Turun yliopisto
University of Turku

Igor V. Pilipenko

The Sochi 2014 Winter Olympics – the cost-benefit analysis and ways to improve the project efficiency

Electronic Publications of Pan-European Institute 4/2013

ISSN 1795 - 5076

The Sochi 2014 Winter Olympics – the cost-benefit analysis and ways to improve the project efficiency[1]

Igor V. Pilipenko[2]

4/2013

Electronic Publications of

Pan-European Institute

http://www.utu.fi/pei

[1] The author would like to thank Professor Clive Belfield (City University of New York, Columbia University in the City of New York) for advice and the valuable comments on the initial draft of this paper that the author prepared at Columbia University in May 2010. The first revision of this paper of August 2012 was presented at the 2013 Annual Meeting of the Association of American Geographers in Los Angeles, LA, USA on 9-13 April 2013. The final version of the article was completed in June 2013.

[2] Igor V. Pilipenko was born in Moscow in 1980. Trained as geographer and economist he holds Ph.D. degree in economic, social and political geography from Lomonosov Moscow State University (2004) and MPA degree from Columbia University in the City of New York (2010). He has worked as Research Fellow in Lomonosov Moscow State University, Faculty of Geography, Department Geography of the World Economy (2001-2012) and was Visiting Professor at the University of Economics, Prague (October 2010). He also worked as Adviser to the Chairman and Director of economic programs of "Business Russia", one of the largest business associations in the Russian Federation (2006-2009), and as consultant in the World Bank in its headquarters in Washington, DC and its resident office in Moscow (2010-2011). He is the author of the book "The competitiveness of nations and regions in the world economy: theory, the experience of small nations of Western and Northern Europe" (2005) and of 39 academic articles and papers in Russian, English, Hungarian (translated), and Ukrainian (translated) on national and regional competitiveness, cluster policy and cluster development in Russia and Europe, regional innovation systems, cost-benefit analysis of public investment projects, manufacturing sector development, and tertiary education issues in Russia.

Abstract

Russia will be hosting the 2014 Winter Olympic and Paralympic Games (WOPG) in the city of Sochi in Krasnodar Krai for the first time in its history including the history of the former USSR. The selection of Sochi took place after eight years of a steady economic growth in Russia that rebounded from the 1998 economic crisis at an average GDP annual growth rate of 6.8% during 1999-2006. Staging of the 2014 WOPG is associated with one of the largest investment programmes in the country in the 2000-2010s causing a number of discussions about necessity of such large spending, while the estimated costs of the Olympics also vary considerably depending on methods of calculation and assumptions used. In this paper we firstly analysed drawbacks of economic impact studies often used for evaluation of public investment projects' costs, including the 2014 WOPG. Secondly, using studies about sport events in the USA and Olympic Games that took place during last 30 years we revealed advantages of cost-benefit analysis in obtaining unbiased estimations of public investments' efficiency. Thirdly, to evaluate the Sochi-2014 project efficiency we employed cost-benefit analysis with five accounts (areas of impact), namely government financial account, resident/consumer account, environmental account, economic and social development accounts, calculated the net present value of this project and assessed its possible alternatives. In conclusion we suggested several policy directions that would enhance public investment efficiency within the Sochi-2014 project.

Keywords: cost-benefit analysis, Russia, Winter Olympics, Sochi, economic impact studies.

JEL Code: D61, H54, L83, N94.

Contents

Abbreviations

CGM – Computable general equilibrium model

CPI – Consumer Price Index

FTP-1997 – the Federal Target Programme “The social-economic development of the resort city Sochi for the period till 2010”

FTP-2006 – the Federal Target Programme “Development of the city of Sochi as a mountain-climate resort (2006-2014)”

GDP – Gross Domestic Product

GRP – Gross Regional Product

IOC – International Olympic Committee

METB – Marginal excess tax burden

NPV – Net Present Value

OCOG – Olympic Committee of the Olympic Games

RUB – Russian rouble

UNEP – United Nations Environment Programme

USD – United States dollar

WOPG – Winter Olympic and Paralympic Games

1 Introduction

The city of Sochi in Krasnodar Krai region in the Russian Federation was selected on 04 July 2007 to host the XXII Olympic Winter Games and XI Paralympic Winter Games in 2014. Russia will be hosting the Winter Olympic and Paralympic Games (WOPG) for the first time in its history, including the history of the former Soviet Union[3]. The selection of Sochi took place after eight years of a steady economic growth in the Russian economy that rebounded from the 1998 economic crisis at the average rate of 6.8% during 1999-2006, and after an unsuccessful bid for hosting the 2002 Winter Olympics when the Sochi's candidacy had not been even shortlisted [Regnum, 2007][4].

Staging of the 2014 WOPG is associated with one of the largest investment programmes in the country in the 2000-2010s causing a number of discussions about necessity of such large spending. Estimations of the impact of the 2014 Olympics on the city of Sochi, on the regional economy of Krasnodar Krai and on the Russian economy as a whole ranged from very optimistic [see Kleyner, 2010] to extremely pessimistic ones [see Nemtsov, Milov, 2009; Nemtsov, Martynyuk, 2013] that is generally in line with differences in the perception of many previous Olympic Games [see Lenskyj, 2000; Preuss, 2006]. The estimated costs of the Olympics also vary considerably depending on methods of calculation and assumptions used.

On the one hand, according to the estimations given in the Federal Target Programme "Development of the city of Sochi as a mountain-climate resort (the years of 2006-2014)" initiated in June 2006 (FTP-2006) partly in connection with a candidacy of Sochi for hosting the 2014 WOPG all costs associated with construction of venues, improvement of infrastructure, etc. totalled 316 billion Russian roubles (RUB) or ca. USD 12 billion [Sochi 2014 Olympic Committee, 2007, p. 3]. The economic impact analysis performed in the FTP-2006 predicted a positive impact on the economy of Krasnodar Krai at RUB 341 billion (equivalent of USD 12.63 billion) including the direct effect of RUB 179.9 billion (equivalent of USD 6.66 billion), the indirect economic effect of RUB 92.9 billion (USD 3.44 billion), and the stimulated economic effect of RUB 68.2 billion (USD 2.52 billion)

[3] The Soviet Union hosted the XXII Summer Olympic Games in 1980 in the city of Moscow; some sport events of the 1980 Olympics were also held in the cities of Tallinn (yachting events), Leningrad, Kiev and Minsk (all – football tournament).

[4] There were two more Russian bids for the Summer Olympics during the 1990-2000s: the city of Saint-Petersburg was an applicant city for the 2004 Summer Olympics but failed to be shortlisted, while the city of Moscow's bid for the 2012 Summer Olympics was eliminated in the first round of the final selection process of the International Olympic Committee in 2005 [Regnum, 2007; Rossiyskaya Gazeta, 2005].

[The Government of the Russian Federation, 2006, p.4]. On the other hand, some experts believed that the expenditures for staging of the 2014 WOPG would amount to USD 15.1 billion with the exchange rate of 35 RUB/USD [Nemtsov, Milov, 2009, p.19].

The main one-off contribution to the subsequent increase in expenditures was due to construction of a new multimodal (highway-railway) road between two clusters of Olympic venues, namely the Coastal cluster in Imeretin valley on the sea shore of Black Sea where all indoor facilities would be located and the Mountain Cluster constructed for outdoor sports. The road construction costs that initially were not included into the budget were estimated by the Ministry of Transport of the Russian Federation in late 2009 at RUB 242 billion [Rossiyskaya Gazeta, 2009], which was an equivalent of USD 8.3 billion using a more realistic exchange rate of 29.15 RUB/USD. However, later the company Russian Railways which commissioned this construction work announced that the construction costs would be 6.2% lower amounting to RUB 227 billion [INTERFAX, 2010]. As a result, the total initial costs of staging the Olympics were estimated at RUB 543 billion (ca. USD 20 billion). However in June 2010 the Ministry of Regional Development of the Russian Federation revealed that the total construction costs of the Olympic venues and infrastructure would reach RUB 950 billion [Sochi-24, 2010], while in February 2013 it was announced that the final budget of the 2014 WOPG and all related spending would amount to RUB 1,526 billion [RBCdaily, 2013].

R. Nureev and E. Markin in their articles on Olympic Games and the 2014 WOPG outlined typical costs and benefits of hosting Olympics, identified Olympic business cycles, but did not monetise benefits and costs of the 2014 WOPG, nor the Net Present Value (NPV) of this project was calculated [Nureev, Markin, 2008; Nureev, Markin, 2009; Nureev, Markin, 2010]. The first initial cost-benefit analysis of the 2014 WOPG was performed in our article [Pilipenko, 2011], where we estimated the NPV of the Sochi-2014 project to be equal to negative USD 6.01 billion.

The aim of this paper is to conduct a further and more detailed evaluation of the Sochi-2014 project and benefits/costs associated with staging of the 2014 WOPG using the tools of cost-benefit analysis. In our analysis we used information from open sources only including the Sochi-2014 Bid Books, texts of Federal laws of the Russian Federation and Governmental Decrees with regard to the WOPG 2014 as well as academic books and articles on economic impact and cost-benefit analysis of previous Olympics and other

sport events, newspaper articles and Internet-resources with data and information on the WOPG 2014 preparation process.

