given country), where this company operates.

This parent company has a subsidiary (the parent controls more than a half of the subsidiary's stock) on the territory of loyal

jurisdiction  $B$  and an affiliated company on territory  $C$ . The subsidiary also has an affiliate on territory  $C$ . Territory  $C$  is used for concealing income and tax evasion by the residents of jurisdictions  $A$  and  $B$  rather than for any real economic activities.

Proceeding from this assumption, we have built a range of scenarios: from the simplest (basic) to more realistic ones, taking into consideration various methods of tax planning and the corresponding countermeasures. The basic scenario involves a bipartite financial structure while more complex and, therefore, more realistic scenarios, tripartite financial structures.

#### 3.2. Basic scenario. Model of a bipartite financial structure investing in fixed assets

The parent company has invested in fixed assets of its subsidiary by purchasing its shares ( $S$ ). The profit obtained by the subsidiary on territory  $B$  is repatriated in the form of dividends to territory  $A$ .

*Scenario description:*

a) The profit of the parent company in territory  $A$  is subject to taxation with the effective tax rate  $t_{AA}$  applied in territory  $A$ .

b) The profit of the subsidiary in territory  $B$  is taxed at the effective tax rate  $t_{BB}$  applied in territory  $B$ .

c) The profit of the subsidiary left once the taxes on territory  $B$  are paid is repatriated in the form of dividends to territory  $A$  and is subject to the repatriation taxes on dividend payments at the rate  $t_{S_{BAB}}$  applicable in jurisdiction  $B$ .

d) The profit repatriated in the form of dividends to territory  $A$  is subject to the repatriation taxes on dividend payments at the rate  $t_{S_{BAA}}$  applicable in parent jurisdiction  $A$  (in cases when  $A$  applies the residence principle).

e) If jurisdiction  $A$  applies the territoriality principle, then  $t_{S_{BAA}} = 0$  (but in this case royalty and interest are usually taxed).

f) If the dividends are not repatriated, then  $t_{S_{BAB}} = 0$  (but jurisdiction  $A$ , according to the residence principle, can charge a tax at the rate of  $t_{S_{BAA}}$  on the profit remaining in jurisdiction  $B$  in order to stimulate the repatriation of dividends).

<sup>6</sup> EY. Transfer pricing secondary adjustments. HMRC consultation. London: Ernst & Young LLP; 2016.

The above-described and following notations are based on the principles described below (Fig. 2):

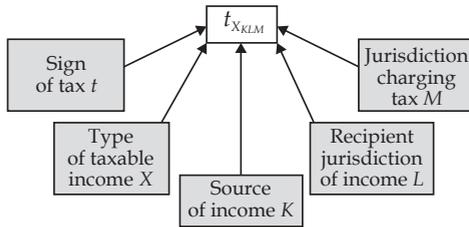


Figure 2. The general format of notations in the formulae (tax rates are used here as an example)

The main formula of the basic scenario is as follows:

$$D_A(1 - t_{AA}) = D_B(1 - t_{BB}) - D_B(1 - t_{BB})t_{S_{BAB}} - D_B(1 - t_{BB})t_{S_{BAA}} = D_B(1 - t_{BB})(1 - t_{S_{BAB}} - t_{S_{BAA}}). \quad (1)$$

This expression allows us to assess the impact of national tax policies on the behaviour of TNCs. When we plug the actual tax rates of different jurisdictions into formula (1), we can find in which jurisdiction (in this case A or B), the company's income net of taxation will be higher and, therefore, which jurisdiction will be more profitable for this company's business. If governments do not interfere into activities of economic entities (tax rates are 0%), then we are dealing with a situation of economic equilibrium – investment is equally beneficial in any of the jurisdictions ( $D_A = D_B$ ).

### 3.3. Complex scenario.

#### Model of a tripartite financial structure shifting profits into a tax haven

This is an expanded model taking into account tax planning methods (transferring a part of the income to tax haven C through a resident company in loyal jurisdiction B) and counter-measures: controlled transactions (CT) and application of the arm's length principle; controlled foreign corporations (CFC); and secondary adjustments (SA) (for more on secondary adjustments<sup>7</sup>).

<sup>7</sup> EY. Transfer pricing secondary adjustments. HMRC consultation. London: Ernst & Young LLP; 2016.

Its general formula (in a compressed form) looks the following way:

$$D_A^a + D_{CA}^p + D_{S_{AB}}^p + F_{AC} = D_{S_{BA}}^a + D_{BA}^p + D_{S_{CB}}^p + F_{BC}, \quad (2)$$

where  $D_A^a, D_{S_{BA}}^a$  are the net of tax incomes from the active business operations of the parent and its subsidiary on territories A and B respectively;

$D_{CA}^p, D_{S_{CB}}^p$  are the net passive incomes (presented separately due to the peculiarities of their taxation) of the parent and its subsidiary from affiliates in jurisdiction C;

$D_{BA}^p, D_{S_{AB}}^p$  are the net passive incomes obtained by the parent and its subsidiary from each other;

$F_{AC}, F_{BC}$  are the total “grey” incomes (both active and passive) shifted by the parent and its subsidiary to offshore jurisdiction C net of taxes on repatriation of passive incomes.

Each element of formula (2), in its turn, has its expanded expression:

1. Net incomes from active business operations of the parent company and its subsidiary in territory A ( $D_A^a$ ) includes the income from territory C ( $D_{AC}^a$ ) net of the “grey” income shifted to offshore jurisdiction C ( $F_{AC}$ ) and the taxes paid in territory A ( $T_{AC}^a$ ) plus the money saved through tax planning ( $T_{AC}^{a+}$ ), with consideration to the counter-measures taken by the national government ( $\Delta\varphi_{ACA}, \Delta\varphi_{R_{ACA}}, \Delta\varphi_{I_{ACA}}$ ):

$$D_A^a = D_{AC}^a - F_{AC} - T_{AC}^a + T_{AC}^{a+} = \{D_A(1 - d_{R_{AB}} - d_{I_{AB}} - d_{R_{CA}} - d_{I_{CA}})\} - \{D_A\varphi_{AC} + D_A(\varphi_{R_{AC}} + \varphi_{I_{AC}})\} - \{[D_A(1 - d_{R_{AB}} - d_{I_{AB}} - d_{R_{CA}} - d_{I_{CA}})]t_{AA}\} + \{D_A\Delta\varphi_{ACA}t_{AA} + D_A(\Delta\varphi_{R_{ACA}} + \Delta\varphi_{I_{ACA}})t_{AA}\}, \quad (3)$$

where  $d_{R_{AB}}$  is the income (not from active operations) in the form of royalties (R) received in territory A from territory B;

