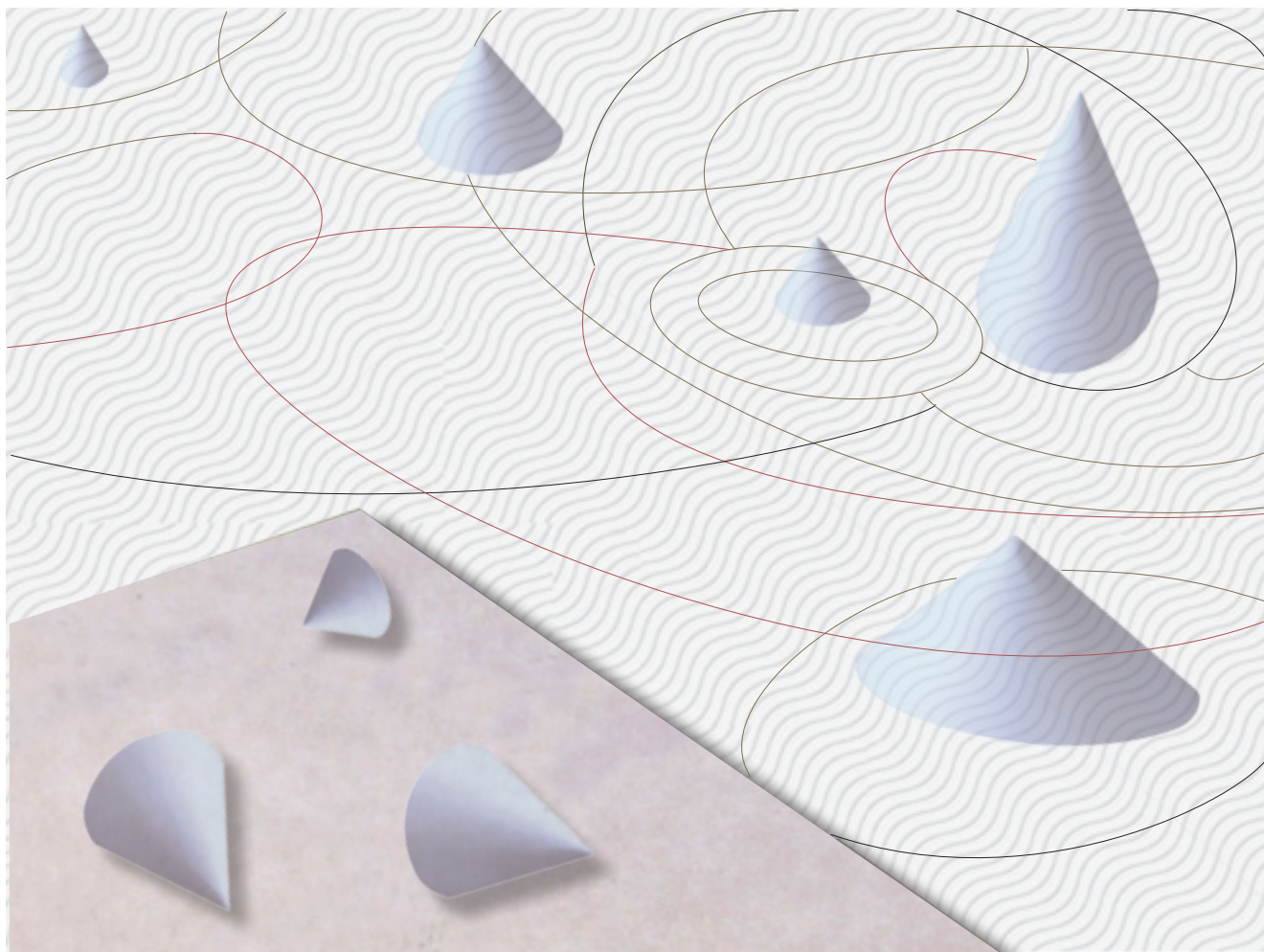


Tax Incentives for R&D and Innovation: Demand versus Effects*

Leonid Gokhberg, Galina Kitova, Vitaliy Roud



Tax incentives have proven effective as a tool used by governments to support science, technology and innovation, and are used by many countries striving for sustainable economic growth and enhanced global competitiveness. There is international evidence on the demand for and effectiveness of tax incentives as part of science, technology and innovation policy. Fiscal stimuli are increasingly combined in a more flexible manner, thus contributing to attaining a wider spectrum of objectives; means of international comparison and evaluating impact of these tools are actively evolving.

Based on the results of a specialized survey, this article analyses the demand for research and innovation tax incentives from Russian manufacturing enterprises, research institutes and universities performing research and development (R&D).

Leonid Gokhberg — First Vice Rector, National Research University — Higher School of Economics (HSE), and Director, HSE Institute for Statistical Studies and Economics of Knowledge (HSE ISSEK). Address: 11, Myasnitskaya str., Moscow 101000, Russian Federation. E-mail: lgokhberg@hse.ru

Galina Kitova — Head, Division for Science Policy, HSE ISSEK. Address: 11, Myasnitskaya str., Moscow 101000, Russian Federation. E-mail: gkitova@hse.ru

Vitaliy Roud — Research Fellow, HSE ISSEK Innovation Economics Laboratory. Address: 11, Myasnitskaya str., Moscow 101000, Russian Federation. E-mail: vroud@hse.ru

Keywords

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Global trends

One obvious sign of the increasing importance of tax incentives for R&D in government policy in recent years is the significant increase in the countries that are using them. While in 1995 only 12 OECD member states used such incentives, in 2013 as many as 27 incorporated tax incentives into their policies, in addition to Brazil, China, India and Russia. At the same time, some countries do not offer special indirect support for R&D, refuse to provide incentives on the grounds that they are not effective (Mexico and New Zealand) [OECD, 2010c, 2011a, 2011b, 2013a, 2013c], or prefer to foster a favourable tax environment as a whole (for instance, Estonia, Germany, and Sweden).

The growing popularity of tax incentives for R&D is reflected in the dynamics of national spending on tax incentives. From 2006 to 2011, expenditure on incentives rose in one in three OECD countries (in some cases by 25%), and as a percentage of all OECD member states' support for R&D it reached one third (two thirds excluding the USA) [OECD, 2013a, 2013b]. It is interesting that while this figure increased in countries such as France (from 37.5% to almost 70%) and Turkey (from 29% to 52%), it actually fell in Hungary, Italy, the USA, Japan and other states. As a result, the relationship between direct and indirect incentives for research varies between countries very widely [OECD, 2010e; OECD, 2013c].

The most widespread R&D tax incentive tools — used in varying combinations to support the development of small and medium-sized (including innovation) businesses, start-ups, certain priority R&D areas, economic industries and other segments of the national innovation system — include [Köhler *et al.*, 2012; OECD, 2002b, 2011b, 2012, 2013e; Palazzi, 2011]:

- tax credits, allowing companies to reduce their tax liabilities depending on the level of R&D expenditure or growth;
- accelerated depreciation of R&D fixed assets (including machinery and equipment, buildings, structures and intangible assets);
- tax exemption for some R&D expenditure (including over 100% of the amount);
- reduced income tax or social taxes (or total exemption from these taxes) for staff carrying out R&D (or certain categories of staff);
- reduction of or exemption from companies' income tax for income generated using R&D results.

Motivation

Market failures can, as a rule, explain the need for government support for R&D (direct or indirect). Market failures prevent companies from blocking the dissemination of new knowledge obtained as a result of scientific investment and the use of this knowledge by society (in particular, by other economic actors), meaning that companies do not make a full return on their investment [OECD, 2002b, 2011b; Palazzi, 2011; Köhler *et al.*, 2012].

It is assumed that government intervention in this sphere through R&D funding, intellectual property protection and other developmental measures can compensate those developing new knowledge for any short-fall in income and stimulate growth in R&D expenditures.

Other rationales for government support for R&D include:

- the specific nature of research activity (delays, risks of not achieving the desired result or increased costs; the skewing of information between producers and consumers of knowledge, among others);
- the complexity and high costs involved in attracting external funding, due to the specific nature of research activities [OECD, 2011b];

- the importance of certain types of R&D in terms of fulfilling the government's aims (defence, safety, health care, energy, etc.) [Köhler *et al.*, 2012];
- the need for cooperation between knowledge producers and between knowledge producers and users [OECD, 2002c; Köhler *et al.*, 2012];
- the key role of investment in R&D in terms of competitiveness and long-term growth [Köhler *et al.*, 2012].

While the requirement for government R&D support and the need to expand support is undisputed, the choice of the various forms of support and balancing these types is down to each individual country based on, among other factors, best practices, the potential effects and costs, national challenges and constraints.

Advantages and disadvantages

The generally accepted advantages of tax incentives for R&D include [OECD, 2002b, 2010a, 2013a; Palazzi, 2011; Köhler *et al.*, 2012]:

- the nature of the market i.e. non-intervention in market mechanisms and relations;
- access for all companies and relative neutrality towards R&D areas, the parameters of the companies carrying out R&D etc.;
- a more effective approach to identifying R&D types that require support as research is carried out directly by companies, while in the case of direct funding, the government carries out the research;
- the economics of government and business spending through the 'imposition' of corporate taxes on the existing system;
- autonomy from the budgetary process, which simplifies decision making.

Moreover, as shown from recent experience, tax instruments are renowned for their relative stability in the light of fluctuations in the global economy and their effectiveness in terms of overcoming the negative consequences of such shifts (as seen, in particular, during the global economic crisis of 2008–2009). It is also important that international regulation does not set any restrictions on the use of tax instruments, which would be fraught with accusations of protectionism. On the other hand, such measures help to bring transnational companies' research divisions into the country.