The remainder of the paper is organised as follows. In section 2 we outline main stages in the development of the city of Sochi. Section 3 provides a review of studies focused on estimation of impacts on economy and society of nations, regions and cities of Olympic Games, in particular, and sport events, in general, using tools of economic impact and cost-benefit analysis. The fourth section outlines the class of cost-benefit analysis we performed in this paper, sets out policy option for consideration and identifies agency and standing for the purpose of our cost-benefit analysis. Section 5 catalogues the impacts of the WOPG 2014, selects measurement indicators and predicts the impacts quantitatively over the life of the project, while in section 6 we monetise identified impacts. In the seventh section the NPV of the Sochi-2014 project with different policy options is calculated and the sensitivity analysis is performed to check robustness of the obtained results. Finally, in section 7 we discuss the limitations of our calculations and present recommendations for enhancement of positive impacts on the Russian economy from the staging of the 2014 WOPG in Sochi.

2 Outline of the historical development of Sochi

Sochi has the permanent urban population of 360.3 thousand [Rosstat, 2012], which makes it the 49th largest city in Russia by population, while the total population in the municipality of Sochi (Greater Sochi) reaches 437.6 thousand [Rosstat – Krasnodar Krai, 2012]. Sprawled for 145 km along the Black Sea coast and the Greater Caucasus Mountain Range Sochi has been well-known in Russia and in the former USSR as one of the main seaside, balneological and, recently, skiing resorts thanks to its unique geographical location combining a humid subtropical climate, sources of spa waters and a close proximity to mountains with elevation difference between 550 m and 2320 m. Its strong brand of a resort city with a wide range of opportunities for tourist activities has been shaped step-by-step since this settlement was given the status of a town in the Russian Empire back in 1898.

In the same year of 1898 the first scientific field trip explored the local hydro-mineralogical resources, the climatic potential and geological composition of the sea shore and provided the first evidence of a huge resort potential of this area. The first private resort hotel called “Caucasus Riviera” was opened in 1909 [Sochi City Administration, 2013], and by 1914 there were about 150 private land plots and properties including those belonging to the Imperial family, while the town itself had the permanent population of ca. 13 thousand people. The ownership structure in the town changed completely after the February and October Revolutions of 1917 and the Russian Civil War, when eventually in 1920 all the property was nationalised [Ermakov, Leonov, 1987].

Following the after-Civil War recovery period in the beginning of the 1920s, Sochi was granted the status of a national resort in the Soviet Union on 26 May 1925 that provided impetus for its further development. However, the first Town Master Plan spanning 25 years was not created until 1933, when the industrial base of the country and new engineering facilities created during the First Five-Year Plan enabled the thorough reconstruction and development of the town’s infrastructure. A number of new sanatoriums and spa-centres with the initial total capacity of ca. 10 thousand people were built; the capacity of the resort was soon increased to ca. 25 thousand visitors in 1937 [Pravda, 1935; Ermakov, Leonov, 1987]. The total budget allocated for the realisation of the 1933 Master Plan amounted to RUB 1.4 billion, which is equal to ca.

USD 11.2 billion in 2006 prices[5]. As a result by the year of 1940, when ca. 40% of the budget was allocated, the number of tourists spending their holidays in the resort town increased to ca. 110 thousand. Later during the Great Patriotic War (World War II) the town was converted into the largest hospital complex in the country with a total capacity temporarily increased to 40 thousand, so that more than 350 thousand wounded Soviet soldiers were recovered in Sochi [Ermakov, Leonov, 1987; Sochi City Administration, 2013].

After the Great Patriotic War, the annual number of tourists visiting Sochi for vacation or medical treatment was increasing rapidly. By the mid-1950s, when the number of arrivals achieved a milestone of 500 thousand, it became clear that the town infrastructure had reached its limits. Therefore, in 1961 the boundaries of the city of Sochi were extended to form the municipality of Greater Sochi, and since then the city comprised four city districts, namely Lazarevskoe, Central (the historical town of Sochi), Khosta, and Adler city districts stretched for 145 km along the Black sea shore. In 1965 the new 1967-1992 City Master Plan was adopted [Rodina, 2009], according to which the total capacity of sanatoriums and spa-centres was increased to 73 thousand with ca. 3 million arrivals by 1975. The capacity was further extended to 84 thousand people by the year of 1985, while the total number of tourist arrivals (mostly from within the Soviet Union) exceeded 4.5 million by the year of 1987 [Ermakov, Leonov, 1987; Poltoranov, Slutskiy, Kozlov, 1986; The Government of the Russian Federation, 1997].

The new City Master Plan was prepared in 1990; however because of the changing political and economic situation in the country it was never adopted. After the dissolution of the USSR in 1991 the Russian Parliament and the Government of the Russian Federation granted the city of Sochi the status of a Federal Resort in 1993 [Presidium of the Supreme Council.., 1993]. However, throughout the 1990s and the beginning of the 2000s there was no well-ordered strategy of urban development in Greater Sochi. It eventually led to a chaotic construction of new buildings, transportation problems and traffic congestion, as well as to the deterioration of the infrastructure, which did not match

[5] To convert the rouble prices in 1933 into US dollars in 2006 we used the RUB/USD exchange rate of 1.9461 for the year of 1927/28 verified in statistical yearbooks published in both Russian and English [Minvneshtorg, 1960; Soviet Union Information Bureau, 1929]. As the exchange rate by 1933 remained unchanged in the USSR, we took it to calculate an equivalent in 1933 US dollars amounting to USD 719 million (1,400,000,000 RUB /1.9461 RUB/USD = 719,387,492 USD). Then we used the Consumer Price Index (CPI) data provided by the U.S. Department of Labor [Bureau of Labor Statistics, 2013] to inflate this number to the 2006 prices obtaining a USD 11.2 billion equivalent (719,387,492 USD x CPI index in 2006 / CPI index in 1933 = 719,387,492 USD x 201.6 / 13.0 = 11,156,039,890 USD).

the changing demand for municipal services. The problems in the urban development were also coupled with a fourfold drop in tourist arrivals that amounted to only less than a million in 1995 as a consequence of the economic crisis in the Russian economy and local military conflicts nearby, namely in Abkhazia and Chechen Republic. All these resulted in a 40% decline of the local industrial output over 1991-1995 and the decreasing efficiency of agriculture, while passenger and freight turnover dropped by 50% and 70%, respectively [The Government of the Russian Federation, 1997]. Moreover, the growing mismatch between the aging tourist infrastructure that was previously well-developed but kept underinvested since the beginning of the 1990s, less sophisticated services inherited from the Soviet era and rising transportation and accommodation costs associated with staying in Sochi contributed to that Sochi started losing its tourists in the fierce competition with resorts in Turkey, Egypt and other Mediterranean countries which were able to offer Russian visitors a tourist product with a better price-quality ratio. It also became clear that some peculiarities of the local economy that were not so relevant within the planned economy, namely strong seasonality of the existing resort which was oriented for balneological treatment and seaside tourism mainly from April to November and lack of year-round opportunities for tourism, turned into objective constraints for the city's development in the market economy.

These deficiencies were initially tackled in the Federal Target Programme "The social-economic development of the resort city Sochi for the period till 2010" (FTP-1997) adopted in 1997 with the total expenditures of RUB 34.9 trillion (equivalent of USD 6.1 billion) [The Government of the Russian Federation, 1997]. Besides rehabilitation and expansion of the existing infrastructure FTP-1997 envisaged *inter alia* the development of a new mountain resort in Krasnaya Polyana with the specialization on skiing. Despite the initial negative impact of the Russian economic crisis of 1998 and some changes in the FTP-1997, this program as well as the economic recovery in Russia in the early 2000s provided an impulse for the development of a new specialization of Sochi as a winter sports resort. As a result of the improved economic situation and rising standards of living in Russia, from the one side, and new investments into modernization of the city's infrastructure, from the other side, the number of tourist arrivals by the year of 2005, when the initial application of Sochi to host 2014 Winter Olympics was submitted to the International Olympic Committee (IOC), increased to 3.08 million [Kommersant, 2010]. Furthermore, when on 22 June 2006 the IOC shortlisted Sochi together with Salzburg, Austria and Pyeongchang, South Korea, the

new FTP-2006 worth USD 12 billion was adopted with the aim to develop further the specialization of Sochi as a winter sports resort and a training centre for national sports teams and to support its bid for the 2014 Olympics [The Government of the Russian Federation, 2006].

Besides the strong economic performance, the full financial support from the Federal Government, and the overwhelming support by the local population, Sochi revealed in the contest against two other shortlisted candidate cities several distinct advantages: the concept of the WOPG in Sochi was promoted as the most compact Olympics in the history of Olympic Games as it would take only 10 min from the airport to reach the Coastal cluster of venues and maximum 50 min to travel from the Coastal cluster to the Mountain cluster [Sochi 2014 Olympic committee, Theme 8, p.9]. This geographically favourable location and the fact that all the venues in the Coastal cluster and the main Olympic Village would be within a walking distance from each other, while it would take only 16 min to reach the Mountain cluster venues from the mountain Olympic Village, were noted by the IOC [International Olympic Committee, 2007] and subsequently contributed to the selection of Sochi during the 119th IOC Session on 4 July 2007 as the host city of the 2014 Olympics.