$d_{I_{AB}}$  is the interest income (I) received in territory A from territory B;

$d_{R_{CA}}$  is the income paid in the form of royalties (R) from territory A to territory C;

$d_{I_{CA}}$  is the interest income (I) from territory A to territory C;

$\varphi_{AC}, \varphi_{R_{AC}}, \varphi_{I_{AC}}$  are the “grey” incomes moved by the TNC to jurisdiction C by un-

derstating the market cost of goods (transfer pricing), overstating the royalties paid for the use of intangibles and credit interests respectively;

$\Delta\varphi_{ACA} = \varphi_{AC} - \varphi_{ACA}$  are the net “grey” incomes shifted by the TNC to jurisdiction C by understating the market cost of goods after country A has introduced measures to counter tax planning ( $\varphi_{ACA}$ );

$\Delta\varphi_{R,ACA} = \varphi_{R,AC} - \varphi_{R,ACA}$  are the net “grey” incomes shifted by the TNC to jurisdiction C by overstating royalty payments for intangibles after country A has introduced measures to counter tax planning ( $\varphi_{R,ACA}$ );

$\Delta\varphi_{I,ACA} = \varphi_{I,AC} - \varphi_{I,ACA}$  are the net “grey” incomes shifted by the TNC to jurisdiction C by overstating credit interest payments after country A has introduced measures to counter tax planning ( $\varphi_{I,ACA}$ ).

2. The net (of tax) income from active business operations of the parent and its subsidiary in loyal jurisdiction B looks the following way:

$$\begin{aligned}
 D_{S_{BA}}^a &= D_{BC}^a - F_{BC}^a - [T_{BC}^a - T_{BC}^{a+}] - \\
 &- [T_{S_{BAB}}^a - T_{S_{BAB}}^{a+}] - [T_{S_{BAA}}^a - T_{S_{BAA}}^{a+}] = \\
 &= \{D_B(1 - d_{R_{BA}} - d_{I_{BA}} - d_{R_{CB}} - d_{I_{CB}})\} - \\
 &- \{D_B\varphi_{BC} + D_B\varphi_{R_{BC}} + D_B\varphi_{I_{BC}}\} - \\
 &- \{[D_B(1 - d_{R_{BA}} - d_{I_{BA}} - d_{R_{CB}} - d_{I_{CB}})t_{BB}] - \\
 &- [D_B\Delta\varphi_{BCB}t_{BB} + D_B\Delta\varphi_{R_{BCB}}t_{BB} + D_B\Delta\varphi_{I_{BCB}}t_{BB}]\} - \\
 &- \{[D_B(1 - d_{R_{BA}} - d_{I_{BA}} - d_{R_{CB}} - d_{I_{CB}})(1 - t_{BB})t_{S_{BAB}}] - \\
 &- [D_B\Delta\varphi_{BCB}(1 - t_{BB})t_{S_{BAB}} + D_B\Delta\varphi_{R_{BCB}}(1 - t_{BB})t_{S_{BAB}} + \\
 &+ D_B\Delta\varphi_{I_{BCB}}(1 - t_{BB})t_{S_{BAB}}]\} - \\
 &- \{[D_B(1 - d_{R_{BA}} - d_{I_{BA}} - d_{R_{CB}} - d_{I_{CB}})(1 - t_{BB})t_{S_{BAA}}] - \\
 &- [D_B\Delta\varphi_{BCB}(1 - t_{BB})t_{S_{BAA}} + D_B\Delta\varphi_{R_{BCB}}(1 - t_{BB})t_{S_{BAA}} + \\
 &+ D_B\Delta\varphi_{I_{BCB}}(1 - t_{BB})t_{S_{BAA}}]\}. \quad (4)
 \end{aligned}$$

3. The net passive income obtained by the parent from its affiliate in an off-shore jurisdiction C is as follows:

$$\begin{aligned}
 D_{CA}^p &= [D_{CA}^p - F_{CA}^p - T_{CA}^p] = \\
 &= [D_{CA}^I + D_{CA}^R] - [F_{CA}^I + F_{CA}^R] - \\
 &- [T_{CA}^I + T_{CA}^R] + [T_{CA}^{I+} + T_{CA}^{R+}] = \\
 &= \{D_{R_{CA}} + D_{I_{CA}}\} - \{D_{R_{CA}}\varphi_{R_{CA}} + D_{I_{CA}}\varphi_{I_{CA}}\} - \\
 &- \{D_{I_{CA}}t_{I_{CA}} + D_{R_{CA}}t_{R_{CA}}\} + \\
 &+ \{D_{I_{CA}}\Delta\varphi_{I_{CAA}}t_{I_{CA}} + D_{R_{CA}}\Delta\varphi_{R_{CAA}}t_{R_{CA}}\}. \quad (5)
 \end{aligned}$$