However, tax incentives for R&D are not without their disadvantages, as often cited by critics. First, there is the risk of significant (and unforeseen) growth in government spending, which some countries try to avert by introducing tax incentives for companies that increase their R&D expenditure or by limiting the maximum amount of support per company. Government spending on the administration of tax privileges is increasing, something which is becoming especially complex and even problematic with the advent of globalization (due to transnational monetary flows, the geographical distribution of research and production divisions within companies, the dilution and diversion of profits due to taxation, etc.) [European Commission, 2009; OECD, 2013a, 2013f, 2013g]. One cannot fail to note the limitations placed on the scope of these mechanisms by industry in particular, ignoring the marked increase in the role of the services sector in developed countries over the last decade [European Commission, 2009]. There are also limitations on the range of beneficiaries, which are mostly major transnational companies (1,500 of such companies account for roughly 90% of global R&D expenditure [OECD, 2013a]). As a result R&D tax support contributes not only to higher R&D expenditure by national companies, but also a flow of foreign investment into this sphere. The situation is complicated by the fact that no widely recognized appraisal of the value and effectiveness of tax privileges for research and innovation activity has yet been carried out, despite several positive results from the development of international measurement standards in this field [OECD, 2010b, 2011a, 2012, 2013c].

Shifting aims

The range in aims of tax incentives for R&D is ever increasing, although, as we will see, there is still some uncertainty surrounding R&D tax incentives' contribution to R&D performance. Nonetheless, historically, the first and foremost aim of such support — increasing private business sector spending on R&D — is still just as important and there is now much, persuasive evidence on the subsequent effects [OECD, 2002b 2010a 2013a; Köhler *et al.*, 2012; KPMG, 2012].

Over the last decade, tax incentives for R&D have also been used to achieve the following pressing aims for the majority of countries [OECD, 2002c]:

- long-term growth and increased competitiveness of the national economy;
- increased labour productivity and innovation activity;
- structural progress in the national innovation system and enhanced collaboration between participants;
- support for the development of small and start-up innovation companies;
- foreign investment for R&D.

This list reflects both Russian practices in tax incentives for R&D (including the declared aims and instruments used, expected costs and results, etc.) and the areas of analysis. These areas of analysis can be divided into two groups, one of which is linked to surveying and comparing tax privileges for R&D (on an international level), and another with assessing the effects of incentives.

Experience of surveys and international comparisons

Studies to survey and compare various countries' tax incentive measures for R&D look to analyze spending on incentives or their intensity.

The B-index is generally used to survey and compare the intensity of R&D tax incentives [Warda, 1996, 1997, 2001, 2006]. The methodology (developed in the 1980s) has been steadily improved and it has increasingly been used in practice [OECD, 2002b, 2007, 2009, 2013c; European Commission, 2008; Palazzi, 2011].¹ In essence, the B-index, valued between 0 and 1, reflects a company's pre-tax income allowing it to break even for every one dollar of expenditure on R&D. All things remaining equal, the higher the tax incentives for R&D, the lower the value of the B-index should be, and its deviation from one is simply an assessment of the size (intensity) of these incentives.

To date, four rounds of studies have been carried out internationally to collect data on R&D tax incentive schemes and the costs of these programmes (2007, 2009, 2011 and 2013). The surveys used were accompanied by the necessary explanatory notes and commentaries [OECD, 2013f] and the results obtained were presented in various publications by the OECD [OECD, 2007, 2011a, 2012, 2013c among others]. It is also worth noting the round-ups of key trends and the design of R&D tax incentives in various countries, including the comparison of the intensity of indirect incentives for companies in OECD member states [OECD, 2003]. In 2011, the OECD again offered an assessment of global tax incentive schemes for R&D, the advantages and disadvantages of such schemes, their intensity in certain countries, as well as other parameters [OECD, 2011b]. The study [OECD, 2010d] not only systematized current approaches to collecting, classifying and analysing data on tax incentives for research and innovation activity, but also outlined the main areas for the optimization and development of corresponding international standards. The analysis of government spending

¹ Thus, the first release of the OECD's regular analytical report on science, technology and industry indicators (*OECD Science, Technology and Industry Scoreboard*), published in 1999 [OECD, 1999], set out the results of a B-index calculation for 22 OECD member states, as well as various methodological explanatory notes. Subsequent releases of the report, issued every two years, offer both developments of the B-index methodology and a wider range of countries taking part in the comparative analysis of R&D tax incentive intensity. The 2007 and 2009 reports featured tax expenditure on R&D following specialist OECD surveys, and the 2013 report covered tax expenditure alongside the B-index itself [OECD, 2007, 2011a, 2013c].

on R&D tax incentives is a relatively new area of research in the field of international comparisons [OECD, 2007, 2010c, 2011a, 2013c], while the calculation of the total amount of tax expenditure has a much longer history [OECD, 2010b, 2011a, 2013c].²

The development and approval of approaches to internationally compare tax expenditure on R&D was accompanied by a gradual reduction in the number of tax privileges included in the calculation and the generalization of the formulae. In practice, indirect R&D incentives are characterized by growing diversity in the tools used and in the distribution not only for ‘proper’ R&D in line with international standards defining these terms [OECD, 2002a] but also for operations involving intellectual property, software development, researcher pay, public-private sector partnerships and collaboration in the research sector [OECD, 2010d, 2012]. However, surveys tend on the contrary to be growing simpler and cruder [Burman, 2003; Burman *et al.*, 2008; Weisbach, 2006; OECD, 2010b].

Evaluation of effects

Studies into the effects of tax incentives for R&D (dating back over 30 years) are extremely numerous, heterogeneous, largely empirical, and are often restricted to the manufacturing industry (sometimes in combination with the services sector) [OECD, 2002b, 2010a; Köhler *et al.*, 2012; Vartia, 2008; Palazzi, 2011]. The majority of these studies are based on data from the 1980s–1990s, when tax incentives for R&D were only used by certain countries and the list of tax incentive instruments supporting only certain positions remained unchanged for a number of years.

Research has confirmed the impact of tax incentives on growth in R&D spending in the short-term [Bernstein, 1986; Mansfield, 1986; Mansfield, Switzer, 1985] and has shown significant variation in this impact depending on the support instrument, country, time frame, methods used etc. In particular, studies have demonstrated that R&D tax incentives are more effective for profitable companies and science-intensive industry sectors, while the impact of these incentives on the aggregate productivity of factors of production and innovation activity is on the whole insignificant and only appears in the long-term. Such a fact does not detract from their contribution to development in the R&D sphere (including through foreign investment) [OECD, 2002b; Taxand, 2011–2012].

On the whole, results from the assessment of R&D tax incentives’ effectiveness and their impact on companies’ spending dynamics in this area, on innovation activity, labour productivity and other indicators have been extremely heterogeneous, ambiguous and often disparate. Recently, however, there has been a shift in emphasis of such research: from detecting and measuring the impact of indirect R&D support instruments on certain indicators to studying the potential for integrating these instruments into recipes for stable growth amid global challenges and restrictions on development [OECD, 2013a, 2013b, 2013c, 2013d].

At the same time, as mentioned, existing empirical data have not yet made it possible to confirm or refute the now extremely popular hypotheses relating to the positive effects of tax incentives for R&D on companies’ innovation activity, labour productivity, population well-being, economic growth, countries’ competitiveness, flows of ‘pro-scientific/pro-innovation’ foreign investment or other special developmental reference points.

² The notion of ‘tax expenditure’ was introduced by Stanley Surrey in the 1960s–1970s to analyse privileges and other preferences on income tax in the USA [Surrey, McDaniel, 1985]. The development of this concept was complicated by including in tax expenditure not only income tax but other taxes, and by discussions of the criteria for reflecting preferences in tax expenditure (for example, only those which deviate from the standard tax system can be ‘converted’ into a direct government support programme) [IMF, 2007; Weisbach, 2006; Burman *et al.*, 2008; Rogers, Toder, 2011; OECD, 2010d].

Research to date into tax incentives for R&D can be grouped into the following topics:

- channels to integrate instruments into recipes for sustainable growth [OECD, 2013a, 2013b, 2013c, 2013d];
- the effects of incentives under globalization (including foreign investment in R&D) [Taxand, 2011–2012; OECD, 2011b];
- the expediency of limiting R&D benefits to transnational companies and establishing a priority taxation scheme for R&D carried out by non-transnational domestic companies [OECD, 2013a; European Commission, 2009];
- designing tax benefits for R&D which would make it possible to avoid a reduction in tax income ‘not offset’ by growth in private investment in R&D, or income from the marketing of R&D results [OECD, 2013a; Köhler *et al.*, 2012];
- the balance between tax and direct support for R&D among private companies taking into account small companies’ preference for direct investment, the allocation of which must take place on a competitive basis with objective and transparent criteria and with the involvement of international experts [OECD, 2010a, 2013a; Köhler *et al.*, 2012].

Russian practice

Research and innovation in tax policy

In recent years, Russia has seen greater attention paid from government to tax preferences, including for innovation activity. This is down to stricter budget restrictions, demands for more effective budget spending and, at the same time, a desire to find instruments capable of achieving extremely ambitious specialist socio-economic development targets set by the so-called ‘May decrees’ issued by the President of the Russian Federation³ and other documents.