3 Literature review on costs and benefits of Olympic Games and other sport events

In order to justify staging of sport events public authorities often commission studies that mostly employ economic impact analysis using input-output tables to estimate multiplier effects from realization of new projects, *i.e.* an increased demand for goods, services and labour in relevant economies. Direct and indirect impacts are estimated in terms of additional Gross Domestic Product (GDP) or Gross Regional Product (GRP) produced, new jobs created or new tourist arrivals expected as a result of hosting sports events. However, in general the economic impact analysis approach tends to overestimate benefits from realisation of projects due to the following reasons [Shaffer et al., 2003 p. 4; Crompton, 1995; Hudson, 2001]:

Firstly, in economic impact analysis all expenditures are assumed to have positive impacts on a studied economy. Therefore, basically all investment projects assessed by economic impact analysis usually turn out to be attractive for government spending.

Secondly, costs associated with capital investments are usually treated as benefits on the grounds that they stimulated further economic activity in an economy through multipliers. However, in a situation when initial costs are substantial, while induced economic activities are insignificant, the question about efficiency of such investments can be raised.

Thirdly, crowding out effects are usually not taken into account. In other words, the situation when realised public investments could replace possible private investments is usually not considered in economic impact analysis.

Fourthly, additional jobs associated with investment projects are calculated as if local/regional economies had high unemployment rates prior to the implementation of these projects. However, in reality additional vacancies are often being filled by migrants not only from different regions of a studied country but also from abroad. Moreover, many created jobs often turn out to be not permanent but of a temporary nature[6].

[6] Crowding out effects through, for instance, higher prices and limited labour resources are included into Computable general equilibrium models (CGM) and in dynamic CGMs that take into account the time dimension. A CGM was employed, for instance, in the economic impact

Finally, in economic impact analysis opportunity costs are mostly ignored. It is assumed that production capacities are underutilized in a studied economy, and free capacities would be used to implement a considered project, which is usually not the case in reality[7].

Unlike economic impact analysis, cost-benefit analysis as a policy assessment method clearly distinguishes positive (benefits) and negative (costs) impacts, quantifies them in monetary terms, and presents results in terms of Net Present Value (Net Social Benefits) of policy alternatives calculated as a difference between discounted costs and benefits in their comparable present values. Besides a range of economic impacts, cost-benefits analysis also takes into account social, environmental, and other impacts that affect the utility of individuals, thus allowing a more precise calculation of net impacts of state funded projects on the society and justifying more efficient social decision making [Boardman et al., 2006; Lenskyj, 2000] [8]. A typical cost-benefit analysis includes the following steps [Boardman et al., 2006]: (1) specification of alternatives; (2) decision on agency and standing; (3) cataloguing of positive and negative impacts; (4) predicting impacts quantitatively over time; (5) monetisation of all impacts; (6) discounting costs and benefits to present values; (7) computing NPVs per alternative; (8) performing sensitivity analysis; (9) providing policy advices.

Estimation of impacts of sport events on national and regional economies are among the salient examples of differences between results obtained through economic impact analysis and cost-benefit analysis. The studies employing economic impact analyses usually conclude that staging of sport events is beneficial for state budgets and national/regional/local economies. The positive results, however, may differ in terms of magnitude of positive/negative impacts depending on a desire of authorities to attract a new team into a region/city or to foster its relocation elsewhere. For instance, when the

analysis of the 2000 Summer Olympics in Sydney, while the dynamic CGM was used for the 2012 Olympics in London [East of England Development Agency, 2006].

[7] To minimise opportunity costs in economic impact analysis it is suggested to plan carefully demand for construction works and services in order to avoid over-utilisation of capacities in a region or a host city. This was proposed, for example, with regard to the 2010 Winter Olympics in Vancouver [Minister of State for Community Charter, 2002].

[8] The Ministry of Transport of the Russian Federation estimated public, commercial and budget efficiency of subprograms within Federal Target Programmes through calculation of NPVs [see, for example, calculations with regard to the subprogram “Maritime transport” within the FTP “Modernization of the Transport System of Russia” [Mintrans, 2007]). However, no estimations of cash flows over the life of the programme were provided for calculation of NPVs; opportunity costs or crowding out effects were not assessed either; and an impact on the environment was also not presented. Besides this it remained unclear companies with what kind of ownership (public, private or mixed) were taken into account in calculation of the commercial efficiency.

US baseball team “San Francisco Giants” was contemplating to move from San Francisco, CA to San Jose, CA both town halls commissioned studies on estimation of this team’s possible economic impact on their local economies. Both studies revealed that hosting the team is beneficial for local economies. However, in San Francisco the annual positive impact was estimated at USD 3.1 million, while in San Jose the expected benefits ranged from annual USD 50 million to USD 100 million [Crompton, 1995].

Contrary to the studies that use economic impact analysis, the estimations employing cost-benefit analysis evidence that at least financial impacts of sports activities on local economies are usually negative [see, for instance, Long, 2005; Owen, 2005; Rappaport, Wilkerson, 2001; Shaffer, Greer, Mauboules, 2003]. Moreover, such economic benefits like increased number of tourist arrivals, higher employment rates (or lower unemployment), higher rate of new business establishments, widening of a local tax base and increased revenues from managed sports facilities that are often envisioned prior to realization of projects related to sports activities do not materialize in most cases.

For example, only 31% of expenditures realised by the Olympic Committee of the Summer Olympics in Atlanta were expected to have positive economic impacts on the local economy [Baade, Matheson, 2002]. The study of Olympic Games from 1972 to 2008 revealed that high occupancy rates, which hotels enjoyed during the Olympics were achieved at the cost of lower occupancy rates prior to and after the Olympic Games, while only a considerable improvement in infrastructure could contribute to increasing of tourist arrivals in countries/regions hosting Olympic Games [Preuss, 2006]. For instance, the disruption caused by the Olympic Games in Atlanta distinctly crowded out tourists from hotels across the whole state of Georgia. While leading hotel chains received high revenues, catering and retail sector experienced lower demand, and the overall impact on the tourist sector remained ambiguous in that case [Owen, 2005, pp.7-9].

The impact of previous Olympics on local employment was studied by Green (2003). His research was based on several Olympic Games (Lake Placid-1980, Calgary-1988, Salt Lake City-2002 and others) and showed that Olympic cities/regions usually managed to accelerate a job growth thanks to intensive construction works prior to the Olympic Games, but this growth was subsequently offset in the post-Games period when the number of jobs often dropped dramatically, so that no long-term positive impact on local/regional employment was found [Green, 2003, p.8].

Likewise, the real costs of public subsidies in the USA for 99 sports facilities hosting teams from four major leagues (National Football League, Major Baseball League, National Basketball Association, and National Hockey League) turned out to be 40% higher than officially reported costs (that is extra USD 50 million per facility or a total value of USD 5 billion of extra costs) [Long, 2005, p.135]. Furthermore, no systematic evidence was found that new business establishments had positive correlation with location of sports teams in four above-mentioned sports leagues in the USA [Siegfried, Zimbalist, 2000].

When nominating a city for hosting the Olympics, organisers often underestimated expected costs of Olympic projects. Besides publishing budgets of Olympic Committees, bid books of candidate cities could comprise incomplete information about additional capital expenditures associated with staging of the Olympic Games and necessary improvements of urban infrastructure. In other cases, organising committees were forced to increase their budgets already in the course of realisation of their Olympic projects to accomplish construction of Olympic venues on time and in accordance with the rules and commitments. For instance, the organisers of the Summer Olympics 2004 in Athens initially envisioned costs to amount USD 1.6 billion, but eventually spent up to USD 16 billion. The costs of staging Olympic Games 2008 in Beijing were originally projected at USD 1.6 billion as well. However, when counting in all necessary infrastructure expenditures the real costs of the 2008 Olympics reached USD 40 billion. The Central Government of Spain accumulated after the 1992 Olympics in Barcelona the total debt of USD 4 billion, while the Government of Catalonia was left with USD 2.1 billion in debt. Finally, despite the final surplus of USD 28 million received by the Organising Committee of the 1998 Winter Olympics in Nagano, the public debt attributed to various levels of the Japanese Government achieved USD 11 billion [Zimbalist, 2010, p.10].

Summing up the results of the cost-benefit studies, we can conclude that most of large-scale sport events from the financial point of view were unprofitable for state budgets. Nevertheless, realisation of mega sport events can be beneficial for a society and local residents thanks to improvements in urban infrastructure and improved standards of living. One should also take into account a range of political aspects, such as enhanced prestige of a hosting country and a host region/city, as well as moral factors like feeling of pride and national spirit by the population of a host country/region/city. So, many of these factors also impel governments to bid for staging of the Olympics and other large-scale sports events. Unfortunately, the contribution of these aspects to benefits and costs of

the Olympic projects is still hard to estimate thoroughly even with the tools of cost-benefit analysis, while they are mostly ignored in economic impact analyses. One can only hope that social, political, and moral factors would partially compensate for or eventually even outweigh considerable financial costs of staging mega sport events like Olympic Games for state budgets.

4 Class of cost-benefit analysis, policy options, agency and standing

We considered hosting of the 2014 WOPG from the ex-ante perspective and took the year of 2006 as a starting point of our ex ante cost-benefit analysis. This year was selected because three main decisions were taken in 2006 that shaped the initial budget of the 2014 WOPG and the list of expenditures associated with the Sochi Olympics. Firstly, the Government of the Russian Federation issued a Decree about the FTP-2006 providing financial resources in the amount of RUB 316 billion to improve the infrastructure of Sochi and to construct or enhance sports venues. Secondly, the Executive Board of the IOC selected Sochi as the Candidate City to host the 2014 WOPG along with Pyeongchang and Salzburg. And finally, the budget of the Olympic Committee of the Olympic Games (OCOG) in Sochi was approved to be later included into the Sochi Bid Books.