4. The net passive income obtained by the subsidiary from the affiliate in an off-shore jurisdiction C is as follows:

$$\begin{aligned}
 D_{S_{CB}}^p &= D_{CB}^I + D_{CB}^R - [F_{CB}^I + F_{CB}^R] - [T_{CB}^I + T_{CB}^R] + \\
 &+ [T_{CB}^{I+} + T_{CB}^{R+}] - [T_{S_{BAB}}^{I_{CB}} + T_{S_{BAB}}^{R_{CB}}] + [T_{S_{BAB}}^{I_{CB+}} + T_{S_{BAB}}^{R_{CB+}}] - \\
 &- [T_{S_{BAA}}^{I_{CB}} + T_{S_{BAA}}^{R_{CB}}] + [T_{S_{BAA}}^{I_{CB+}} + T_{S_{BAA}}^{R_{CB+}}] = \\
 &= D_{I_{CB}} + D_{R_{CB}} - \{D_{I_{CB}}\varphi_{I_{CB}} - D_{R_{CB}}\varphi_{R_{CB}}\} - \\
 &- \{D_{I_{CB}}t_{I_{CB}} + D_{R_{CB}}t_{R_{CB}}\} + \\
 &+ \{D_{I_{CB}}\Delta\varphi_{I_{CBB}}t_{I_{CB}} + D_{R_{CB}}\Delta\varphi_{R_{CBB}}t_{R_{CB}}\} - \\
 &- \{[(D_{I_{CB}} - D_{I_{CB}}t_{I_{CB}} - D_{I_{CB}}\Delta\varphi_{I_{CBB}})t_{S_{BAB}}] + \\
 &+ [(D_{R_{CB}} - D_{R_{CB}}t_{R_{CB}} - D_{R_{CB}}\Delta\varphi_{R_{CBB}})t_{S_{BAB}}]\} + \\
 &+ \{[(D_{I_{CB}}\Delta\varphi_{I_{CBB}}t_{I_{CB}})t_{S_{BAB}}] + \\
 &[(D_{R_{CB}}\Delta\varphi_{R_{CBB}}t_{R_{CB}})t_{S_{BAB}}]\} - \\
 &- \{[(D_{I_{CB}} - D_{I_{CB}}t_{I_{CB}} - D_{I_{CB}}\Delta\varphi_{I_{CBB}})t_{S_{BAA}}] + \\
 &+ [(D_{R_{CB}} - D_{R_{CB}}t_{R_{CB}} - D_{R_{CB}}\Delta\varphi_{R_{CBB}})t_{S_{BAA}}]\} + \\
 &+ \{[(D_{I_{CB}}\Delta\varphi_{I_{CBB}}t_{I_{CB}})t_{S_{BAA}}] + \\
 &+ [(D_{R_{CB}}\Delta\varphi_{R_{CBB}}t_{R_{CB}})t_{S_{BAA}}]\}. \quad (6)
 \end{aligned}$$

5. The net passive income obtained by the parent from its subsidiary:

$$\begin{aligned}
 D_{BA}^p &= D_{S_{BA}}^I + D_{S_{BA}}^R - \\
 &- [T_{I_{BAB}}^I + T_{R_{BAB}}^R] - [T_{I_{BAA}}^I + T_{R_{BAA}}^R] = \\
 &= D_{I_{BA}} + D_{R_{BA}} - \{D_{I_{BA}}t_{I_{BAB}} + D_{R_{BA}}t_{R_{BAB}}\} - \\
 &- \{D_{I_{BA}}t_{I_{BAA}} + D_{R_{BA}}t_{R_{BAA}}\}. \quad (7)
 \end{aligned}$$

6. The net passive income obtained by the subsidiary from its parent:

$$\begin{aligned}
 D_{S_{AB}}^p &= D_{S_{AB}}^p - T_{ABA}^p - T_{ABB}^p - T_{S_{BAB}}^{pAB} - T_{S_{BAA}}^{pAB} = \\
 &= [D_{S_{AB}}^I + D_{S_{AB}}^R] - \\
 &- [T_{I_{ABA}}^I + T_{R_{ABA}}^R] - [T_{I_{ABB}}^I + T_{R_{ABB}}^R] - \\
 &- [T_{S_{BAB}}^I + T_{S_{BAB}}^R] - [T_{S_{BAA}}^I + T_{S_{BAA}}^R] = \\
 &= \{D_{R_{AB}} + D_{I_{AB}}\} - \{D_{I_{AB}}t_{I_{ABA}} + D_{R_{AB}}t_{R_{ABA}}\} - \\
 &- \{D_{I_{AB}}t_{I_{ABB}} + D_{R_{AB}}t_{R_{ABB}}\} - \\
 &- \{D_{R_{AB}}(1 - t_{R_{ABA}} - t_{R_{ABB}})t_{S_{BAB}} + \\
 &+ D_{I_{AB}}(1 - t_{I_{ABA}} - t_{I_{ABB}})t_{S_{BAB}}\} - \\
 &- \{D_{R_{AB}}(1 - t_{R_{ABA}} - t_{R_{ABB}})t_{S_{BAA}} + \\
 &+ D_{I_{AB}}(1 - t_{I_{ABA}} - t_{I_{ABB}})t_{S_{BAA}}\}. \quad (8)
 \end{aligned}$$

7. The overall amount of the active and passive “grey” incomes shifted by the

parent to offshore jurisdiction C net of repatriation taxes on passive incomes:

$$\begin{aligned}
 F_{AC} &= [(F_{AC}^a - T_{ACA}^p + F_{CA}^p)] = \\
 &= [(F_{AC}^a - (T_{ACA}^I + T_{ACA}^R) + F_{CA}^I + F_{CA}^R)] = \\
 &= \{[D_A \varphi_{AC} + D_A \varphi_{R_{AC}} + D_A \varphi_{I_{AC}}] - \\
 &\quad - (D_A \varphi_{R_{AC}} t_{R_{ACA}} + D_A \varphi_{R_{AC}} t_{R_{ACA}})\} + \\
 &\quad + \{D_{I_{CA}} \varphi_{I_{CA}}\} + \{D_{R_{CA}} \varphi_{R_{CA}}\}. \quad (9)
 \end{aligned}$$

8. The overall amount of the active and passive “grey” incomes shifted by the subsidiary to offshore jurisdiction C net of repatriation taxes on passive incomes:

$$\begin{aligned}
 F_{BC} &= [(F_{BC}^a + F_{CB}^I + F_{CB}^R)] = \\
 &= [(F_{BC}^m - (T_{BCB}^I + T_{BCB}^R) + F_{CB}^I + F_{CB}^R)] = \\
 &= \{[D_B \varphi_{BC} + D_B \varphi_{R_{BC}} + D_B \varphi_{I_{BC}}] - \\
 &\quad - (D_B \varphi_{R_{BC}} t_{R_{BCB}} + D_B \varphi_{R_{BC}} t_{R_{BCB}})\} + \\
 &\quad + \{D_{I_{CB}} \varphi_{I_{CB}}\} + \{D_{R_{CB}} \varphi_{R_{CB}}\}. \quad (10)
 \end{aligned}$$

Unlike the basic model, this model allows us to consider tax planning in all its complexity, including a subsidiary registered in a loyal jurisdiction and having connections with a tax haven. Moreover, with the help of this model we can find out which methods of countering such sophisticated tax planning strategies are likely to be most efficient.