The change in the level of innovation orientation of Russia’s policies can be detected in the country’s Taxation Policy Priorities, which, from 2007, have been developed alongside the federal budget and define the outlook of the tax policy for a three-year period (Table 1) [Ministry of Finance, 2011, 2012, 2013, 2014, 2015]. While in 2011–2013, incentives for innovation were included in the corresponding tax policy agenda (in particular, in the list of aims, directions, and instruments), the ‘Policy Priorities’ for 2014–2016 and 2015–2017 contained no such provisions (Table 1).

The ‘Policy Priorities’ for 2012 make provisions for monitoring the effectiveness of tax stimuli. The priority for 2013 sets out cut-backs in ineffective preferences, while the draft of taxation policy for 2015–2017 is geared towards monitoring tax expenditure [Ministry of Finance, 2015]. The first official publication providing information on this for 2010–2012 backs this up (in the section on benefits in force during this period for certain tax types).⁴ The draft also setting out the most pressing issues for the majority of countries, such as counteracting the erosion of the tax base and the taking of profits through taxation [OECD, 2013f, 2013g], the abolition of certain incentives (regional and local) and revision of the rules for their introducing (only on a temporary basis, etc).

³ Decree of the President of the Russian Federation ‘On measures to implement government policy in the field of education and research’ no 599, dated 07.05.2012 (<http://www.kremlin.ru/news/15236>, accessed 29.08.2013), and decree no 596 ‘On long-term government economic policy’ (<http://www.kremlin.ru/news/15232>, accessed 29.08.2013).

⁴ In the absence of an universally recognised definition of the concept ‘tax expenditure’ [Ministry of Interior Affairs, 2007; Weisbach, 2006; Burman *et al.*, 2008; Rogers, Toder, 2011; OECD, 2010d] and the incomplete nature of international standards to calculate tax expenditure, we have used here the simplified, though still operational, interpretation, namely the income shortfalls in the Russian Federation budgetary system which are down to the application of tax benefits and other instruments (preferences) established by laws on taxation and duties [Ministry of Finance, 2015].

Table 1. **Russian tax policy 2009–2017: declared priorities, aims and directions**

| | 2009–2011 | 2010–2012 | 2011–2013 | 2012–2014 | 2013–2015 | 2014–2016 | 2015–2017 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Priorities | | | | | | | |
| Effectiveness of the tax system | + | + | + | + | + | + | + |
| A balanced budgetary system | + | + | + | + | + | + | |
| Stabilization of the tax burden | + | + | | | | | + |
| Stability of the tax system | | | | + | + | + | |
| De-offshorisation | | | | | | | + |
| Aims | | | | | | | |
| Unification of rates | + | | | | | | |
| Growth in administration quality | + | | | | | | |
| Neutrality of key taxes | + | | | | | | |
| Effectiveness of key taxes | + | | | | | | |
| Counteracting the negative effects of a crisis | | + | + | | | | |
| Creating conditions for a transition to economic growth | | + | + | | | | |
| Incentives for innovation and modernisation | | | + | + | + | | |
| Supporting investment in education and health care | | | | + | | | |
| Supporting investment | | | | | + | + | + |
| Development of human capital | | | | | | + | |
| Rise in entrepreneurial activity | | | | | | + | + |
| Budget stability | | | | | | | + |
| Tax competitiveness | | | | | | | + |
| Directions | | | | | | | |
| Tax administration | + | + | + | + | + | + | |
| Innovation activity | | | + | + | | | |
| Human capital | | | | + | + | + | |
| Monitoring the effectiveness of tax tools | | | | + | | | |
| Investment | | | | | + | + | |
| Cutting back ineffective incentives | | | | | + | | |
| De-offshorisation | | | | | | + | + |
| Priority development areas | | | | | | | + |
| Small businesses | | | | | | | + |
| Foreign organizations | | | | | | | + |
| Regional/local taxes (refusal to introduce new ones, repeal, etc.) | | | | | | | + |
| Effectiveness of tax stimuli and tax expenditure | | | | | | | + |
| Indicating the ‘source’ when introducing new incentives (including repealing ineffective incentives) | | | | | | | + |
| Introduction of temporary incentives | | | | | | | + |

Source: compiled by the authors based on the Taxation Policy Priorities of the Russian Federation for the corresponding periods.

An analysis of Russia’s tax policy measures planned for implementation in 2013–2015 (Table 2) [Ministry of Finance, 2013] confirms the gradual removal of the innovative focus from the country’s policy. The list of measures has been organized into two groups: those linked to stimulating economic growth (predominantly through support for investment) and those aimed at increasing budget income (including by repealing ineffective preferences). Tax guidelines for 2014–2016 [Ministry of Finance, 2014] set out the support for investment, entrepreneurial activity and development of human capital, which does not rule out mediated incentives for innovation activity. However, the majority of instruments (as in the tax policy for 2015–2017 [Ministry of Finance, 2015]) aimed to balance the budget by increasing income and optimizing spending.

Thus, the analysis of Russian tax policy declarations for 2009–2017 (see Tables 1 and 2) shows that the peak — in terms of being geared towards increasing innovation activity — was in 2011 [Ministry of Finance, 2011]. After this year, the focus shifted to assessing the effectiveness of tax benefits and budgetary spend-

Table 2. **Pro-innovation instruments in the Russian Federation's tax policy planned for implementation in 2009–2016**

| Name | 2009–2011 | 2010–2012 | 2011–2013 | 2012–2014 | 2013–2015 | 2014–2016 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Income tax: increasing expenditure on some R&D (factor of 1.5 from 2009; according to the Government list) | + | | | | | |
| Income tax: clarifying the list of R&D for application the factor of 1.5) | | + | | | | |
| Tax incentives for innovation activity: <ul style="list-style-type: none"> • temporary reduction in insurance contributions for engineering companies and businesses set up under Federal Law no 217, dated 02.08.2009; • defining a list of R&D expenditure items; • option of creating provisions for forthcoming R&D expenditure; • exemption from tax on fixed assets (machinery, equipment, etc.) acquired by educational and research (innovation) organizations to fulfill a science/technology production contract (order); • increasing the amount of investment tax credit and delegation of powers to offer tax credits to Russian regions; • exemption from income tax for non-profit organizations in socially important fields; • exemption from income tax up until 2020 for commercial organizations operating in the education and health care sector; • exemption from tax on property remaining at the end of a grant agreement; • Skolkovo benefits package | | | + | | | |
| Monitoring the effectiveness of tax benefits: <ul style="list-style-type: none"> • optimizing tax benefits; • analyzing their use (demand, performance, tax expenditure) | | | | + | | |
| Tax incentive measures: supporting investment and human capital (including exempting Russian Presidential grants awarded to young researchers from personal income tax; exemption from property tax for machinery and equipment) | | | | | + | + |
| Measures to increase Russian budgetary income: <ul style="list-style-type: none"> • repealing ineffective tax benefits and preferences (developing a normative base to assess their effectiveness, regulations, criteria and indicators); • preparing reports on budgets' tax expenditure and effectiveness | | | | | + | |

Source: compiled by the authors based on the Taxation Policy Priorities of the Russian Federation for the corresponding periods.

ing for this purpose, which in turn can be explained by the increasing pressure of budget restrictions.

Assessment of Russia's volume and effectiveness of tax support for research and innovation

The decision taken by the Government of the Russian Federation to monitor the effectiveness of its instruments [Government Commission, 2010b] served as an impulse to develop approaches to measure and assess the results of tax incentives for research and innovation in the Russian Federation. Implementing this monitoring meant tackling a wide range of methodological, information, organizational and other problems.

According to the first official assessment of tax expenditure on innovation activity in Russia, based on tax statistics data, tax expenditure was 12.2 billion roubles in 2010 i.e. less than 2% of total tax expenditure on incentives for economic development [Ministry of Finance, 2014]. The calculation method for these figures is, admittedly, somewhat vague.

Based on information provided as part of efforts to update the strategy for social and economic development of Russia for the period up to 2020 [Government of the Russian Federation, 2008] at the decision of the Russian Government [HSE, RANEPa, 2013], tax expenditure on civilian innovation activities from the federal budget was estimated to be approximately 800 bil-

lion roubles in 2011, while direct expenditure was valued at 500 billion roubles.⁵ Thus, up to 2020 the relationship varies between stabilization and growth of the share of tax expenditures depending on the country's social and economic development scenario [Gokhberg, Kuznetsova, 2011].

In 2014, official summary data were published on the amount of tax expenditure by the Russian Federation in 2010–2012, broken down according to tax and benefit type [Ministry of Finance, 2015]: 65.5 million roubles in 2010, 76 million roubles (2011) and 94.1 million roubles (2012) of tax expenditure went on research in these years (scientific research and design and trial work). However, it is not possible to assess the completeness or accuracy of these figures, or to calculate the tax expenditure on innovation activity overall. Thus the question of the scale and effectiveness of indirect support for research and innovation remains open.

Uncertainty surrounding the volume and structural characteristics of indirect support for research and innovation in many ways explains the interest in such support for empirical studies and the interpretation of results.

Empirical studies on tax incentives for innovation in Russia

Empirical studies on tax incentives for innovation in Russia are relatively rare. Thus, very often such projects (studies, surveys) have quite general or complex aims and objectives. What interests us are the assessments that such studies contain, but only on a few specific issues, which in many ways predetermine the results obtained and seriously restrict the potential of their practical use.

According to experts who took part in a survey relating to the Russian Government's anti-crisis policy in 2008–2009, the positive effects of the government's tax instruments ultimately led to some improvement in tax administration and a lesser tax burden for one of the major industries in the Russian economy generating revenue for the budget: the oil industry [HSE, IAC, 2009]. Positive anti-crisis effects of reducing income tax (from 24% to 20%) and repealing value added tax (VAT) for imported technological equipment with no Russia-made equivalent were significantly diminished due to the high share of loss-making companies as well as the non-transparent practice of preparing a list of such equipment.