The Russian Government determined three main objectives for the implementation of the Sochi FTP-2006 [The Government of the Russian Federation, 2006]:

To develop the infrastructure of Sochi that was one of prime tourist destinations in the USSR, but since its dissolution Sochi had been losing domestic tourists who reoriented themselves more in favour of sea resorts in Turkey, Egypt and other countries[9].

To construct athlete venues for national bobsleigh, skeleton, luge, short-track, ski jumping, skiing, and Alpine skiing teams that previously were forced to have trainings often abroad, and even Russian National Championships in some sports took place outside of Russia (for instance, ski jumping in Germany, bobsleigh and luge in Latvia, etc.). Such a disappointing situation in the country that had had long traditions in winter sports disciplines was again due to the dissolution of the USSR as many sport venues located outside of Russia in newly independent Republics were either costly for renting or even abandoned. Eventually, the lack of venues and low quality of available athlete

[9] According to the Federal Agency for Tourism, the following countries were in the top-10 list of favorite destinations for Russian tourists in 2012: (1) Turkey – 2.5 million visitors, (2) Egypt – 1.9 million, (3) China – 1.3 million, (4) Thailand – 885 thousand, (5) Spain – 792 thousand, (6) Germany – 713 thousand, (7) Greece – 690 thousand, (8) Italy – 571 thousand, (9) United Arab Emirates – 549 thousand, (10) Finland – 513 thousand tourists [Rosturizm, 2013].

facilities contributed to the deteriorating performance of the Russian athletes at Winter Olympic Games since 1994[10].

To support the city of Sochi's competitive advantages as a Candidate City to host the 2014 WOPG by providing funding for construction of all Olympic venues and the entire associated infrastructure.

As we could see, the FTP-2006 included two possible scenarios. In Scenario One, Sochi would be elected as a hosting city of the 2014 WOPG, which implied completion of all three objectives described above with all planned expenditures. In Scenario Two, Sochi would not have been elected as the hosting city and in this case only objectives (1) and (2) would have been realized with lesser capital expenditures.

Taking into account two proposed scenarios, we considered two policy options for the purpose of our cost-benefit analysis: Policy option (1) – to host the 2014 WOPG and to implement the Sochi FTP-2006 in full reaching designated objectives (1), (2), and (3); Policy option (2) – not to host the WOPG 2014 and to implement the Sochi FTP-2006 to fulfil the objectives (1) and (2) only. In monetised terms, we compared the incremental costs of the Policy option (1) with the costs of the alternative Policy option (2) that would be incurred regardless of whether Sochi would host the 2014 WOPG or not. Policy option (1) was then further divided into Policy option (1.1) that implied a construction of a multimodal motorway-railway road Adler-Krasnaya Polyana and Policy option (1.2) with a construction of a cheaper alternative road Sochi-Krasnaya Polyana, proposed by several experts [see Voronkov, 2008; Nemtsov, Milov, 2009][11].

As construction of athlete venues and staging of the Olympic Games have impacts on many facets of the society we took the social perspective for our cost-benefit analysis. For the purpose of this paper we gave standing to all the members of the society in

[10] Starting at the first place in the medal table of the 1994 Olympics in Lillehammer with 11 golden medals and 23 medals in total, the team Russia regressed to the third place in the 1998 Olympic Games in Nagano (nine and 18 medals, respectively), went two places lower in the 2002 Winter Olympics in Salt Lake City (five and 13 medals), rebounded to the fourth place in the 2006 Olympics in Turin winning eight gold medals and a total of 22 medals, but finally ended up at the 11th place in the last Winter Olympics in Vancouver in 2010 securing only three gold, five silver and seven bronze medals.

[11] It was argued that construction costs of the alternative road Sochi-Krasnaya Polyana would be lower in comparison to the multimodal road Adler-Krasnaya Polyana due to the fact that it would be shorter (45 km vs. 48 km) and that it would go along an older road used earlier in the mid-20th century but currently abandoned [Voronkov, 2008]. However, it should be noticed that the multimodal road Adler-Krasnaya Polyana comprises essentially two separate roads, a motorway and a railroad, while the alternative road would have been only a motorway.

Russia and treated the Federal, regional and local levels of the government as one Government. The time span of the study included the whole Olympic cycle of 2006-2016 identified in the special Federal Law on hosting the 2014 WOPG [Fed. zakon as of 1 December 2007 No.310-FZ] which spans from the preparation of the Bid books in 2006 till staging the 2014 WOPG in February-March 2014 and also including two years after the Olympic Games.

As a basis for our calculations we used the detailed information on expenditures for the Olympics and related infrastructure presented in the FTP-2006 in the amount of RUB 316 billion and additional RUB 227 billion to be spent on the multimodal motorway-railway road Adler-Krasnaya Polyana. The further increase in construction costs to RUB 950 billion announced in June 2010 and to RUB 1,526 billion as revealed in February 2013 was not incorporated into our calculations, because there was no exact information on the distribution of these costs across constructed venues and over time. However, in case this information would become available it should be processed in the same way, in accordance with the cost-benefit analysis methodology, as we processed the available quantitative data collected and used in this paper.

5 The impact of the 2014 Winter Olympics on the economy and society of Russia

To estimate costs and benefits of hosting the 2014 WOPG in Sochi we employed the five-account approach elaborated by Shaffer, Greer, and Mauboules (2003) that takes account of different impacts on the economy, society and nature. This approach includes the following accounts (areas of impact) [Shaffer et al., 2003]:

1. Government financial account that evaluates net return or cost to taxpayers from realisation of a sport mega event;
2. Resident/consumer account summarising net benefits for residents of a hosting country/region/city;
3. Environmental account, which comprises impacts on the environment;
4. Economic development account specifying costs and benefits contributing to a national/regional/local income and employment;
5. Social account that characterises community and social impacts of a mega sport event.

Annex 1 provides a summary of costs and benefits associated with these five accounts with regard to the 2014 Olympics in Sochi.

5.1 Government financial account

As the costs we included the following items in this account[12]:

- C.1.1 – All incremental expenditures of the Federal and regional governments in Scenario One of the FTP-2006 in comparison to Scenario Two except for contributions from the Federal and regional governments to the Olympic Committee of Sochi 2014 that were considered as governmental transfers from the point of view of the cost-benefit analysis methodology and standing identified in this paper. The expenditures included construction costs of 11 Olympic athlete venues (see Annex 2), two Olympic villages in each of two

[12] Unlike studies of other Olympics in the case of Sochi we did not include possible losses of tax revenues as a cost item because the 2014 OCOG Sochi as a non-for-profit legal entity was not expected to generate profits; donations to the OCOG were considered exempt from the corporate tax; ticket sales for sport events would be exempt from the value-added tax; the corporate property tax was not levied on the real estate under construction and expected not to be levied five years on from the Olympic Games as a new Special Economic Zone would be established on the site of the Olympic venues [Sochi 2014 Olympic committee, Theme 6, p.95].

clusters of Olympic venues (the Coastal cluster in Adler and the Mountain cluster in Krasnaya Polyana), Media Centres, roads and railways, utilities and physical infrastructure, telecom infrastructure, electricity infrastructure, medical facilities, environmental protection, city planning, and visitor accommodation[13]. The construction works have been procured and controlled by the special public corporation "Olympstroy" established in 2007 according to the special Federal law [Fed. zakon as of 30 October 2007 No.238-FZ].

- C.1.2 – All expenditures incurred by the Sochi OCOG in the period prior to the 2014 WOPG (2007-2014). The Sochi OCOG is a representative of the Russian Government, the Russian Olympic Committee and the City of Sochi according to the special Federal law [Fed. zakon as of 1 December 2007 No.310-FZ].
- C.1.3 – The additional costs of the new multimodal road (highway-railway) Adler-Krasnaya Polyana that were initially unbudgeted in the FTP-2006 but incurred later after the City of Sochi was elected as a hosting city of the 2014 WOPG[14]. This 48km-long road would provide the quickest connection between two clusters of Olympic venues (maximum 27 min trip with one stop in Esto-Sadok) [SKMost, 2011].
- C.1.4 – Costs of maintenance, removal, and changing of specialization of athlete venues after the 2014 Winter Olympics. Anticipating a possible underutilisation of several athlete venues after the 2014 WOPG the Government took a decision to convert or to move and convert four Olympic venues: Adler Arena Skating Centre, Iceberg Skating Palace, "Ice Cube" Curling Center, and "Shayba" Arena (see Annex 2).
- C.1.5 – Interest payments on the public debt acquired to finance the organisation of the Olympics in Sochi. There was a solid consolidated budget surplus in 2006-2007 (8.4% and 6.0% of GDP, respectively [Rosstat, 2011]) and a solid Federal budget surplus (7.4% and 5.5% of GDP, respectively [Minfin, 2007; Minfin, 2008]) when the decisions about the candidacy of the city of Sochi were made. However, the financial crisis of 2008-2009 hit severely the Russian economy[15]; the Government of the Russian Federation was forced to implement an anti-crisis response using the Federal budget as well as the

[13] It should be noticed that unlike many other hosting cities most of the Olympic venues in Sochi have been constructed from scratch.
[14] In Policy option (1.2) this item was excluded from calculations as the multimodal road Adler-Krasnaya Polyana would not have been constructed without staging the 2014 Olympics.
[15] GDP of Russia in 2009 contracted by 7.9% [Ministry of economic development…, 2010].