**3.4. Complex scenario focused on national welfare. Model of a tripartite financial structure with incomes previously shifted to a tax haven**

The above-described scenarios considered models of tax equilibrium regarding the interests of economic entities. However, national economies comprise not only private but also public enterprises financed by taxes. It is obvious that the interests of the states are much wider than those of private economic entities and, therefore, require us to take into account the tax revenues of national governments.

If we formulate our research question in such a way, the logic of mathematical modelling will change: while in the above-described models we focused on corporate income equilibrium regardless of the jurisdiction (and, therefore, regardless of which jurisdiction will benefit from

these assets), now we are going to look at the situation from the perspective of the national interests of jurisdiction A by taking into account the global incomes of a multinational corporation accumulated within this jurisdiction (including “grey” incomes) as well as tax revenues *T* of jurisdiction A.

In this case, the economic equilibrium model will consider the equilibrium of incomes of different territories and the incomes of territory A will be calculated the following way:

$$\begin{aligned}
 D_{ABC}^c + T &= \\
 &= D_A^a + (D_{S_{BA}}^a + D_{S_{CB}}^p + D_{S_{AB}}^p + D_{BA}^p) + \\
 &\quad + D_{CA}^p + T_{ABC}^c - T_{ABC}^{c+}, \quad (11)
 \end{aligned}$$

where  $D_{ABC}^c$  is the income from three territories (as distinct from the previous scenarios, which took into account only the company’s income from the territory of its registration and tax haven C);

$D_{S_{BA}}^a, D_{S_{CB}}^p, D_{S_{AB}}^p$  are the dividends obtained by the parent from its subsidiary (from active business operations –  $D_{S_{BA}}^a$ ; in the form of passive income –  $D_{S_{CB}}^p, D_{S_{AB}}^p$ ).

Taxes *T* charged by state A include taxes on incomes from territories A, B and C and on incomes repatriated to jurisdictions B and C ( $T_{ABC}^c$ ), reduced by the sums of payments saved by TNCs as a result of tax planning ( $T_{ABC}^{c+}$ ):

$$\begin{aligned}
 T &= T_{ABC}^c - T_{ABC}^{c+} = \\
 &= [(T_{AC}^a - T_{AC}^{a+}) + (T_{ACA}^I + T_{ACA}^R) + \\
 &\quad + (T_{ABA}^I + T_{R_{ABA}}^R)] + [(T_{S_{BAA}}^a - T_{S_{BAA}}^{a+}) + \\
 &\quad + ((T_{S_{BAA}}^{I_{CB}} + T_{S_{BAA}}^{R_{CB}}) - (T_{S_{BAA}}^{I_{CB}^+} + T_{S_{BAA}}^{R_{CB}^+}) + \\
 &\quad + (T_{S_{BAA}}^{I_{AB}} + T_{S_{BAA}}^{R_{AB}}) + (T_{I_{BAA}}^I + T_{R_{BAA}}^R)] + \\
 &\quad + [(T_{CA}^I + T_{CA}^R) - (T_{CA}^{I+} + T_{CA}^{R+})], \quad (12)
 \end{aligned}$$

where  $T_{AC}^a$  signifies the tax revenues of jurisdiction A from the active business operations of the parent company;

$T_{AC}^{a+}$  means the losses in tax revenues of jurisdiction A from active business operations of the parent company and the passive operations when incomes are shifted from jurisdiction A to offshore jurisdiction C as a result of tax planning;

$T_{ACA}^I, T_{R_{ACA}}^R$  are the tax revenues of jurisdiction A in the form of taxes on re-

patriated passive income (interests and royalties) when the income is paid from jurisdiction A to offshore jurisdiction C;

$T_{I_{ACA}}^I, T_{R_{ABA}}^R$  are the tax revenues of jurisdiction A in the form of taxes on repatriated passive income (interests and royalties) when the income is paid from jurisdiction A to loyal jurisdiction B;

$T_{S_{BAA}}^a$  means the tax revenues of jurisdiction A in the form of the tax on dividends from the subsidiary's active business income;

$T_{S_{BAA}}^{a+}$  stands for the losses in tax revenues of jurisdiction A in the form of taxes on dividends from the subsidiary's income from active and passive operations when the income is paid from loyal jurisdiction B to offshore jurisdiction C as a result of tax planning;

$T_{S_{BAA}}^{I_{CB}}, T_{S_{BAA}}^{R_{CB}}$  are the tax revenues of jurisdiction A in the form of taxes on dividends from passive operations when the income is paid from offshore jurisdiction C to loyal jurisdiction B;

$T_{S_{BAA}}^{I_{CB}+}, T_{S_{BAA}}^{R_{CB}+}$  are the losses in tax revenues of jurisdiction A in the form of taxes on the subsidiary's passive income when the income is paid from offshore jurisdiction C to loyal jurisdiction B as a result of tax planning;

$T_{S_{BAA}}^{I_{AB}}, T_{S_{BAA}}^{R_{AB}}$  are the tax revenues of jurisdiction A in the form of taxes on the income from passive operations when the income is paid from jurisdiction A to loyal jurisdiction B;

$T_{I_{BA}}^I, T_{R_{BAA}}^R$  are the tax revenues of jurisdiction A in the form of taxes on passive income (interests, royalties) when the income is paid from loyal jurisdiction B to jurisdiction A;

$T_{CA}^I, T_{CA}^R$  are the tax revenues of jurisdiction A in the form of taxes on passive income (interests, royalties) when the income is paid from loyal jurisdiction C to jurisdiction A;