A study into innovation activity among Russian industries showed that tax benefits proved the most effective support instrument [Gracheva *et al.*, 2012; Kuznetsova, Roud, 2011]. 62% of the more than 2,000 respondents representing businesses from the 11 largest sectors of the manufacturing industry agreed with this, while only 40% of respondents recognized the effectiveness of direct support. These results can probably be explained by the fact that respondents had in mind the effectiveness of tax support for innovation, not for their own business or the country as a whole, but as an institution functioning under appropriate external conditions.

The majority of experts who took part in a 2011 survey on the innovation climate in Russia (the 'Innoprom' Barometer) [IRP Group, 2011] observed that the Tax Code and other elements of tax legislation did not incentivize innovation activity (75.5%), and that the support instruments in the legislation to encourage innovation supply and demand are ineffective (64% and 58.6% for innovation supply and demand, respectively). Similar assessments were made in a 2011–2012 study into the factors affecting innovation activity at Russian industrial businesses [Ivanov *et al.*, 2012]. Over one quarter of the participants

⁵ The lack of an agreed method for calculating even public and official data on direct and indirect federal budget expenditure on innovation means that existing assessments are poorly developed from a methodological perspective, and are often fragmented and scattered. For instance, in 2010, the Russian Ministry for Economic Development valued direct federal budget expenditure on innovation in 2009–2012 at roughly 1 trillion roubles per year [Government Commission, 2010a], having included in this figure items which should not be categorized as such under accepted international standards and evoke doubts.

considered tax incentives to stimulate innovation the main barrier to innovation activity, although there was considerable variation in assessments of certain instruments' effectiveness. While 17–18% of respondents recognized the positive effects of the accelerated depreciation of fixed assets used solely for research activity and of VAT exemption on imported technological equipment with no Russia-made equivalent, only 13–14% of respondents thought that the application of the 1:5 ratio to R&D expenditure had positive results. Almost half of all respondents (47%) reported that they did not apply for tax benefits as a result of uncertainty surrounding their terms and conditions and the high likelihood of disputes with tax authorities. 37% reported that they did not want to attract the attention of the tax authorities or additional audits; almost one third (32%) stated that they did not want the burden of having to prove their entitlements to a certain benefit. In turn, 'consumers' of tax benefits have expressed dissatisfaction with the scale of benefits, their conditions and the quality of administration [*Ibid.*].

Moreover, we can turn to the surveys carried out by the Russian Union of Industrialists and Entrepreneurs (RUIE, henceforth referred to by its Russian abbreviation of RSPP) in 2011–2013 [RSPP, 2011, 2012, 2013] devoted specifically to government (primarily tax) support for companies' innovation activities. The advantages of these surveys include the efficiency with which they were carried out and the analysis and publication of the results, while the disadvantages include the considerable incomplete information on the programmes and methodology.

The 2011 survey [RSPP, 2011] concludes by indicating the respondents' affiliation with particular types of economic activity. The analysis of the survey groups the tax benefits which were in force between 2008 and 2010 according to the level of demand from business. This demand was assessed by the share of respondents claiming a particular form of benefit.

The 2012 survey [RSPP, 2012] only touched upon the 1:5 ratio for R&D expenditure, an updated list for which had been approved by the Russian Government in February 2012. This survey was carried out among 30 companies (mostly large companies) engaged in various types of economic activity: only three of the surveyed companies claimed this benefit. Other respondents either did not meet the eligibility criteria (as a rule, the list of R&D approved by the Russian Government) or did not attempt to claim to avoid any problems with the administration of standards (e.g. submission to the tax authority of R&D performance reports, expert assessments). Moreover, it became apparent that business considered this benefit not as a stimulus to increase R&D expenditure, but rather as a way to save money.

The 2013 survey [RSPP, 2013] looked at 24 tools of direct or indirect government support. More than half of all respondents (56.9%) represented the manufacturing industry, and roughly one in ten companies (10.8%) operated in transportation, communications, etc.

Assessments of the demand for and effectiveness of tax support for innovation (based on the results of the RSPP survey (Table 3) suggest low overall demand from businesses for state tax support and a correlation between demand and economic activity type.⁶

According to the assessment by RSPP experts, the key reason behind companies' low demand for tax stimuli for innovation is not meeting the eligibility criteria (Table 4). In particular, companies did not use VAT exemption on imported technological equipment or operations involving intellectual property because they did not actually import such equipment or did not carry out such opera-

⁶ Thus, according to the 2011 survey, fuel and energy companies did not seek VAT exemption for imported technological equipment or the 1:5 ratio for R&D expenditure [RSPP, 2011].

Table 3. Demand for tax incentives for innovation activity (based on the results of companies' surveys carried out by RSPP in 2011–2013)

| Benefits | Share of surveyed companies using the instrument |
|--|--|
| VAT exemption for R&D carried out using budget funds and funds from other sources, as well as by education institutions and scientific organizations under business contracts (sub-point 16, point 3, article 149 of the Russian Tax Code) | < 1% (2011) > 29.7% (2013) |
| VAT exemption for imported technological equipment on the Russian Government list (point 7, article 150 of the Russian Tax Code) | > 33% (2011) 15.6% (2013) |
| Use of the 1:5 ratio for R&D expenditure (point 11, article 262 of the Russian Tax Code) | < 25% (2011) 10% (2012) 6.2% (2013) |
| Accelerated depreciation of R&D fixed assets (with a coefficient of 3 or less; point 2, article 259.3 of the Russian Tax Code) | < 1% (2011) 4.7% (2013) |
| VAT exemption for patent and licensing operations (sub-point 26, point 2, article 149 of the Russian Tax Code) | 4.3% (2013) |

Sources: [RSPP, 2011, 2012, 2013].

Table 4. Reasons for companies not claiming tax benefits for innovation activity (as a percentage of respondents who selected each option)

| Tax tools | Reasons for not claiming | Mismatch conditions of use | Closed list of conditions of use | Difficulty in proving right to use | Lack of information on tools | Small scale of benefits |
|--|--------------------------|----------------------------|----------------------------------|------------------------------------|------------------------------|-------------------------|
| VAT exemption for R&D carried out using budget funds and funds from other sources, as well as by education institutions and scientific organizations under business contracts (sub-point 16, point 3, article 149 of the Russian Tax Code) | | 58 | — | 2.4 | 17.1 | 7.3 |
| VAT exemption for imported technological equipment on the Russian Government list (point 7, article 150 of the Russian Tax Code) | | 46 | 18 | 4 | 8 | 6.0 |
| Use of the 1:5 ratio for R&D expenditure (point 11, article 262 of the Russian Tax Code) | | 40 | 9.1 | 12.7 | 5.5 | 10.9 |
| Accelerated depreciation of R&D fixed assets with a coefficient of 3 or less (point 2, article 259.3 of the Russian Tax Code) | | 35.8 | — | 5.7 | 15.1 | 15.1 |
| VAT exemption for patent and licensing operations (sub-point 26, point 2, article 149 of the Russian Tax Code) | | 55.6 | 5.6 | 5.6 | 5.6 | 8.3 |

Source: [RSPP, 2013].

tions. Other reasons worth noting, in our opinion, are companies' lack of information about certain stimuli and the small scale of the benefits.

These examples are, in essence, the only empirical analyses of tax incentives for innovation in Russia carried out to date. We took into account the approaches and conclusions above when designing our investigation into the demand for such tax instruments in 2012–2013, and present the key results of this study below.

Assessment of demand for R&D and innovation tax incentives in Russia

Aim and objectives of the study

In view of the lack of any objective information in Russia on demand for tax incentives for research and innovation activity, their target audiences and the effects of their use, the foremost aim of our research was to assess the level of demand for these stimuli and the factors governing this demand. The study focused on three groups of organizations (research organizations, universities performing R&D, and manufacturing enterprises) and on indirect forms of support for research and innovation.⁷

⁷ The study was carried out in 2012-13 as part of a large-scale project to monitor the economics of science and research, implemented by HSE ISSEK at the request of the Russian Ministry of Education and Science (2011–2013).

To achieve the study's aims, several tasks were carried out to prepare and conduct the study, and analyze the results, including:

- Compiled a list of incentives related to each of the three, above-named groups of organizations⁸, and analyzed practices in terms of claims (based on explanatory letters and other documents from tax bodies and materials from commercial courts);
- Developed a survey (questionnaires) for the three groups of organizations, the structure of each following the same logic (applied to a particular exemption i.e. if 'yes', what did it give the organization; if 'no', why).

Sample

The study covered 519 research organizations, 299 universities performing R&D and 851 manufacturing enterprises (a total of 1,669).⁹

The sample of the first group included research organizations with at least 51 R&D personnel spread across 25 Russian regions (federal subjects). The share of state academies of sciences,¹⁰ state science centres (SSC) and Moscow in this group is in line with the overall number of research organizations in the country.

The sample of the universities (299 organizations) covered 25 Russian regions and the 29 national research universities (NRU) which are positioning themselves as hubs and drivers of development both within the R&D sector in Russia. It is important to bear in mind that a survey of all the NRUs could cause some bias of the results in favour of best practices (for example, over-estimating the share of universities using tax incentives for research and innovation activity).