Reserve Fund in order to support the banking sector and the real economy[16]. As a result the Federal Budget surplus of 4.0% in 2008 was followed by the Federal Budget deficit of 5.9% of GDP in 2009 [Minfin, 2009; Minfin, 2010c], while the consolidated budget surplus of 4.1% in 2008 was followed by the consolidated budget deficit of 6.3% in 2009 [Rosstat, 2011]. Subsequently, the Federal Government issued 5-year sovereign notes and 10-year sovereign bonds in April 2010 at the London Stock Exchange for the first time since the default in 1998 [Minfin, 2010a; Minfin, 2010b]. Moreover, in June 2009 the Russian Government cancelled contributions to the 2014 OCOG for 2009 and 2010 promising to repay it in 2011 [GZT, 2009].

- C.1.6 – Marginal excess tax burden (METB) associated with the incremental expenditures of the FTP-2006. Again, the reversal of the Government's fiscal position in 2009 when the Federal budget was executed with a deficit after eight years of budget surpluses implied that the Government should raise taxes (most likely the taxes on mineral resource extraction) to collect the amount needed and, therefore, generating METB.

Accordingly we identified the following benefits associated with the Government financial account:

- B.1.1 – All revenues received by the Sochi OCOG during 2006-2016 less contributions from the Federal and regional governments that we considered as governmental transfers according to the cost-benefit analysis methodology.
- B.1.2 – The avoided construction costs of a new 45km-long and less expensive road Sochi-Krasnaya Polyana as an alternative proposal to the multimodal road Adler-Krasnaya Polyana [Voronkov, 2008]. As the construction of the multimodal road Adler-Krasnaya Polyana was connected mostly with staging of the Olympics, we included the avoided construction costs of the alternative road Sochi-Krasnaya Polyana as benefits[17].
- B.1.3 – Revenues from the use of Olympic venues after the 2014 WOPG in Sochi.
- B.1.4 – Avoided costs of staging National Championships in ski jumping and bobsleigh abroad.

[16] The anti-crisis fiscal policy response reached to ca. 6.7% of GDP for two years (2.6% in 2008 and 4.1% in 2009) which amounted to ca. RUB 2.9 trillion [The World Bank, 2009].
[17] In Policy option (1.2) this item was included as costs into the Government financial account.

5.2 Resident/consumer account

Disruption and congestion during the construction works before the 2014 WOPG and during the Olympic Games could be identified as main negative externalities in the resident/consumer account (C.2.1). The benefits seemed to be more substantial comprising pride and enjoyment of citizens of Sochi and Russia of hosting the 2014 WOPG (B.2.1), a joy from attending the 2014 WOPG events (B.2.2), and improved infrastructure, housing and transportation facilities in the region (B.2.3).

5.3 Environmental account

Though the Sochi 2014 Bid Books contained the description of the environmental protection programme totalling USD 305 million to be spent on green technologies before and during the Sochi WOPG, this account includes only costs to the nature (C.3.1) due to the following reasons. Most of construction works have been carried out in the immediate vicinity of Sochi National Park, National Biosphere Reserve and Federal Nature Reserve (the above-mentioned new road Adler-Krasnaya Polyana goes even through a part of Sochi National Park). This was the main source of concerns of the United Nations Environment Programme (UNEP) that had been monitoring the ecological situation around construction sites in Sochi. In January 2010 UNEP published a report warning on environmental damage already made and possible future environmental impacts on landscapes around Sochi [UNEP, 2010]. We also included fines for breaking the environmental laws of the Russian Federation by construction companies as costs (C.3.2) because penalty fees would be spend on regeneration of natural landscapes damaged during the construction works.

5.4 Economic development account

This account summarises income and new job creation effects of the 2014 WOPG on the economy of Krasnodar Krai region and the Russian economy as a whole. Following the salient case of the 1996 Olympic Games in Atlanta discussed already above [Owen, 2005, p.7], among the costs in this account we could mention the crowding out effect on the local business in Sochi before and during the 2014 WOPG (C.4.1). The positive effects of the 2014 WOPG included creation of new continuing jobs in the economy of Krasnodar Krai region (B.4.1) and a net increase in foreign tourist arrivals during and after the 2014 WOPG (B.4.2) that would increase exports of services from Krasnodar Krai region and the Russian Federation as a whole.

5.5 Social account

The social account catalogues community and social impacts of the 2014 WOPG in Sochi. Based on the experience of previous Olympic Games and taking into consideration the construction programme in Sochi one could conclude that displacement of local tenants and house owners (C.5.1) was one of the main negative externalities in staging the Olympics, in general. For example before the 1996 Summer Olympics in Atlanta around 30,000 low-income people plus ca. 9,000 homeless people were displaced [Shaffer et. al., 2003, p.23]. As for the benefits, we could include free tickets distributed among the residents of the City of Sochi for the 2014 WOPG events (B.5.1).

6 Monetisation of impacts

For calculation of costs and benefits we employed mostly the accounting/budget method together with the inputs method. Due to lack of exact quantitative information with regard to several cost/benefit items we were forced to make some assumptions and simplifications.

6.1 Government financial account

We used the data from the FTP-2006 to calculate incremental expenditures for the Sochi WOPG (C.1.1). First, the public expenditures (Federal and regional) were subtracted from the total amount of expenditures that comprised Federal, regional and private expenditures. Secondly, to obtain monetary units comparable with other Olympic Games we converted values given in the FTP-2006 in nominal Russian roubles into constant 2006 roubles[18] and then into US dollars[19]. Thirdly, we subtracted the Federal and regional government expenditures in Scenario One from the Federal and regional government expenditures in Scenario Two to obtain the value of incremental spending caused by hosting the 2014 WOPG in Sochi. The contribution of the Federal and regional governments to the Sochi OCOG in the amount of USD 338 million was also excluded because it is a transfer (refer to Annex 3 for detailed calculations of the item C.1.1).

In order to include expenditures and revenues of the Sochi OCOG into our calculations as costs (C.1.2) and benefits (B.1.1) we used the cash flows of the OCOG budget presented in the Sochi Bid Books [Sochi 2014 Olympic committee, Theme 6, 2007].

In Policy option (1.1) the unbudgeted costs of construction of the new multimodal road Adler-Krasnaya Polyana (C.1.3) were calculated as follows[20] (see Annex 4). As the exact cash flow of the project was not disclosed, we took the estimation of construction costs of RUB 227 billion announced by the Ministry of Transport of the Russian Federation and the Russian Railways [Rossiyskaya Gazeta, 2009; INTERFAX, 2010] and then, given the common practice in official documents of the Ministry of Transport

[18] To convert nominal roubles to 2006 roubles we used CPI indices for 2007-2012 provided by Rosstat (2007 – 11.9%, 2008 – 13.3%, 2009 – 8.8%, 2010 – 8.8%, 2011 – 6.1%, and 2012 – 6.6% [Rosstat, 2013], the average targeted level of CPI at 5.5% for 2013, and 4.5% for 2014 [Ministry of Economic Development…, 2012].
[19] 2006 roubles were converted into US dollars at the exchange rate of 27.57 RUB/USD that was used in the Sochi 2014 Bid Books [Sochi 2014 Olympic committee, Theme 6, p. 99].
[20] In Policy option (1.2) we excluded the item (C.1.3) from our calculations.

to present construction costs in nominal terms[21], we distributed this amount evenly over the construction period of 2009-2013 (RUB 45,4 billion of annual expenditures). Afterwards these values were adjusted for inflation and converted into USD amounts using the same exchange rate as for the FTP-2006 expenditures above. Simultaneously, we added as benefits in the Government financial account the avoided construction costs of the alternative road Sochi-Krasnaya Polyana (B.1.2). We took the expert estimates for construction costs of such a road at the level of USD 50 million per every kilometre of a road [Nemtsov, Milov, 2009, p.23-24]. As this road would have been 45 km long, the total expenditures would have reached ca. USD 2.25 billion, which we assumed to be distributed equally along 2009-2013 (USD 450 million of annual expenditures)[22].

Further we estimated the maintenance costs of athlete venues (C.1.4) that would be owned by the state authorities after the 2014 WOPG during last two years of the Olympic cycle (2015-2016) using the following procedure. Firstly, from 11 Olympic athlete venues we identified seven incremental ones that had been built only because Sochi was selected for hosting the 2014 WOPG, while other four (compulsory) venues would be constructed regardless of the 2014 Olympics (see Annex 2). Secondly, we found that from seven incremental athlete venues six ones with the total capacity of 77,500 seats would be in the state ownership after the 2014 Olympics: “Fisht” Olympic Stadium (40,000 seats), "RusSki Gorki" Jumping Centre (7,500 seats), Adler Arena Skating Centre (8,000 seats), Iceberg Skating Palace (12,000 seats), “Ice Cube” Curling Center (3,000 seats), and “Shayba” Arena – Maly Ice Palace (7,000 seats). Having taken the maintenance costs of RUB 50,000 per seat in 2005 prices[23], we obtained the total maintenance costs for all six incremental venues with the state ownership to reach USD 155.4 million annually[24]. Taking into account the plans of the Government to move or convert four Olympic athlete venues after the 2014 WOPG[25]

[21] See, for instance: [The Government of the Russian Federation, 2001; The Government of the Russian Federation, 2010].
[22] In Policy option (1.2) this item was treated as costs being a part of the Government financial account.
[23] We found an example of the annual maintenance costs of a hockey stadium with 3,000 seats in the city of Ryazan’ in the European Russia that were estimated at RUB 150 million in 2005, that is RUB 50,000 per seat. [Vechernyaya Ryazan’, 2005].
[24] The annual maintenance costs of RUB 50,000 per seat were inflated by 9% to arrive to 2006 prices, and then we converted this amount into US dollars and multiplied by a number of seats to receive the annual maintenance costs for six incremental Olympic venues [77,500 seats x 2,005 USD per seat = 155,387,500 USD].
[25] The Ministry of Regional Development of the Russian Federation announced that “Shayba” Arena (Maly Ice Palace) would be moved to the city of Vladikavkaz, “Ice Cube” Curling Center

we estimated the one-off costs for relocation and conversion to amount 20% of total construction costs of respective venues (RUB 1.4 billion or USD 49.9 million[26]) and included them into costs for the year of 2014.