$T_{CA}^{I+}, T_{CA}^{R+}$  are the losses in tax revenues of jurisdiction A in the form of taxes on passive income (interests, royalties) when the income is paid from offshore jurisdiction C to jurisdiction A;

$$T_{AC}^a = [D_A(1 - d_{R_{AB}} - d_{I_{AB}} - d_{R_{CA}} - d_{I_{CA}})]t_{AA};$$

$$T_{AC}^{a+} = D_A \Delta \varphi_{ACA} t_{AA} + D_A (\Delta \varphi_{R_{CA}} + \Delta \varphi_{I_{CA}}) t_{AA};$$

$$T_{I_{ACA}}^I = D_A \varphi_{I_{AC}} t_{I_{ACA}}; T_{R_{ACA}}^R = D_A \varphi_{R_{AC}} t_{R_{ACA}};$$

$$T_{I_{ABA}}^I = D_{I_{AB}} t_{I_{ABA}}; T_{R_{ABA}}^R = D_{R_{AB}} t_{R_{ABA}};$$

$$T_{CA}^{I+} = D_{I_{CA}} \Delta \varphi_{I_{CA}} t_{I_{CA}};$$

$$T_{CA}^{R+} = D_{R_{CA}} \Delta \varphi_{R_{CA}} t_{R_{CA}};$$

$$T_{S_{BAA}}^a = D_B(1 - d_{R_{BA}} - d_{I_{BA}} - d_{R_{CB}} - d_{I_{CB}}) \times (1 - t_{BB}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{a+} = D_B \Delta \varphi_{BCB} (1 - t_{BB}) t_{S_{BAA}} + D_B \Delta \varphi_{R_{RCB}} (1 - t_{BB}) t_{S_{BAA}} + D_B \Delta \varphi_{I_{BCB}} (1 - t_{BB}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{I_{CB}} = D_{I_{CB}} (1 - t_{I_{ABA}} - t_{I_{ABB}}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{R_{CB}} = D_{R_{CB}} (1 - t_{R_{ABA}} - t_{R_{ABB}}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{I_{CB}+} = (D_{I_{CB}} \Delta \varphi_{I_{CB}} t_{I_{CB}}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{R_{CB}+} = (D_{R_{CB}} \Delta \varphi_{R_{CB}} t_{R_{CB}}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{I_{AB}} = D_{I_{AB}} (1 - t_{I_{ABA}} - t_{I_{ABB}}) t_{S_{BAA}};$$

$$T_{S_{BAA}}^{R_{AB}} = D_{R_{AB}} (1 - t_{R_{ABA}} - t_{R_{ABB}}) t_{S_{BAA}};$$

$$T_{I_{BA}}^I = (D_{I_{BA}} (1 - t_{I_{BAB}})) t_{I_{BA}};$$

$$T_{R_{BAA}}^R = (D_{R_{BA}} (1 - t_{R_{BAB}})) t_{R_{BAA}};$$

$$T_{CA}^I = D_{I_{CA}} t_{I_{CA}}; T_{CA}^R = D_{R_{CA}} t_{R_{CA}};$$

$$T_{CA}^{I+} = D_{I_{CA}} \Delta \varphi_{I_{CA}} t_{I_{CA}};$$

$$T_{CA}^{R+} = D_{R_{CA}} \Delta \varphi_{R_{CA}} t_{R_{CA}}.$$

Together the models show the movements of capitals and incomes inside the TNC structure operating in different countries. The company redistributes its incomes among these countries by using methods of tax planning while pursuing its own economic interests. An important factor in the TNC's choice of strategies is the policy of each country in the sphere of international taxation (how efficiently their governments manage to prevent profit shifting). This factor determines changes in the international capital flows and, consequently, the amount and structure of taxes, performance of transnational corporations, and trends in national welfare.

**3.5. Implementation of the mathematical models**

The mathematical models were calculated by using spreadsheet software Microsoft Excel. First, we checked the models for adequacy (whether the model reacts logically to external regulators such as taxes, tax planning and counter-measures). Second, we designed a program of computational experiments (see Table 1) to investigate the efficien-

cy of different policy measures in this sphere.

The mathematical models were then parameterized, that is, we assigned numerical values to variables. For this purpose we chose the countries which are of particular interest to the Russian Federation as trade partners and those that are often used for tax planning – loyal (Laos, Malta, and Cyprus) and offshore (British Virgin Islands, Panama) jurisdictions (Table 2).

Table 1

**Description of computational experiments and their variants**

No measures are taken to repatriate the incomes shifted to lower-tax jurisdictions	Corporate profits	<b>Experiment 1</b> CFC rules are not applied, the corporate income tax rate is nominal	A	
			B	
		$\Delta$ between countries A and B		
		<b>Experiment 2</b> CFC and CT rules are applied, the corporate income tax rate is nominal	A	
	B			
	$\Delta$ between countries A and B			
	National welfare	<b>Experiment 3</b> Analysis of the effect of CFC and CT rules at nominal rates of the corporate income tax	CFC rules are not applied	A
				B
				C
			CFC and CT rules are applied	A
B				
C				
$\Delta$ for country A				
<b>Experiment 4</b> Analysis of the losses in tax revenues if CFC rules are not applied and the tax rates are effective		100% participation	A	
			B	
			C	
	20% participation (avoidance of CFC rules)	A		
		B		
		C		
$\Delta$ of country A				
Corporate profits	<b>Experiment 5</b> CFC and SA rules are not applied, the corporate income tax rate is nominal	A		
		B		
		$\Delta$ between countries A and B		
	<b>Experiment 6</b> CFC, CT and SA rules are applied, the corporate income tax rate is nominal	A		
		B		
		$\Delta$ between countries A and B		
With respect to national welfare	<b>Experiment 7</b> Analysis of the effect of CFC, CT and SA rules if the corporate income tax rate is nominal	CFC and SA rules are not applied in country B	A	
			B	
			C	
		CFC, CT and SA	A	
			B	
			C	
	$\Delta$ for country A			
	<b>Experiment 8</b> Analysis of the losses in tax revenues if CFC and SA rules are not applied and the tax rate is effective	100% participation	A	
			B	
			C	
20% participation (avoidance of CFC, CT and SA)		A		
		B		
		C		
$\Delta$ for country A				