The sample of manufacturing enterprises (851 organizations), spread across 26 regions, consisted of a group of organizations which fill out the federal statistical monitoring form for innovation activity.¹¹ Almost $\frac{3}{4}$ of these organizations carried out this type of activity i.e. incurred spending on technological, marketing or organizational innovation in 2011.

Toolkit

The survey was addressed to the directors of the organizations and was based around a questionnaire developed for each of the three groups mentioned above. The questionnaire contained questions on the characteristics of the organizations which were important in terms of achieving their research goals and their use of direct and indirect research and innovation support mechanisms (tax instruments were included as a separate block of questions in the questionnaires). The uncertainty over the initial list of tax benefits aimed at stimulating research and innovation activity complicated the planning of the study's questionnaire. This list was developed using expert assessments and contained the following income tax tools:

⁸ The lists were formed on the basis of expert assessments of the 'involvement' of certain tools specified in the Russian Tax Code that support/stimulate R&D and/or innovation, as defined in accordance with international standards on supporting and delimiting the corresponding types of activity [OECD, 2002a; OECD, *Eurostat*, 2005].

⁹ The general population for these samples was formed based on corresponding impersonal data from a federal statistical survey of R&D and innovation, which harmonized its methodology with international standards in the field [OECD, 2002a; OECD, *Eurostat*, 2005]. Considering that in 2011, R&D was conducted by 581 universities, of which 299 participated in the survey [HSE, 2013b], it is obvious that this sample's size is excessive (and, admittedly, two others). However, the size of the universities sample and the other two samples was dictated by the requirements from the Russian Ministry of Education and Science, which contracted the project under which the survey was conducted.

¹⁰ Since the study was carried out in 2013, i.e. prior to the restructuring of state academies of science (as per the Federal Law 'On Russian Academy of Sciences, the restructuring of state academies of sciences and amendments to certain legislative acts of the Russian Federation' no 253-FZ), the article looks at their former structure.

¹¹ The federal statistical monitoring of innovation activity is the only source of reliable and comparable data on domestic organizations carrying out innovation activity [Gokhberg, 2012]. It involves annual continuous surveys of legal entities which are not classified as small businesses but operate in the manufacturing industry and carry out other forms of economic activity. The survey is carried out using 'Form no 4 — Innovation' which comprises 12 sections, each of which reflect various characteristics of the surveyed organizations and their innovation activity.

- income tax exemption for funds to implement specific research, science and technology programmes and projects, as well as innovation projects. These refer to funds that have been received from budgets to support research, science and technology and innovation activity, created in accordance with Federal Law ‘On science and government science and technology policy’ no 127-FZ, dated 23.08.1996¹² (point 14, article 251 of the Russian Tax Code);
- accelerated depreciation of fixed assets used solely for scientific and technical activities and with a special coefficient of no more than 3 (sub-point 2, point 2, article 259.3 of the Russian Tax Code);
- the use of the 1:5 ratio for expenditure on R&D, the list of which was approved by the Russian Government (point 7, article 262 of the Russian Tax Code).

The questionnaires also included questions on organizations’ claims for VAT exemption for patent and licensing operations¹³ and for R&D carried out by education and research organizations using budget funds and resources from other Russian funds for fundamental research, humanitarian research and technological development, among others, based on business contracts etc. (sub-point 16, point 3, article 149 of the Russian Tax Code). Some other incentives were examined which were classified (for the purposes of this study) as instruments to stimulate research and innovation activity.

When drafting the questionnaire, we took into account general requirements in terms of the survey size — essential to guarantee the quality of the survey results.

Results: manufacturing enterprises

Amid low overall demand from manufacturing enterprises for tax support instruments for research and innovation activity (Table 5), variation between instruments and types of enterprises was extremely significant. Two exceptions to this — VAT exemption when exporting goods outside the Russian Federation (customs export procedures etc.) and accelerated depreciation of fixed assets — merely confirm the distinct legal nature of such provisions, as their relationship with research and innovation activity is small in practice. Accelerated depreciation of fixed assets is stipulated not only for ‘innovation’ reasons, such as, for instance, equipment being classified as energy efficient or used only for science and technology activities, but also for when it is used in aggressive environments, leasing, etc. (article 259.3 of the Russian Tax Code).

Three categories of enterprises were comparatively active: the largest (with more than 1,000 staff) organizations, those carrying out innovation activity, and organizations affiliated in some way with the state.¹⁴ Accelerated depreciation of fixed assets was used by over one third of these three kinds of organizations (43%, 36% and 37.4% respectively) and less than a quarter (23.1%) of the overall sample; the 1:5 ratio for R&D expenditure was used by roughly 25% (compared with 7% on average).

While the leading performance of innovative organizations as noted above is logical, the two other categories raise some questions. In international practice, tax incentives for R&D and innovation are used to attract private investment in this sphere, increase innovation activity, national competitiveness, etc. In Russia on the other hand, major state and/or quasi-state companies (meaning the public sector of the economy as a whole) are the main beneficiaries.¹⁵ The cur-

¹² Available at: http://www.consultant.ru/document/cons_doc_LAW_153964/, accessed 27.09.2013.

¹³ As per sub-point 26, point 2, article 149 of the Russian Tax Code, exercising exclusive rights to inventions, useful models, industrial designs, software, databases, integrated circuit layouts, know-how, and the issuance of a license to use the mentioned results are exempt from VAT.

¹⁴ In our survey, state affiliation was defined as when the surveyed enterprises belong to an integrated structure created by — or with the involvement of — the state (including state corporations).

Table 5. **Demand from manufacturing enterprises for tax incentives for R&D and innovation: 2011**

| Examples of incentives | Share of organizations used tax incentive (percentage of total respondents) |
|---|---|
| For income tax | |
| Accelerated depreciation of fixed assets linked to research and innovation activity (including those used only for science and technology activities, energy-efficient equipment etc.; article 259.3 of the Russian Tax Code) | 23.1 |
| Expenditure on R&D on the Russian Government list (including R&D without positive results) with a ratio of 1:5* | 7 |
| Expenditure on innovation consisting of expenditure on production/product sales** | 8 |
| For value-added tax (exemption/zero rate) | |
| Patent and licensing operations (sub-point 26, point 2, article 149 of the Russian Tax Code) | 0.3 |
| R&D using government budget funds | 3.8 |
| R&D using Russian Foundation for Basic Research and extra-budgetary foundations funds (sub-point 16, section 3, article 149 of the Russian Tax Code) | 0.6 |
| R&D related to the creation of new products/technologies | 0.8 |
| R&D related to the improvement of products/technologies | 0.5 |
| Imported equipment with no equivalent manufactured in Russia (according to the Russian Government list) | 2.8 |
| For exports of goods from Russia (customs export procedures, etc.) | 23.7 |
| Incentives established by Russian regions | |
| Reduced income tax rate (specifically on profit that would be subject to transfer to regions' budget) | 10.6 |
| Property tax allowance (excluding allowance set out in the Russian Tax Code) | 13.7 |

* Since 2012 this rate, in place since 2011 (article 262 of the Russian Tax Code), has been expanded to include a list of expenses which are classed as R&D expenditure for tax purposes, and other innovations.

** Other expenditure on production/product sales can be included in the following expenses linked to innovation activity: certification and standardization of a product/service; information, audit, consultancy and other similar services; training and re-training of staff; developing and setting up new plants and workshops; paying royalties, etc. (article 264 of the Russian Tax Code).

*** Since Russian regions are entitled to reduce income tax payable to their budget for certain categories of taxpayers from 18% (set by the Russian Tax Code) to 13.5% (article 284.1 of the Russian Tax Code), such decisions can also be taken to stimulate research and innovation activity in the region.

Source: authors' calculations based on data of Institute for Statistical Studies and Economics of Knowledge, National Research University – Higher School of Economics (henceforth HSE ISSEK).

rent situation in Russia is quite different from the recommendations of international organizations regarding priority support through tax instruments for innovative small, medium and start-up domestic companies [OECD, 2013d].

In line with the study's results, the weak demand for research and innovation tax support from manufacturing enterprises can be explained by two possible factors. Either these enterprises fail to meet the eligibility criteria (90% of respondents did not use the 1:5 ratio for R&D expenditure as they did not have any such expenditure in 2011), or the exorbitant transaction costs linked to proving entitlement to a particular benefit are an obstacle. As a result of the high transaction costs, almost one in nine respondents refused the opportunity of accelerated depreciation of fixed assets.

Statistical analysis of the typical combinations¹⁶ of tax incentives used by companies allows us to delineate five basic models of their tax behaviour in research and innovation (Table 6).

The first model, predominantly based on VAT exemption for exports,¹⁷ is implemented by roughly one in five of the surveyed enterprises (20.7%). The next three models of businesses' tax behaviour are linked to regional incentives (on

¹⁵ In Russia, almost half of the Russian economy is concentrated in the public sector but plans to shrink this concentration are lagging and experiencing some difficulties [Rodionov, 2012; HSE, RANEP, 2013; Guriev, 2013]. This fully explains the leadership of pro-state companies in terms of receiving the tax incentives provided in the Russian Federation for research and innovation activity.

¹⁶ The grouping is derived using latent class analysis technique. The proportion or errors in the classification is 0.0581. The classification is statistically significant at the 1% significance level (based on bootstrapping).

¹⁷ This refers to point 2, article 151 of the Russian Tax Code, which governs VAT levies when exporting goods from Russian territory. It is important to recognize that the classification exemption of exports from VAT among research and innovation incentives is highly relative.