The social benefits from the use of the venues after the 2014 WOPG (B.1.3) were calculated from the assumption about 24 competitions/events per year hosted in six state-owned venues with an average 50% attendance (i.e. 38,750 seats) and an average ticket costing 20 US dollars plus TV revenues worth USD 10 million. As a result we estimated the revenues from the use of six venues after the 2014 Olympics at USD 28.6 million annually[27]. Unfortunately, we could not find any information about costs of staging National Championships in ski jumping and bobsleigh abroad (B.1.4), and therefore this item was left without any quantitative estimation.

Further we estimated the costs of public debt (C.1.5) using the information about the issuance of sovereign five-year notes by the Russian Government on London Stock Exchange in April 2010 [Minfin, 2010b]. We assumed that one third of the incremental costs from the FTP-2006 would be financed through sovereign debt during 2010-2014. As the note's coupon was 3.625% we multiplied 1/3 of the incremental cash flows associated with the FTP-2006 by 3.625% to obtain the costs of the public debt service.

Finally, to estimate precisely the METB from raising taxes to finance the incremental expenditures of the FTP-2006 we needed to know what exactly taxes would be raised and what the METB from these taxes were. As both variables remained not well known[28], we were forced to use the estimation of the METB from all taxes in Russia and took a study of Krupenina, Movshovich, and Bogdanova (1998) as a reference. They estimated the METB for the Russian tax system in the year of 1996 to be equal to 0.67. However, since 1996 the Russian tax system had undergone reforms and became one of the simplest in the world, so we believed that a half of the METB in

would be moved to the city Rostov-on-Don, Adler Arena Skating Centre would be converted into a Trade and exhibition centre, while there are also plans to move Iceberg Skating Palace [RIA-Novosti, 2011].

[26] The construction costs amounted to: "Shayba" Arena (Maly Ice Palace) – RUB 1.03 billion, "Ice Cube" Curling Center – RUB 0.45 billion, Adler Arena Skating Centre – RUB 1.1 billion, Iceberg Skating Palace – RUB 4.3 billion [The Government of the Russian Federation, 2006]. The assumed one-off costs for relocation and conversion were calculated as follows: (1,033,000,000 RUB + 452,000,000 RUB + 1,100,000,000 RUB + 4,290,000,000 RUB) x 20% = 1,374,948,000 RUB or 49,871,160 USD converted using the exchange rate of 27.57 RUB/USD.

[27] Total revenues were equal to: (77,500/2) x 20 USD x 24 + 10,000,000 = 28,600,000 USD.

[28] From the structure of the tax system in Russia, we could suppose that the Government would most likely raise some of the excise taxes.

1996 (*i.e.* 0.33) would be a justified estimation of the current METB[29]. We assumed that since the budget deficit in the year 2010 two thirds of the incremental expenditures of the FTP-2006 would be financed through raising taxes[30]. Therefore, we multiplied two-thirds of the FTP-2006 incremental expenditures by 0.33 to obtain the value of the METB.

6.2 Resident/consumer account

The costs and benefits pertained to the resident/consumer account were hard to precisely monetise within the scope of this paper, and we could draw only general conclusions from the mass media, because further detailed studies were needed. It was reported that the construction works (C.2.1) were affecting the everyday life of Sochi residents as well as tourists in the beginning of August 2009, ass traffic congestion sprawled for ca. 20 km on the federal motorway Sochi-Adler causing many people to come late to their work and tourists to miss their air flights [Newsland, 2009]. Unfortunately, we did not find any comprehensive study on the impact of the traffic congestion on the residents of Sochi, and therefore it was impossible so far to make any quantifiable judgments about the social costs of traffic congestion.

The Olympic-related construction works have already brought and will bring substantial benefits to the local residents in terms of the improved and extended roads and communal infrastructure (B.2.3) that includes a new by-pass around the central part of Sochi, an alternate motorway for the main city street called Kurortny prospect, a number of new road intersections, five new co-generation stations and 18 new substations, and a number of other considerable improvements [Kommersant, 2010]. The 2014 Olympics finally provided an incentive to the creation of a new Sochi Master Plan that was adopted in 2009 stipulating the urban development of Greater Sochi till 2032. It envisioned further development of the city into a year-round resort, expansion of the capacity of SPA-centres and sanatoriums threefold (up to 220,000 people), additional upgrading and development of the infrastructure of the Sochi agglomeration [Sochi City Administration, 2009; Rodina, 2009]. In order to quantify two other benefit items in this account, i.e. pride and enjoyment of hosting the 2014 WOPG (B.2.1) and the opportunity to attend the sport events at the 2014 Winter Olympics (B.2.2)

[29] Our estimation was in fact equal to the METB from all taxes in the USA (0.33) provided by Boardman et al. (2006).
[30] The remaining one third of the incremental expenditures was assumed to be financed through borrowings from abroad (see the item C.1.5).

additional studies to determine willingness-to-pay of Sochi and Russian residents are required. However, we could envision that the item B.2.1 would result in a substantial positive impact.

6.3 Environmental account

Within this account we identified one item, namely a fine of RUB 1.8 billion that the Ministry of Natural Resources of the Russian Federation imposed on different construction companies due to the violation of the environmental laws of Russia (C.3.2)[31] [RIA Novosti, 2010]. It was a result of 80 inspections carried out by the Ministry of Natural Resources in 2009 where ca. 150 cases of violation of the environmental laws were found. The item C.3.1 remained unmonetised, because we did not find extensive studies estimating inflicted damage to the nature by the Olympics construction works.

6.4 Economic development account

In order to estimate an increase in newly created jobs (B.4.1) we referred to the FTP-2006 where new 89,700 jobs were expected in Krasnodar Krai region from which 45,000 permanent jobs would be located in the City of Sochi. In addition to this, 145,000 new temporary jobs including 52,000 jobs in Sochi were anticipated. However, the FTP-2006 estimated that from 89,700 permanent jobs at least 30,000 jobs would be occupied by immigrants [The Government of the Russian Federation, 2006], which from the point of view of the cost-benefit analysis is a net transfer abroad. Therefore, while the creation of new permanent jobs was undoubtedly a strong benefit for the local and regional economy that also helped Krasnodar Krai region to weather the economic crisis of 2008-2009 [Kommersant, 2010], the attraction of immigrant workers contributed to the reduction of these benefits. Following the experience of previous Olympic Games with regard to changes in employment, studied by Green (2003), we could also expect that the after-Olympics period in Sochi might offset the job growth in the pre-Olympics period leaving the overall impact of the 2014 WOPG on new jobs creation as ambiguous.

An expected increase in foreign tourist arrivals in order to raise net exports of services (B.4.2) should have been one of the most important targets of hosting the 2014 WOPG

[31] The amount of RUB 1.8 billion was deflated to obtain its equivalent in 2006 prices (RUB 1.2 billion) and then converted into US dollars (1,200,000,000 / 27.57 = 43,525,571 USD).

in Sochi[32]. However, the economic impact analysis in the FTP-2006 did not consider in its calculations a growth in foreign tourist arrivals that could be expected during the 2014 WOPG[33]. It might be explained by the willingness of the Federal and regional authorities to create stimuli firstly for the Russian tourists, so that they change their preferences from the foreign tourist destinations in favour of the Sochi resort. The FTP-2006 envisioned that by 2015 the number of tourist arrivals in Krasnodar Krai region would increase up to 7 million from which 4.2 million tourists would stay in Sochi [The Government of the Russian Federation, 2006, p.13]. This target was almost achieved by the year of 2010 when 4 million tourists visited Sochi. But the growth in tourist arrivals was slowing down in 2008-2010 and in 2011 a drop to 3.7 million tourist arrivals was observed[34], while the occupancy rate of sanatoriums and SPA-centres in 2011 decreased by 3.5% [Sochi City Administration, 2012].