Table 2

## Characteristics of tax instruments used by specific loyal jurisdictions

No	Jurisdiction (form of company registration)	1		2		3		4		5		6	
		nominal	actual*	nominal	actual	nominal	actual	nominal	actual	nominal	actual	nominal	actual
1	Netherlands (BV)	0.47	-	0.25	-	0	0	0.25	0.25	0.25	0.25	0.15	0.05; 0.15
2	Ireland (Resident Privat LTD)	0.26	-	0.125; 0.25	-	0.13	0.03	0.25	0.25	0.125; 0.25	0.125; 0.25	0.2	0.1
3	Switzerland (AG/SA/LTD)	0.288	-	0.12-0.24	-	0; 0.12-0.24	0; 0.07-0.09	0.12-0.24	0.12-0.24	0.12-0.24	-	0.35	0; 0.05; 0.15
4	Switzerland (GmbH/SARL)	0.288	-	0.12-0.24	-	0; 0.12-0.24	-	0.12-0.24	-	0.12-0.24	0.12-0.24	0.35	0; 0.05; 0.15
5	Cyprus (BC)	0.227	-	0.125	-	0	0	0; 0.125	0; 0.125	0.125*0.2	-	0	0.05; 0.1
6	Malta (Private LLC)	0.439	-	0.35	-	0; 0.35	-	0.35	-	0.35	0.125*0.2	0	0.05; 0.1
7	Liechtenstein (AG)		-	0.125	-	0	0	0.125	0	0.125	0	0	0.2
8	Luxembourg (SARL)	0.205	-	0.18	-	0; 0.18	0; 0.13-0.03	0.18	0.18	0.18*0.2	0.18*0.2	0.15	0.05; 0.15
9	Montenegro	0.221	-	0.09	-	0.09	0	0.09	0	0.09	0	0.09	0.05; 0.15
10	Armenia	0.185	-	0.2	-	0.2	0.15; 0.1	0.2	0.1	0.2	0.2	0.1	0.05; 0.1
11	Moldova	0.405	-	0.12	-	0.12	0.02	0.12	0.12	0.12	0.02	0.06	0.1
12	Kirghizia	0.29	-	0.1	-	0.1	0	0.1	0	0.1	0	0.1	0.1
13	Bulgaria	0.271	-	0.1	-	0; 0.1	0	0.1	0	0.1	0	0; 0.05	0.15
14	Scotland (LP)		-	0*	-	0*	-	0*	-	0*	-	0*	n/a
15	Laos	0.262	-	0.24	-	0	0	0.24	0.14	0.24	0.24	0.1	0.1

Compiled by using the data: Deloitte. Tax guides and highlights, 2018; Tax Foundation. Designing a Territorial Tax System: A Review of OECD Systems, 2017; PwC. World Tax Summaries. Corporate Taxes 2017/18; EX. Worldwide Corporate Tax Guide, 2017.

As a result, for our computational experiments we selected Russia as a parent jurisdiction, Laos as a typical loyal jurisdiction for opening subsidiaries, and the British Virgin Islands (BVI) as a typical offshore jurisdiction. Instead of these countries we could have used any other countries corresponding to the given types of jurisdictions since in this case what matters is not the intricacies of tax legislations of specific countries but the key factors that determine TNCs' behaviour and efficient policies in the sphere of international taxation.

The purpose of our experiments was to analyze the most relevant situations in international taxation, first regarding TNCs' economic interests and then, regarding the national welfare of the parent jurisdiction. The series of experiments also tested the efficiency of such key methods of tax regulation of international capital flows as CT, CFC and SA in different situations and in different combinations.

#### **4. Modelling results and discussion**

The results of the computational experiments are shown in Table 3.

This table contains the description of each experiment and the economic interpretation of its results (regarding corporate economic interests and national welfare) as well as the information about the net (of taxes) incomes allocated to different jurisdictions and the difference ( $\Delta$ ), which is used to check the profitability of investment, including the net income, taxes and "grey" incomes shifted to an offshore.

##### **4.1. Efficiency of controlled transactions (CT) rules**

When the government resorts to such tough measures as CT rules, it may be detrimental to the economic interests of TNCs (see Experiment 1 in Table 3).

As the results of our computational experiments have shown, when CT rules are not applied to the subsidiary, the net income of the parent in home jurisdiction (39.6 units) is slightly lower than the income of its subsidiary in Laos (46.0 units), which means that the parent company in

Russia may be economically motivated to establish a subsidiary in a loyal jurisdiction (Laos) and use it for its economic activities – debit and credit operations. It thus makes sense for the TNC to engage in tax planning and benefit from the opportunities provided by the offshore jurisdiction (BVI) even though the nominal rate of the corporate income tax in jurisdiction B (24%) is higher than in jurisdiction A (20%).

It should be noted that the more efficiently the rules are enforced, the less income is left to the company in the parent jurisdiction since these funds are redistributed in the form of tax revenues for the benefit of the government. Consequently, the TNC becomes interested in avoiding the CT rules through expanding its activities in the loyal and offshore jurisdictions to the detriment of the parent jurisdiction. For the government, CT rules may turn into a source of problems since instead of the extra tax revenues the result might be the shrinking tax base and tax revenue losses. This result appears even more disappointing from the perspective of national welfare since the country risks losing capitals (which may entail losses of jobs, production outputs and so on) and tax revenues.

There is yet another important point worth considering. As far as intangible assets are concerned, CT rules usually prove to be ineffective since accelerated digitalization has been changing the principles of price-setting, which means that TNCs will always find ways of shifting a part of their income and avoiding taxes through transfer pricing of intangibles.

##### **4.2. Efficiency of controlled transactions and controlled foreign corporation rules (CT+CFC)**

For TNCs the introduction of CFC rules in addition to CT rules (Experiment 2 in Table 3) increases the negative effect since, if these rules are imposed on the subsidiary in the loyal jurisdiction, the offshore company will be also subject to these rules. The result is the fall in the subsidiary's income (redistributed in the form of taxes for the benefit of the parent juris-

Table 3

**Results of the computational experiments for the cases of Russia (parent jurisdiction A), Laos (loyal jurisdiction B) and the BVI (offshore C)**