Table 6. **Models of manufacturing enterprises' use of R&D and innovation tax incentives (%)**

| | Tax incentives use model | | | | | Did not use tax incentives | Total |
|---|--------------------------|------|------|------|------|----------------------------|-------|
| | 1 | 2 | 3 | 4 | 5 | | |
| Share of enterprises having applied the corresponding model of R&D and innovation tax support | 20.7 | 8.6 | 11.6 | 15.3 | 2.8 | 41.0 | 100 |
| Share of enterprises that applied of some incentives (out of all enterprises that applied the corresponding model): | | | | | | | |
| Income tax stimuli | | | | | | | |
| accelerated depreciation of R&D fixed assets | 3.2 | 1.5 | 29.2 | 7.4 | 1.7 | | |
| taking into account R&D expenditure | 3.0 | 0.0 | 24.7 | 75.4 | 4.6 | | |
| taking into account innovation expenditure | 0.4 | 0.3 | 11.3 | 0.0 | 1.3 | | |
| reduced tax rate, set by Russian regions | 6.0 | 39.0 | 32.6 | 8.7 | 99.9 | | |
| VAT exemption or zero | | | | | | | |
| patent and licensing operations | 0.1 | 0.0 | 0.2 | 4.4 | 0.0 | | |
| R&D using state budget funds | 1.5 | 0.0 | 3.5 | 56.2 | 0.0 | | |
| R&D using Russian Foundation for Basic Research and extra-budgetary foundations funds | 0.0 | 0.0 | 1.0 | 8.9 | 0.0 | | |
| R&D related to the creation of new products/technologies | 0.0 | 0.0 | 4.9 | 7.9 | 0.0 | | |
| R&D related to the improvement of products/technologies | 0.0 | 0.0 | 5.1 | 2.9 | 0.0 | | |
| imported equipment with no Russia-made analogue | 0.6 | 3.9 | 3.9 | 4.7 | 71.6 | | |
| exports of goods from the Russian Federation (customs export procedures, etc.) | 100.0 | 0.4 | 1.2 | 40.2 | 99.5 | | |
| Other allowance | | | | | | | |
| for property tax | 10.7 | 99.6 | 4.7 | 21.2 | 99.9 | | |
| investment tax credit | 3.1 | 0.2 | 29.2 | 0.0 | 0.0 | | |

Source: authors' calculations based on HSE ISSEK data.

property and income tax; 8.6% of enterprises), income tax incentives (11.6% of enterprises), and a combination of stimuli for R&D and VAT on exports (15.3% of enterprises). The final model is used by less than 3% of enterprises which have taken advantage of VAT exemption for imported equipment, export and regional-level incentives.

An analysis of additional characteristics of those businesses which implement the tax models outlined above allows us to paint a portrait of such organizations and assess the effects of indirect incentives in the sphere of research and innovation (Table 7).

The first three tax strategies are for the most part intrinsic to medium-size private companies operating in low-tech and low level medium-tech sectors geared towards the Russian market and not engaging in expenditure on innovation activity. The fifth strategy, on the contrary, is largely used by large companies (with over 500 staff) in high level medium-tech forms of economic activity. Clearly, such a portrait of companies applying the different tax models can be used to assess the effectiveness of the tax system in research and innovation and to optimize the system by taking into account national priorities for social and economic development.

The choice of specific tax model is unequivocally linked to the resulting combined effects on the intensity and success of businesses' innovation activities (Table 8). Thus, the first of these variants is, as expected, neither linked to changes in businesses' spending on innovation nor variations in the amount of innovation output. The second model is associated with low intensities of incremental innovations and innovations geared towards regional markets. The most perceptible link with development of innovation activity is shown by the third strategy, which is linked to using a combination of R&D benefits relating to income tax. The resulting effects involve intensified spending on various forms

Table 7. **Characteristics of enterprises using various models of R&D and innovation tax support (percentage of total number of enterprises applying the corresponding model)**

| | | Tax incentives use model | | | | |
|---------------------------------------|------------------------|--------------------------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 |
| Number of employees | 51–100 | 3.9 | 7.4 | 14.3 | 7.9 | 0.5 |
| | 101–250 | 24.8 | 54.2 | 57.2 | 38.2 | 19.0 |
| | 251–500 | 41.0 | 12.2 | 14.5 | 9.4 | 2.5 |
| | 501–1000 | 13.7 | 14.8 | 6.1 | 11.0 | 51.9 |
| | 1001+ | 16.6 | 11.4 | 8.0 | 33.4 | 26.1 |
| Ownership type | private | 80.5 | 84.3 | 68.9 | 70.4 | 90.0 |
| | public | 4.0 | 7.1 | 14.7 | 9.2 | 2.5 |
| | mixed public-private | 7.4 | 3.2 | 11.2 | 13.4 | 0.5 |
| | foreign involvement | 8.1 | 5.4 | 5.2 | 6.9 | 7.0 |
| Innovative activity in reporting year | no | 78.5 | 71.7 | 62.3 | 39.9 | 70.6 |
| | yes | 21.5 | 28.3 | 37.7 | 60.1 | 29.4 |
| Priority markets | local | 9.1 | 26.4 | 21.8 | 2.1 | 15.8 |
| | regional | 15.6 | 18.2 | 42.5 | 3.6 | 0.0 |
| | Russian Federation | 71.9 | 54.6 | 31.8 | 88.8 | 75.3 |
| | CIS | 0.7 | 0.9 | 3.7 | 2.9 | 6.4 |
| | other countries | 2.7 | 0.0 | 0.2 | 2.7 | 2.5 |
| Types of manufacturing | high-tech | 9.5 | 3.3 | 10.2 | 22.7 | 0.0 |
| | high level medium-tech | 32.1 | 36.5 | 27.2 | 51.2 | 85.8 |
| | low level medium-tech | 23.3 | 37.0 | 6.7 | 12.8 | 13.7 |
| | low-tech | 35.1 | 23.3 | 56.0 | 13.3 | 0.5 |

Source: authors' calculations based on HSE ISSEK data.

Table 8. **Change in the intensity and performance of enterprises' innovative activity depending on the model of tax support in research and innovation (marginal effects of choosing the model on the likelihood of improving the corresponding measure)***

| Effects on innovative activity | | Marginal effects of the model | | | | | Regression characteristics | | |
|---|--|-------------------------------|-----------------|----------------|----------------|----------------|----------------------------|------------|-----------|
| | | 1 | 2 | 3 | 4 | 5 | N | Stat. sig. | Pseudo-R2 |
| Expenditure on innovation (by activity type) | R&D | -0.00124 | -0.0121 | 0.0167 | -0.00752 | 0.0114 | 366 | 0.1084 | 0.0177 |
| | acquisition of machinery and equipment | -0.00825 | 0.00504 | 0.0154 | -0.00497 | 0.00448 | 558 | 0.0225 | 0.016 |
| | starting production | -0.0009 | -0.00145 | 0.00424 | 0.00202 | 0.00559 | 579 | 0.1632 | 0.0113 |
| | production designing | 0.0047 | -0.00217 | 0.00772 | 0.00326 | 0.0043 | 501 | 0.0705 | 0.0152 |
| | purchase of intangible technologies | 0.000594 | -0.00571 | 0.0202 | 0.00799 | -0.0144 | 363 | 0.000 | 0.048 |
| | employees training | -0.00183 | -0.00534 | 0.00514 | 0.00123 | 0.00357 | 502 | 0.0127 | 0.0223 |
| Amount of output innovation (by level of newness) | improved | -0.006 | 0.013 | 0.029 | -0.008 | -0.005 | 467 | 0.022 | 0.0203 |
| | new to firm | -0.013 | -0.005 | 0.015 | -0.015 | -0.041 | 446 | 0.0008 | 0.0314 |
| | new to region | -0.011 | 0.011 | 0.001 | -0.019 | -0.021 | 297 | 0.0609 | 0.0179 |
| | new to Russia | 0.0002 | 0.002 | 0.0004 | -0.001 | -0.015 | 220 | 0.5758 | 0.0201 |
| | new to global market | 0.007 | -0.001 | -0.0003 | -0.012 | 0.025 | 91 | 0.0535 | 0.1017 |

* The marginal effects set out are calculated using logistic regression for the discrete ordered dependent variable (ordered logic). The dependence of the type of $Effect = F(profile, size, sales, ownership, innovation)$ was assessed, where $Effect$ is the scaled variable change in the corresponding parameter from 0 to 6, $size$ and $sales$ are the scaled variable number of employees and the amount of output, $innovation$ is the existence of innovation activity in the reporting period, and $ownership$ is the type of ownership. The figures in bold show statistically significant effects at the 5% level. The regression characteristics include the number of observations for which the corresponding dependent variable has been applied, the statistical significance of the regression overall, and pseudo-R2.

Source: authors' calculations based on HSE ISSEK data.

of innovation activity and an increase in performance, even in relation to the development of products which are new, at best, to the regional market.

Results: research organizations and universities performing R&D

Demand from research organizations and universities performing R&D for R&D and innovation tax incentives was higher than for manufacturing organizations (which fully reflects the distortions in the system of tax incentives in favour of research rather than innovation). An overwhelming number of research organizations (83%) used the opportunity of VAT exemption for R&D (sub-points 16 and 16.1, point 3, article 149 of the Russian Tax Code). Almost half (45.1%) took advantage of a tax benefit for grants supporting research, science, technology and innovation activity; roughly one quarter (24.3%) benefited from VAT exemption for patent and licensing operations. The remainder virtually did not carry out such operations, which indicates their performance.