The decelerating trend and the subsequent reversal of the tourist arrivals dynamics was a part of the crowding out effect on local businesses, which we identified as a cost item in our analysis (C.4.1.). Additionally, the crowding out effect in the hotel sector can be expected before, during and after the Olympics, which would be generally line with the experience of the previous Olympic Games [Preuss, 2006; Owen, 2005]. Besides the adverse effect of the construction works on the occupancy rates, an increase in number of hotel rooms would also impose an additional pressure in the after-Olympic period. According to the FTP-2006 the capacity was to grow by 13,399 rooms: from 28,503 rooms in existing hotels excluding sanatorium and SPA-centres in the year of 2007 to 41,902 rooms by 2014 [Sochi 2014 Olympic committee, Theme 13, p. 45]. Some other expert estimation [see, for instance, Jones Lang LaSalle Hotels (2011), and Kommersant (2012)] envisioned the construction of 20,000 new high-quality rooms by 2014 which is a tenfold increase of the supply in this price segment. As a

[32] It should be noticed that, in general, the number of foreign tourist arrivals had been steadily declining since 2003 when 3.2 million tourists from abroad visited the country. By the year of 2009 this number decreased to 2.1 million arrivals, and during 2010-2011 it slightly increased to 2.3 million tourists [Rosturizm, 2012]. Among the reasons for a downward trend during 2003-2009 the following factors were usually indicated: high costs of travelling, inadequate supply of hotels with acceptable price/quality ratios, unsophisticated services, specific perceptions about Russia, *etc.* [FirstNews, 2011].

[33] An increase in foreign tourist arrivals to Sochi can be also expected in connection with staging of a Russian Gran Prix of Formula One from 2014 till 2020. The new Sochi circuit will be built in the Olympic park in Imeretin valley using partly the infrastructure constructed for the 2014 Olympics [Rossiyskaya Gazeta, 2010].

[34] In the year of 2008 the number of tourist arrivals reached 3.1 million, in 2009 it increased to 3.8 million (23% annual growth), in 2010 it peaked 4 million (only 4% growth), and in 2011 the number of tourists decreased to 3.7 million [Kommersant, 2010; Sochi City Administration, 2012].

consequence, in order to maintain capacity utilisation of hotels minimum at 48% like in the years of 2010-2011 the number of hotel tourists should triple (from 0.9-1 million people who stayed in hotels in 2007-2010 to ca. 3.2 million tourists), while the number of nights spent in hotels should rise from 9 million to 16 million. Taking into account the growth rate of tourist arrivals in recent years this seems to be a hardly attained task. However, no exact calculations can be provided here given the information available, and therefore we left the item C.4.1 without monetisation.

6.5 Social account

The displacement of citizens (C.5.1) took place in Imeretin valley where the Olympic venues forming the Coastal cluster have been built [Sochi.com, 2011]. In total ca. 3,000 people that had had 1786 private land plots with private property and had lived in 256 flats in multi-story houses were resettled. The compensations to these people amounted to RUB 18.5 billion and additional RUB 9.5 billion were spent on construction of new houses for the re-settlers [Rossiyskaya Gazeta, 2012]. Taking into account that the resettlement process had started in April 2009 [Sochi.com, 2011] and following the procedure for the multimodal road Adler-Krasnaya Polyana we distributed evenly the total nominal costs of RUB 28 billion over 2009-2012, adjusted the numbers for inflation and converted them into USD amounts using the same exchange rate of 27.57 RUB/USD. The monetisation of the positive impact from free tickets made available for local residents (B.5.1) was not possible, because no information about the number of free tickets to be provided was found.

7 Net present value and sensitivity analysis

The summarised costs and benefits of staging the 2014 Winter Olympics in Sochi in constant 2006 US dollars are presented in Annex 4. The total benefits equalled to USD 3,169.4 million while the total costs amounted to USD 10,972.1 million from which it could be already concluded that the discounting technique would not enable us to find a positive NPV for the project. For the calculation of the NPV for Policy option (1.1) (see Annex 5) and Policy option (1.2) (see Annex 6) we used the basic social discount rate of 3.5% suggested by Boardman et al. (2006) for public projects plus a country risk premium of 3% that was proposed by the World Bank economists [Bogetic et. al., 2010, p.23], *i.e.* a 6.5% total social discount rate.

The NPV of Policy option (1.1) amounted to negative USD 5.8 billion (or USD 5,754.2 million exactly), while in case of a construction of the cheaper road Sochi-Krasnaya Polyana the NPV of Policy option (1.2) would have equalled to negative USD 5.2 billion (or USD 5,199.1 million exactly). The difference between these two options would be USD 555.1 million. The benefit/cost ratio for the main Policy option (1.1) amounted to only 0.28 suggesting that there was no justifiable discount rate with which the NPV would be positive[35]. This conclusion was confirmed by the sensitivity analysis for Policy option (1.1) (the IRR of the project was 219%) and for Policy option (1.2) (the IRR was equal to 210%) presented in Annexes 7 and 8.

[35] The benefit/cost ratio was calculated as follows: 2,239,500,000 /7,993,700,000 = 0.2802 (see Annex 5).

8 Conclusions

The cost-benefit analysis we carried out in this paper enabled us to draw the following conclusions. Firstly, from exclusively the financial point of view and taking into account all available quantitative data the project of hosting the 2014 Olympics would result in a negative NPV, which is similar to most of previous Olympic Games that also ended up with negative financial results [see Zimbalist, 2010]. The limitations of this paper, however, are that not all benefits and costs were monetised due to lack of appropriate statistics and information on the willingness to pay of residents of Sochi. A number of impacts that will contribute mostly positively to the NPV of the overall project and will have a substantial positive impact on the local economy of Sochi and the regional economy of Krasnodar Krai were so far not quantified, *e.g.* the impact of the newly built infrastructure on the standards of living in Greater Sochi, the benefits of social and economic nature both in short and long run as well as non-material aspects of the Olympics. Also in our analysis we restricted ourselves in the temporal scope by the Olympic cycle only (2006-2016). The increased length of the studied period would contribute to the increasing benefits in the 2014 Olympics project (for instance, through the positive impact from staging of a Russian Grand Prix beyond 2016, and through other factors).

Secondly, all benefits that we were able to monetise pertained to the Government financial account, though the vast majority of costs was also associated with this account and the difference turned out to be deeply negative. The Environmental account contributed only negatively to the final NPV due to cost of damage to nature and environmental fees, from which only environmental fees were monetised. The Resident/Consumer account was not monetised in our paper due to absence of quantitative data, but most likely it would be deeply positive due to pride and enjoyment from staging of the Olympic Games, opportunity to attend the sports events and from the improved infrastructure facilities in Greater Sochi. The balance of the Social account was negative due to displacement of local residents but in general it could be less negative in case free tickets would be distributed widely among the Sochi residents. With the information available, the Economic development account left a controversial impression. On the one hand, the creation of new 59.7 thousand jobs for the Russia's citizens was expected, however these jobs were quite expensive[36], so that

[36] Taking the NPV for Policy option (1.1) as a reference point, one can calculate that the costs of one job would equal to 96,385 USD per job = 5,754,200,000 USD / 59,700 jobs.

it remained unclear if it were the optimal allocation of the Government's resources. On the other hand, the effect of foreign tourist arrivals was not properly taken into account in the FTP-2006, while the potential of Sochi in this area combined with the attractiveness of staging of a Russian Gran Prix in Formula One for foreign tourists could be substantial.

Thirdly, the real costs of staging the 2014 WOPG were largely overestimated by independent experts as well as by governmental officials due to: (1) avoiding adjustments for inflation and discounting of cash flows; (2) the fact that the FTP-2006 costs in Policy option (2) – not to host the WOPG-2014 – were usually included into all calculations though they were to be incurred regardless of that Sochi be elected as the hosting city for the WOPG 2014 or not.

Fourthly, the construction of an alternative road Sochi-Krasnaya Polyana would have decreased the overall costs of the 2014 WOPG and improved the NPV of the project from negative USD 5,754.2 million to negative USD 5,199.1 million, *i.e.* by 10% of the NPV of the Policy option (1.1).

Fifthly, the implementation of certain measures by the authorities would allow reducing of the 2014 WOPG costs and enable receiving more benefits in the long-term perspective. The following measures could be suggested in this regard: (a) preventing the budget of the infrastructure construction works from increasing through economical management of available funds; (b) the efficient management and usage of the newly built Olympic and related infrastructure in Greater Sochi with the aim to attract as many foreign tourists as possible in order to increase exports of services for Krasnodar Krai and the Russian economy as a whole; (c) a stricter control of environmental laws fulfilment should be implemented in order to minimise possible damages to the nature from the construction works; (d) trying to avoid the crowding out effect for the local hotel sector and the small and medium enterprises sector by minimising the adverse effect of the construction activities on local businesses, residents and visitors; (e) elaborating of well-defined strategies on how to use prudently the athlete venues after the 2014 WOPG to minimise excessive maintenance costs and maximise budgetary revenues from the use of venues.

References

Baade, Robert A., and Victor Matheson. (2002). Bidding for the Olympics: Fool's Gold? In Barros, Carlos P., Ibrahimo, Muradali, and Stefan Szymanski (Eds.) "Transatlantic Sport: The Comparative Economics of North American and European Sports". Cheltenham, UK; Northampton, MA: Edward Elgar Publishing, 2002, pp. 127-151.

Boardman, Anthony E.; Greenberg, David H.; Vining, Aidan R., and David L. Weimer. (2006). Cost-Benefit Analysis: Concepts and Practice. Third Edition, Pearson, Prentice Hall, New Jersey, 2006, 560 p.

Bogetic, Zeljko; Smits, Karlis; Budina, Nina, and Sweder van Wijnbergen. (2010). Long-Term Fiscal Risks and sustainability in an Oil-Rich Country: The Case of Russia. The World Bank, Europe and Central Asia Region, PREM Department, March 2010, 33 p.