Scenarios		Total	Total income								
			net incomes		taxes		"grey" incomes				
			total	includ- ing divi- dends	total	includ- ing tax saving	total	includ- ing repa- triated incomes			
No measures are taken to repatriate the incomes shifted to lower-tax jurisdictions	Corporate profits	Experiment 1	A	77.6	39.6	0.0	-22.4	0.0	38.0	-2.0	
			B	85.0	46.0	45.6	-24.6	9.6	39.0	-1.0	
			Δ between A and B	-7.4	-6.4	-45.6	2.2	-9.6	-1.0	-1.0	
	Corporate profits	Experiment 2	A	77.6	39.6	0.0	-22.4	0.0	38.0	-2.0	
			B	63.1	24.1	23.7	-36.9	0.0	39.0	-1.0	
			Δ between A and B	14.5	15.5	-23.7	14.5	0.0	-1.0	-1.0	
	National welfare	Experiment 3	without CFC	A	63.0	40.0	0.0	23.0	0	38.0	-2.0
				B	60	45.6	45.6	14.4	-9.6	39.0	-1.0
				C	77.0					77.0	
		CT and CFC	A	84.9	40.0	0.0	44.9	0.0	38.0	-2.0	
			B	38.1	23.7	23.7	14.4	0.0	39.0	-1.0	
			C	77.0					77.0		
		Δ for A	-21.9	0.0	0.0	-21.9	0.0	0.0	0.0		
	Experiment 4	100% participation	A	103.8	60.0	39.6	43.8	-0.7	38.0	-2.0	
			B	19.2	0.0	0.0	19.2	-12.7	39.0	-1.0	
			C	77.0					77.0		
		20% participation (avoidance of CFC rules)	A	71.1	28.3	7.9	42.8	-0.1	38.0	-2.0	
			B	51.8	35.8	35.8	16.0	-10.7	39.0	-1.0	
	C		77.0								
	Δ for A	32.7	31.7	31.7	1.0	-0.6	0.0	0.0			
	Measures are taken to repatriate the incomes shifted to lower-tax jurisdictions	Corporate profits	Experiment 5	A	79.6	79.6	0.0	-20.4	0.0	0.0	-40.0
				B	85.0	46.0	45.6	-24.6	9.6	39.0	-1.0
				Δ between A and B	-5.4	33.6	-45.6	4.2	-9.6	-39.0	-39.0
		Corporate profits	Experiment 6	A	79.6	79.6	0.0	-20.4	0.0	0.0	-40.0
B				62.5	62.5	62.5	-37.5	0.0	0.0	-40.0	
Δ between A and B				17.1	17.1	-62.5	17.1	0.0	0.0	0.0	
National welfare		Experiment 7	without CFC and SA in B	A	101.0	80.0	0.0	21.0	0.0	0.0	-40.0
				B	60.0	45.6	45.6	14.4	-9.6	39.0	-1.0
				C	39.0					39.0	
		CFC, CT and SA	A	116.9	80.0	0	36.9	0.0	0.0	-40.0	
			B	83.1	60.1	60.1	23.0	0.0	0.0	-40.0	
C			0.0						-80.0		
Δ for A		-15.9	0.0	0.0	-15.9	0.0	0.0	0.0			
Experiment 8		100% participation	A	141.8	100	39.6	41.8	-0.8	0.0	-40.0	
			B	19.2	0.0	0	19.2	-12.7	39.0	-1.0	
			C	39.0					39.0		
		20% participation (avoidance of CFC and SA rules)	A	109.1	68.3	7.9	40.8	-0.2	0.0	-40.0	
			B	51.8	35.8	35.8	16	-10.7	39.0	-1.0	
C			39.0					39.0			
Δ for A		32.7	31.7	31.7	1.0	-0.6	0.0	0.0			

diction). In this case, the parent's income in home jurisdiction will remain the same and will be 39.6 units while that of its subsidiary in Laos will fall to 24.1, which means that for the parent it is no longer feasible to open a subsidiary in a loyal jurisdiction, that is, CFC rules are effective in this case. Nevertheless, the same way as with CT rules, the "grey" income shifted to an offshore is not affected by these measures and, therefore, in this case the government fails to prevent profit shifting and tax base erosion. Furthermore, if we look at this situation from the perspective of national welfare (see Experiment 4 in Table 3), these rules do not give any advantage to the parent jurisdiction in comparison with the situation when CFC rules are not applied since an increase in tax revenues is compensated by the decrease in the dividends from the subsidiary (reduced by the amount of difference between the tax calculated according to CFC rules and the tax paid by the subsidiary in the loyal jurisdiction and thus making it possible for the TNC to claim tax relief under the double tax treaty).

Moreover, we should remember that there are means and ways of dodging CFC rules. One of the ways widely used by TNCs is to reduce the *de jure* (on paper) participation of the parent in the subsidiary's equity to the minimal required level (in Russia – 25% or less), which is detrimental to the national welfare of jurisdiction *A* as the dividends are attributed and paid to other affiliates which buy shares of the subsidiary or are residents of other (usually offshore) jurisdictions.

Our calculations (see Experiment 4 in Table 3) have shown that if country *A* imposes CT and CFC rules on the subsidiary while the TNC tries to dodge these rules, the national welfare of *A* (the sum of tax revenues and net incomes) will fall by 32.7 units due to the drop in the net income of the parent company (from 60 to 28.3) in the form of dividends from the subsidiary (from 39.6 to 7.9). Losses in tax revenues are 1.0 units. Thus, the application of CFC rules in combination with CT rules can bring some paradoxical outcomes: instead of enhancing the country's

economic development through efficient anti-base erosion measures, the government may fail to increase the tax revenues and at the same time face a massive outflow of capitals (due to increased hidden incomes in off-shore jurisdictions – in this case up to 77 units).

#### **4.3. Efficiency of controlled transactions, controlled foreign corporation and secondary adjustments rules (CT+CFC+SA)**

The application of CFC and SA rules in relation to the offshore will push TNCs towards moving back their now taxable "grey" incomes from the parent's operations with an offshore (see Experiment 5 in Table 3). On the one hand, if we look at it from the perspective of national welfare, it is an obviously positive result. On the other hand, such policy encourages TNCs to compensate for their losses by transferring some of their profits to offshores through a loyal jurisdiction. At the end of the day, this will mean that despite all the harsh anti-base erosion measures applied by country *A* in relation to the offshore, the schemes of tax planning will still be effective because the companies will be realizing them through their subsidiaries in loyal jurisdictions. In this situation, if CFC and SA rules are not applied to the subsidiary in a loyal jurisdiction, the net profits of the parent in Russia (79.6) will be considerably higher than the profits of its subsidiary in Laos (46.0 units), which means that by trying to return the hidden income from the parent's operations with the offshore, country *A* increases its net income. From the company's perspective, however, the net income of its subsidiary in jurisdiction *B* (inclusive of "grey" income) is 85,0 units, which makes a slightly larger sum than the income of the parent company. Moreover, about a half of these funds will be accumulated in the offshore. In other words, if there is only one country engaged in the struggle (Russia) and this struggle is directed only against offshores, these efforts are doomed to failure.