Only 4% of all research organizations took advantage of accelerated depreciation of fixed assets used solely for scientific and technical activities. This could be explained by the prevalence amongst them of government-funded institutes (57.8%), whose property (excluding that acquired and used for entrepreneurial activity) is not subject to depreciation (point 2, article 256 of the Russian Tax Code). In several instances, respondents did not have any R&D equipment or instruments.

Universities performing R&D outstripped research organizations in terms of more frequent use of incentives for grants (over 60%) and accelerated depreciation of R&D fixed assets (7.4%). Similar to manufacturing enterprises, the main reasons research organizations and universities did not take advantage of research and innovation tax incentives were ineligibility (based on eligibility criteria) and the risk of disputes with tax authorities.

The approach we propose to identify models of organizations’ tax behaviour in research and innovation, as tested above for manufacturing enterprises, can also be applied to research institutes and universities performing R&D. Doing this allows us to group them according to the structure of their demand for certain forms of tax incentives (Tables 9–12).

Table 9. **Models of research institutes’ use of R&D and innovation tax incentives (%)**

| | Tax incentives use model | | | | | Did not use tax incentives | Total |
|---|--------------------------|------|------|------|------|----------------------------|-------|
| | 1 | 2 | 3 | 4 | 5 | | |
| Share of research institutes that have applied the corresponding model of R&D and innovation tax support | 36.4 | 26.2 | 14.1 | 7.5 | 6.4 | 15.8 | 100 |
| Share of research institutes that applied some incentives (out of all institutes having applied the corresponding model): | | | | | | | |
| Income tax incentives | | | | | | | |
| accelerated depreciation of fixed assets | 4.6 | 4.4 | 2.3 | 12.7 | 0.0 | | |
| taking into account R&D expenditure | 38.1 | 26.6 | 45.3 | 33.4 | 52.1 | | |
| reduced tax rate, set by Russian regions | 4.7 | 0.5 | 0.5 | 15.3 | 5.7 | | |
| VAT exemption or zero | | | | | | | |
| patent and licensing operations | 24.4 | 29.1 | 17.3 | 43.5 | 37.7 | | |
| R&D using state budget funds | 80.2 | 99.9 | 29.3 | 0.4 | 97.4 | | |
| R&D using Russian Foundation for Basic Research and extra-budgetary foundations funds | 68.2 | 0.3 | 14.3 | 0.2 | 56.5 | | |
| R&D based on business contracts | 62.3 | 0.6 | 85.8 | 0.2 | 81.3 | | |
| R&D related to the creation of new products/technologies | 0.1 | 3.5 | 11.6 | 0.1 | 98.8 | | |
| R&D related to the improvement of products/technologies | 0.0 | 0.0 | 8.3 | 0.0 | 93.2 | | |
| Property tax allowance | | | | | | | |
| tax exemption for State Science Centres | 14.3 | 4.3 | 0.0 | 12.8 | 26.9 | | |
| reduced tax rate, set by Russian regions for organizations | 4.5 | 15.8 | 2.2 | 17.9 | 2.9 | | |
| reduced tax rate, set by Russian regions for property | 1.2 | 0.6 | 0.0 | 7.6 | 0.0 | | |

Source: authors’ calculations based on HSE ISSEK data.

Research institutes have exhibited five basic tax strategies (Table 9). Over one third of them (36.4%) primarily use income tax and value-added tax R&D incentives (not only for R&D carried out using budgetary funds but also under business contracts). Demand for tax instruments among the next group of institutes (26.2%) is restricted to allowance for R&D funded by the budget and VAT exemption for patent and licensing operations. Some organizations (roughly 14.1%) focus their attention on VAT benefits for R&D based on business agreements. There is also another small group of organizations which largely focus on incentives for patent and licensing operations (7.5%). The remaining organizations (6.4%) are characterized by high levels of demand for practically all VAT exemptions for R&D.

By analysing the characteristics of research organizations that implement each of the aforementioned tax models in R&D and innovation, we can confirm that these models contain a wealth of information and approximate reality sufficiently (Table 10).

Thus, research institutes implementing the **first model** are noted for their relatively high (compared with other research organizations) proportion of basic research (49.4%), focus on natural and engineering sciences (73.5%), and budgetary funding (almost 56%). The latter explains their usage rate of VAT exemption for R&D carried out using budgetary funds, grants and business contracts. The core of this group is made up of research institutes which until 2013 were part of the system of state academies of science, and now fall under the Federal Agency of Research Organizations. Those representing the **fifth model** differ from the first by their relatively uniform structure of R&D (like research organizations implementing the third model), and their large on average size (based on R&D personnel). This group includes the State Science Centres that were

Table 10. **Characteristics of research institutes using various models of R&D and innovation tax support**

| | | Tax incentives use model | | | | | | | | | |
|--------------------------|--|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | As a percentage of total number of research institutes using the corresponding model | | | | | | | | | |
| Fields of science | Natural sciences | 47.6 | | 22.1 | | 38.4 | | 17.9 | | 48.5 | |
| | Engineering sciences | 25.9 | | 58.8 | | 27.4 | | 53.8 | | 42.4 | |
| | Medical sciences | 8.5 | | 8.8 | | 12.3 | | 17.9 | | 3.0 | |
| | Agricultural sciences | 9.5 | | 8.8 | | 11.0 | | 10.3 | | 6.1 | |
| | Social sciences | 5.3 | | 0.7 | | 4.1 | | 0.0 | | 0.0 | |
| | Humanitarian sciences | 3.2 | | 0.7 | | 6.8 | | 0.0 | | 0.0 | |
| R&D personnel | 51–100 | 20.1 | | 24.3 | | 28.8 | | 10.3 | | 6.1 | |
| | 101–300 | 45.5 | | 42.6 | | 54.8 | | 48.7 | | 24.2 | |
| | 301–500 | 19.0 | | 17.6 | | 9.6 | | 23.1 | | 27.3 | |
| | 501–1000 | 9.5 | | 11.0 | | 5.5 | | 12.8 | | 15.2 | |
| | 1000+ | 5.8 | | 4.4 | | 1.4 | | 5.1 | | 27.3 | |
| | | Mean | S. E. | Mean | S. E. | Mean | S. E. | Mean | S. E. | Mean | S. E. |
| R&D Structure | Basic research | 49.4 | 2.9 | 13.1 | 2.2 | 31.3 | 4.2 | 10.1 | 3.0 | 31.2 | 6.1 |
| | Applied research | 30.3 | 2.1 | 40.6 | 2.8 | 37.5 | 3.8 | 43.5 | 5.5 | 38.2 | 5.1 |
| | Development | 20.3 | 2.1 | 46.3 | 3.0 | 31.2 | 4.2 | 46.3 | 6.1 | 30.6 | 5.2 |
| | Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | | 100.0 | |
| Funding source structure | Budgetary estimate or subsidy | 51.9 | 2.5 | 27.3 | 3.1 | 40.8 | 4.2 | 34.3 | 6.3 | 40.9 | 6.3 |
| | Budgetary subsidy for other purposes | 4.0 | 0.9 | 1.7 | 0.6 | 2.5 | 1.0 | 6.7 | 2.8 | 2.1 | 1.7 |
| | Own funds | 5.8 | 1.0 | 12.2 | 1.9 | 11.5 | 2.9 | 24.4 | 6.0 | 5.9 | 3.1 |
| | Government R&D contracts | 18.5 | 1.8 | 34.2 | 3.0 | 12.2 | 2.7 | 5.9 | 1.9 | 26.0 | 5.0 |
| | Government foundations for R&D support | 5.1 | 0.6 | 0.4 | 0.2 | 6.7 | 2.1 | 2.7 | 1.5 | 2.2 | 0.6 |
| | Business funds | 12.7 | 1.4 | 22.2 | 2.5 | 21.2 | 3.8 | 25.4 | 5.9 | 18.9 | 3.6 |
| | Funds from abroad | 1.0 | 0.2 | 1.5 | 0.5 | 3.0 | 1.5 | 0.1 | 0.0 | 2.5 | 1.2 |
| | Other | 0.9 | 0.3 | 0.5 | 0.2 | 2.2 | 1.3 | 0.6 | 0.6 | 1.4 | 0.8 |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | | 100.0 | | |

Source: authors' calculations based on HSE ISSEK data.

Table 11. **Models of universities’ use of R&D and innovation tax support (%)**

| | Tax incentives use model | | | | Did not use tax incentives | Total |
|---|--------------------------|------|------|------|----------------------------|-------|
| | 1 | 2 | 3 | 4 | | |
| Share of universities that have applied the corresponding model of using R&D and innovation tax incentives | 44.5 | 32.1 | 11.0 | 2.7 | 9.7 | 100 |
| Share of universities which have used some incentives (out of all universities having applied the corresponding model): | | | | | | |
| Income tax allowance | | | | | | |
| zero rate | 12.2 | 32.4 | 46.8 | 30.3 | | |
| accelerated depreciation of R&D fixed assets | 8.4 | 0.0 | 2.9 | 68.8 | | |
| taking into account R&D expenditure | 99.2 | 4.4 | 21.0 | 45.9 | | |
| reduced tax rate, set by Russian regions | 3.1 | 0.2 | 17.6 | 33.6 | | |
| VAT exemption or zero | | | | | | |
| patent and licensing operations | 27.4 | 26.3 | 11.4 | 53.9 | | |
| R&D | 77.4 | 99.7 | 32.9 | 98.9 | | |
| Other incentives | | | | | | |
| for property tax | 25.2 | 22.3 | 50.2 | 16.6 | | |

Source: authors’ calculations based on HSE ISSEK data.

surveyed, which actively seek the benefits established for them offering exemption from property tax.

As for universities performing R&D, we have identified four tax strategies in this field (Table 11). Their R&D and innovation tax behaviour is more heterogeneous than research institutes and manufacturing enterprises: universities have shown demand for virtually all the instruments set out in Table 11.

In the **first variant**, slightly less than half (44%) focus their demand on income tax and VAT incentives for R&D. The **second tax model**, which covers roughly one third of universities (32%), is notable for 100% implementation of incentives for R&D through VAT and income tax exemption.¹⁸ The parameters of the **fifth model** (demand for all instruments as set out in Table 11) are largely down to the relatively high representation in this group of national research universities (NRU), which are the core of higher education research in Russia; their activity in absorbing state support measures is easily understandable (Table 12).

The statistical analysis has not revealed any significant effects of the impact of R&D and innovation tax incentives on research and innovation activity indicators among research institutes and universities (R&D personnel, intensity of internal R&D expenditure, income from commercializing R&D results). This means that we cannot posit any direct link between the tax strategies of research institutes and universities in the research and innovation sphere and real indicators of the intensity and effectiveness of R&D and innovation, at least in the short term. The existing tax incentives in this field are not immediately reflected in the changing everyday practices of research groups and, in particular, in the principles governing how resources are prioritised and distributed.

Conclusions

This article has presented the initial results of our empirical study into the demand for tax incentives for R&D and innovation from manufacturing enterprises, research institutes and universities performing R&D. Some comments must be made before we analyse the results.

First, it is important to recognize a certain bias towards R&D in the list of tax incentives included in the study. This was due to the previously noted lack of any

¹⁸ In accordance with Article 284.1 of the Russian Tax Code, higher education institutions can use a zero income tax rate if their income from education and science/technology activities accounts for no less than 90% of their income.

Table 12. **Characteristics of universities performing R&D and using various models of R&D and innovation tax support**

| | | Tax incentives use model | | | | | | | |
|-----------------------------|---------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | | 2 | | 3 | | 4 | |
| | | Percentage of total number of universities implementing the corresponding model | | | | | | | |
| Type/category of university | Federal university | 6.8 | | 6.3 | | 6.1 | | 0.0 | |
| | University | 53.4 | | 55.2 | | 45.5 | | 25.0 | |
| | Academy | 18.0 | | 18.8 | | 27.3 | | 0.0 | |
| | Institute | 11.3 | | 9.4 | | 18.2 | | 25.0 | |
| | NRU | 10.5 | | 10.4 | | 3.0 | | 50.0 | |
| | | Mean | S. E. | Mean | S. E. | Mean | S. E. | Mean | S. E. |
| Average number of: | Employees | 1746 | 193 | 1708 | 140 | 770 | 145 | 1817 | 378 |
| | Students | 9404 | 852 | 10004 | 935 | 5445 | 1011 | 10602 | 3107 |
| | Post-graduates | 282 | 37 | 310 | 28 | 138 | 26 | 340 | 101 |
| R&D | Share of R&D personnel (%) | 23.58 | 23.10 | 21.44 | 2.08 | 24.45 | 3.88 | 15.55 | 4.81 |
| | Share of R&D in total expenditure (%) | 13.95 | 13.88 | 13.92 | 1.26 | 10.43 | 1.95 | 14.83 | 5.14 |

Source: authors' calculations based on HSE ISSEK data.

recognized formal lists of such stimuli for R&D and innovation or criteria for 'affiliation' with this list. It was also useful to examine more or less universal incentives which are geared towards each of the three groups of organizations and which are actually used by them in practice. A study of manufacturing enterprises, research institutes, and universities required an analysis above all of the instruments supporting R&D specifically. It is possible that such an imbalance in the coverage of the various indirect tools for R&D and innovation partially influenced the finding that research institutes and universities performed best in terms of the use of such incentives (especially when compared with the low average demand for these tax instruments from the manufacturing companies surveyed).

The variation in demand among respondents for R&D and innovation tax incentives according to their type and characteristics (size, type of economic activity, state affiliation, etc.) was, in our opinion, meaningfully significant and must be taken into account when considering the effectiveness and design of tax instruments, particularly their aims, target audience, and content, among others.

The dominance of the state sector (and affiliated organizations) among the beneficiaries of tax support measures for R&D and innovation contradicts the best global trends in terms of rates for private business, especially for start-ups, and small and medium-sized companies. Such a situation means significant economic effects from these policy measures are unlikely and implies that there is significant potential to improve the measures.

Table 13 shows some summary indicators of the demand for R&D and innovation tax incentives from research institutes, universities performing R&D, and manufacturing companies. These indicators allow us to highlight certain key features of the existing indirect support mechanisms.

First, considering the survey's focus on tax incentives for R&D, as noted above, we can explain the relatively low demand for incentives from manufacturing enterprises by the fact that in the reference period (2011) only about 5% of such organizations carried out R&D, and 13.3% engaged in innovation activity [HSE, 2013a]. Demand for tax incentives for R&D and innovation from this group of respondents can be characterized as follows:

- 'Ignorance' of the potential to gain VAT exemption for patent and licensing operations (article 149 of the Russian Tax Code) predominantly due to the lack of such operations, which, in our opinion, is an indirect indicator of

Table 13. Indicators of demand for R&D and innovation tax incentives: 2011

| Indicators of demand | Research institutes | Universities | Manufacturing enterprise |
|---|---|--------------|--------------------------|
| Organizations that received Russian Foundation for Basic Research or Humanitarian Foundation grants (percentage of surveyed organizations) | 45.1 | 63.9 | 0.6 |
| Organizations without any problems concerning tax allowance use of Russian Foundation for Basic Research or Humanitarian Foundation grants (percentage of organizations received the grants) | 96.6 | 95.8 | — |
| Organizations claiming accelerated depreciation of R&D fixed assets (percentage of total surveyed organizations) | 4.0 | 7.4 | 3.4 |
| Organizations not using accelerated depreciation of R&D fixed assets due to the lack of such assets or allocation difficulties (percentage of organizations not using the incentive) | 48.4 | 78.3 | — |
| Organizations that used income tax relief for R&D expenditure (percentage of total surveyed organizations) | 33.7 | 45.8 | 9.9 |
| Organizations that used a reduced income tax rate established by Russian regions for that part of their profit that would be subject to transfer to its budget (percentage of total surveyed organizations) | 3.5 | 6.0 | 9.6 |
| Organizations that used VAT exemptions for patent and licensing operations (percentage of total surveyed organizations) | 24.3 | 23.1 | 0.3 |
| Organizations that did not carry out patent and licensing operations (percentage of total surveyed organizations) | 92.4 | 93.5 | — |
| Organizations that used VAT exemptions for R&D carried out on the basis of business contracts (percentage of total surveyed organizations) | 52.0 | 70.6 | — |
| Organizations that used property tax incentives (percentage of total surveyed organizations) | 19.3 (including state science centres) | 25.0 | 13.7 |

Source: authors' calculations based on HSE ISSEK data.

the low technological level and innovation activity of these organizations.¹⁹ Despite the fact that roughly a quarter of research institutes and universities carrying out R&D made use of this benefit and the tax expenditure on this benefit almost doubled between 2010 and 2012 to reach 16.4 million roubles [Ministry of Finance, 2015], the question of who the beneficiaries are and what the effects of the tax benefit are remains open to debate;

- Relatively high (compared with research institutes and universities carrying out R&D) demand for regional income and property tax incentives, which suggests not only their importance for manufacturing enterprises, but also the efforts of regions to attract investment;
- Leadership of large (more than 1,000 employees) and state-affiliated companies in the use of R&D and innovation tax incentives; this is different from the declared aims of supporting R&D and innovation and actually restricts the impact and positive effects of such measures.

Second, the finding that universities performing R&D were leading in terms of using the tax incentives (those included in the survey) should be understood bearing in mind the modest size of higher education sector in R&D (9% of R&D expenditure and 7.3% of R&D personnel in 2011 [HSE, 2013b]). Nonetheless, together with the perceptible recent growth in state funding for R&D in higher education, the comparatively high demand from universities for indirect support measures reflects the key role of science and technology policy in developing the research and innovation potential of higher education institutions.

Third, the ‘popularity’ of tax incentives for grants from foundations supporting R&D and innovation (article 251 of the Russian Tax Code) is somewhat undervalued by the small size of these grants (for instance, the average size of Russian Foundation for Basic Research and Humanitarian Foundation grants is 400,000–500,000 roubles). It is true that the forthcoming increase in financing

¹⁹ In the RSPP survey mentioned above, 4.3% of businesses surveyed used this instrument, which does not contradict our results.

these foundations and the creation of the Russian Science Foundation in 2013 could lead to growth both in the average size of the grants and in the corresponding tax expenditure.

Fourth, despite the weak overall demand for R&D and innovation tax support measures, Russian research institutes, universities performing R&D, and manufacturing enterprises use certain combinations of these measures which tend to be standard across these groups. Only a small number of organizations use integrated strategies for R&D tax support due to the low levels of innovative activity in Russia. The statistical analysis of manufacturing businesses showed a link between actively applying income-related R&D and innovation tax incentives and intensified innovation activity. In the case of research institutes and universities, we were unable to reveal any significant impact on the distribution of R&D-related resources and the effectiveness of R&D, at least in the short term.

The results presented in this paper are only a first step of a more in-depth analysis. Further research is necessary on the demand for tax incentive instruments to assist in the development of research and innovation, the assessment of the impact of tax incentives on performance in this sphere, and on rationales to underpin policy recommendations that will improve the effectiveness of science, technology and innovation policy. ■

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