As a logical next step, the government of the home jurisdiction can impose CT, CFC, and SA rules on the parent company's subsidiaries in loyal jurisdictions.

Chances are that such scheme would be effective because in this case the TNC will be unable to resort to tax planning as it is bound by the law in all jurisdictions. As Experiment 8 demonstrates, in the situation similar to that of Experiment 4, TNCs can take measures to counter the government's efforts by de jure (on paper) reducing their participation in the capital of the subsidiary in loyal jurisdiction *B* to the level below 25%. Therefore, the government of country *A* won't be able to impose CFC rules and, consequently, SA rules on the subsidiary.

In this case, there will be a considerable decline in the welfare of territory *A* (by 32.7 units) due to the fall in the net income of the parent company (from 100 to 68.3). The losses in tax revenues of the country in question will be 1.0 units (41.8-40.8). Such negative effect can be explained by the drop in dividends paid by the subsidiary in loyal jurisdiction *B* to jurisdiction *A* (from 39.6 to 7.9).

In other words, if higher-tax parent jurisdiction *A* (Russia) has rigorous anti-offshore legislation, the TNC will be tempted to look for loopholes to avoid CFC and SA rules and operate through loyal jurisdictions (in our case Laos) and still enjoy the opportunity of shifting its "grey" incomes to the offshore (39.0).

Thus, in this scenario, a TNC has five main alternatives to choose from:

- 1) to accept the "inevitable" and play by the fair rules of the parent jurisdiction;
- 2) to try to partially compensate for the losses incurred from the imposition of these rules, for example, by using tax planning schemes involving transfer pricing of hard-to-value intangibles;
- 3) avoid these rules by reducing its participation in subsidiaries and affiliates to less than 25%, which is quite a big risk;
- 4) de facto reduce its participation in the business to less than 25%, that is, all but withdraw from active business;
- 5) leave this business altogether.

Which alternative the TNC will go for depends on different factors. From the perspective of national welfare, the first and second alternatives are more preferable but they are not very likely to be the TNC's first

choice. It all depends on the impact of other factors, in particular how comfortable and convenient it is for companies to operate in the parent jurisdiction, whether the "rules of the game" are short-lived or not, how well protected are companies' property rights, how favourable is the business climate and how low are the transaction costs for companies to remain competitive in the home market and international markets. If the transaction costs are too high and damage the company's performance, it will probably choose alternatives 3-5, which cannot be considered as a positive outcome in terms of national welfare.

## 5. Conclusion

In the modern globalized economy, measures to counter tax base erosion and profit shifting to lower- or zero-tax jurisdictions can often bring some unpredictable or contradictory results, in other words, some gain may also entail some loss.

Normally, when approaching this problem, scholars justify the application of such measures in relation to TNCs by pointing out the revenue losses incurred by national governments. However, if we assess the efficiency of such measures not from the fiscal perspective but from the point of view of national welfare, it becomes evident that governments should proceed with extreme caution. Reduction of tax avoidance can be accompanied by a decline in business activity and the shrinking national tax base, which will naturally hamper the country's economic growth.

As the results of mathematical modelling and computational experiments have shown, when seen from the perspective of national welfare, CT rules, meant to curtail tax base erosion, fail to provide the anticipated outcomes when applied within the extensive tax planning network, in particular in the conditions of accelerated digitalization. The same can be said about the combination of CT and CFC rules. All of the above casts doubt on the efficiency of the whole system of countering income concealment and tax base erosion used by national governments.

It doesn't follow, however, that any attempts to improve or develop this sys-

tem need to be abandoned. What it means is that punishments and prohibitions are hardly a panacea, especially if there is a lack of coordination in the efforts of national governments on a higher, international level.

Therefore, the policy makers should be concerned not only with improving national mechanisms of countering base erosion and profit shifting (the negative stimuli) but, first and foremost, with creating positive stimuli – favourable conditions for retaining the capital in the long run such as a good investment climate, low business transaction costs, economic incentives for innovation based on territorial and technological principles, and so on.

The Russian government seeks to address these problems by creating stimuli for foreign investors, although there is still a long way to go in this respect since in the Corruption Perceptions Index Russia is at the bottom of the list.

As for international economic relations, the following recommendations can be formulated. An efficient fiscal policy should be aimed at a slow, gradual change rather than at a radical breakthrough.

1. All the key policy measures should be thoroughly tested before being implemented and the reactions of economic entities to these measures should be monitored.

2. Another important requirement is transparency in tax regulation: the lack of transparency creates an atmosphere of distrust and suspicion. In this case, investors will either find ways to avoid taxes or leave the jurisdiction and/or business altogether. Therefore, a fiscal policy, in the way similar to a monetary policy and its

forward guidance tool [28], should ensure efficient communication between the central fiscal authorities and taxpayers about the future course it is going to take.

3. It is important to enhance mutually beneficial international cooperation in the sphere of taxation based on the shared understanding of the fact that policies limited to one national territory *cannot be effective* in the modern globalized and digitalized world where cross-border transactions involving digital goods and services are becoming widely spread as well as the use of loyal and offshore jurisdictions.

We would also recommend the Russian government to focus on the following policy areas:

1) bring CT rules for digital transactions in accordance with the BEPS requirements<sup>8</sup>, since CT are crucial for countering transfer pricing – the core of tax planning;

2) extend CFC and CT rules not only to offshores but also to loyal jurisdictions;

3) test and introduce SA rules in combination with CFC and CT rules in the Russian Federation;

4) lower the foreign dividend tax rate; introduce exemptions from the additional tax on unreturned dividends should they be repatriated to Russia;

5) improve the mechanisms for identifying the real beneficiary and enhance international cooperation in this sphere.

If such principles and recommendations are implemented, they will stimulate investment into Russian economy and stimulate the country's socio-economic development in general.

<sup>8</sup> OECD. BEPS Action 1: Address the Tax Challenges of the Digital Economy. Public Discussion Draft / OECD. 2014. 24 March–14 April.

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