Bureau of Labor Statistics. (2013). Consumer Price Index, All Urban Consumers – (CPI-U), U.S. City average. All items. U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C., 18 June 2013. [ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt].

Crompton John L. (1995). Economic Impact Analysis of Sports Facilities and Events. // Journal of Sport Management, Volume 9(1), 1995, pp. 14-35.

East of England Development Agency. (2006). Economic Impact Study of the London 2012 Olympic Games and Paralympic Games, Final Report. / Grant Thornton, Torkildsen Barclay, the Christel DeHaan Tourism, Travel Research Institute. / East of England Development Agency, July 2006, 186 p.

Ermakov, Boris, and Vladimir A. Leonov. (1987). Sochi – Kurort. (Sochi – the Resort), Krasnodarskoe Knizhnoe Izdatel'stvo, Krasnodar, 1987, 224 p.

Fed. zakon as of 1 December 2007 No.310-FZ "Ob organizatsii i provedenii XXII Olimpiyskih zimnih igr i XI paralimpiyskih zimnih igr 2014 goda v gorode Sochi, razvitii goroda Sochi kak gornoklimaticheskogo kurorta i vnesenii izmeneniy v otdel'nye zakonodatel'nye akty Rossiyskoi Federatsii". (The Federal Law "About organisation and carrying out of the XXII Winter Olympic and XII Winter Paralympic Games in the city of Sochi, the development of the city of Sochi as a mountain-climate resort and amendments in some legal Acts of the Russian Federation"). Adopted by the State Duma on November 16, 2007 and adopted by the Council of Federation on November 23, 2007, 43 p.

Fed. zakon as of 30 October 2007 No.238-FZ "O Gosudarstvennoi korporatsii po stroitel'stvu olimpiyskih obyektov i razvitiyu goroda Sochi kak gornoklimaticheskogo kurorta". (The Federal Law "About the State Corporation on construction of Olympic venues and the development of the city of Sochi as a mountain-climate resort"). Adopted by the State Duma on October 18, 2007 and adopted by the Council of Federation on October 26, 2007, 13 p.

FirstNews. (2011). Inostrannye turisty chasche edut v Rossiyu. (The foreign tourism are travelling to Russia more often). // FirstNews / Nadezhda Tikhomirova, 29 December 2011. [http://www.firstnews.ru/articles/inostrannye-turisty-chashche-edut-v-rossiyu/].

Green, David A. (2003). Olympic Impacts: Should We Expect an Employment Boom? Canadian Center for Policy Alternatives – BC office, February 2003, 14 p.

GZT. (2009). Sochinskuyu Olimpiadu snyali s gosdovol'stviya (The Olympics in Sochi was deprived of public financing). // GZT.RU, June 3, 2009. [http://www.gzt.ru/Gazeta/ ekonomika-klimat-v-gazete/241284.html].

Hudson, Ian. (2001). The Use and Misuse of Economic Impact Analysis: The Case of Professional Sports. // Journal of Sport and Social Issues, Volume 25, No.1, February 2001, pp. 20-39.

INTERFAX. (2010). Proyekt stroitel'stva dorogi Adler – Al'pika-Servis udeshevili na 6% - Yakunin. (The project construction costs of the road "Adler - Al'pika-Servis" were cut by 6% - Yakunin). // INTERFAX, Sochi, 10 December, 2010. [http://www.interfax.ru/realty/ realtyinf.asp?id=168578&sec=1461].

International Olympic Committee. (2007). IOC 2014 Evaluation Commission Report. XXII Olympic Winter Games in 2014. IOC, June 2007, 87 p.

Jones Lang LaSalle Hotels. (2011). Dlya zapolneniya stroyaschihsya oteley v Sochi neobhodimo uvelichit' chislo gostey v gorode v tri raza. (To fill the newly built hotels in Sochi the number of city guests should be increased threefold). Jones Lang LaSalle Hotels, 17 October 2011. [http://www.joneslanglasalle.ru/Russia/RU-RU/pages/NewsItem.aspx?ItemID=23262].

Kleyner, Georgiy. (2010). Energiya Olimpiady (The Energy of the Olympic Games). // Pryamye Investitsii, No.11(103), 2010, pp. 14-15.

Kommersant. (2010). Sochi-2014: stavka na effektivnost'. (Sochi-2014: focusing on efficiency). // Kommersant, "Business Guide Sochi 2014", Prilozhenie, No.46, 30 November 2010.

Kommersant. (2012). Gostepriimstvo po novym pravilam. (Hospitality according to the new rules). // Kommersant, "Business Guide Sochi 2014", Prilozhenie, No.22, 19 June 2012.

Krupenina, Galina; Movshovich, Solomon, and Maria Bogdanova. (1998). The Marginal Excess Burden of Taxes in the Russian Transition. Economic Education and Research Consortium, Russian Economic Research Program, Working Paper No. 98/05, 1998, 21 p.

Lenskyj, Helen J. (2000). Inside the Olympic Industry: Power, Politics, and Activism. State University of New York Press, Albany, 2000, 216 p.

Long, Judith G. (2005). Full Count: The Real Cost of Public Funding for Major League Sports Facilities. // Journal of Sports Economics, Volume 6, May 2005, pp. 119-143.

Minister of State for Community Charter and 2010 Olympic Bid. (2002). The Economic Impact of the Winter Olympic and Paralympic Games. Initial Estimates, January 2002. / Capital Projects Branch, Ministry of Competition, Science and Enterprise, Province of British Columbia, Honourable Rick Torpe, Minister. A Report prepared for Honourable Ted Nebbeling, Minister of State for Community Charter and 2010 Olympic Bid. Vancouver, 2002, 46 p.

Ministry of Economic Development of the Russian Federation. (2010). Monitoring ob itogah sotsial'no-ekonomicheskogo razvitiya Rossiyskoy Federatsii v 2009 godu. (Digest on results of the social-economic development of the Russian Federation in the year of 2009). Ministry of Economic Development of the Russian Federation, Moscow, 03 February 2010, 134 p. [http://www.economy.gov.ru/minec/activity/sections/macro/monitoring/doc20100203_01].

Ministry of Economic Development of the Russian Federation. (2012). Prognoz sotsial'no-ekonomicheskogo razvitiya Rossiyskoy Federatsii na 2013-2015 gody. (The forecast of the social-economic development of the Russian Federation for 2013-2015). Ministry of Economic Development of the Russian Federation, Moscow, 14 December 2012. [http://www.economy.gov.ru/minec/activity/sections/macro/prognoz/doc20121214_ 02].

Ministry of Finance of the Russian Federation (Minfin). (2007). Predvaritel'naya otsenka ispolneniya federalnogo byudzheta za yanvar-dekabr 2006 goda. Press-reliz. (The preliminary estimation of the Federal Budget execution in January-December 2006. Press-Release). Ministry of Finance of Russian Federation, 18 January 2007. [http://www1.minfin.ru/ru/press/press_releases/index.php?pg4=38&id4=2781]

Ministry of Finance of the Russian Federation (Minfin). (2008). Predvaritel'naya otsenka ispolneniya federalnogo byudzheta za yanvar-dekabr 2007 goda. Press-reliz. (The preliminary estimation of the Federal Budget execution in January-December 2007. Press-Release). Ministry of Finance of Russian Federation, 17 January 2008. [http://www1.minfin.ru/ru/press/press_releases/index.php?pg4=36&id4=5548].

Ministry of Finance of the Russian Federation (Minfin). (2009). Predvaritel'naya otsenka ispolneniya federalnogo byudzheta za yanvar-dekabr 2008 goda. Press-reliz. (The preliminary estimation of the Federal Budget execution in January-December 2008. Press-Release). Ministry of Finance of Russian Federation, 20 January 2009. [http://www1.minfin.ru/ru/official/index.php?pg4=27&id4=6963].

Ministry of Finance of the Russian Federation (Minfin). (2010a). Ob emissii obligatsiy vneshnih obligatsionnyh zaymov Rossiyskoi Federatsii. (About the issuance of the sovereign external notes of the Russian Federation). The Order of the Ministry of Finance of Russian Federation No.243, April 23, 2010.

Ministry of Finance of the Russian Federation (Minfin). (2010b). Ob emissii obligatsiy vneshnih obligatsionnyh zaymov Rossiyskoi Federatsii. (About the issuance of the sovereign external notes of the Russian Federation). The Order of the Ministry of Finance of Russian Federation No.244, April 23, 2010.

Ministry of Finance of the Russian Federation (Minfin). (2010c). Predvaritel'naya otsenka ispolneniya federalnogo byudzheta za 2009 god. Press-reliz. (The preliminary estimation of the Federal Budget execution in 2009. Press-Release). Ministry of Finance of Russian Federation, 19 January 2010. [http://www1.minfin.ru/ru/press/press_releases/index.php?pg4=17&id4=9090]

Ministry of Foreign Trade of the USSR (Minvneshtorg). (1960). Vnesnyaya torgovlya SSSR za 1918-1940 gg. Statisticheskiy obzor. (The external trade of the USSR in the years of 1918-1940. A statistical overview). Ministry of Foreign Trade of the USSR, Chief Customs Directorate, Vneshtorgizdat, Moscow, 1960, 1136 p.

Ministry of Transport of the Russian Federation (Mintrans). (2007). Podprogramma "Morskoy transport" Federal'noy tselevoy programmy "Modernizatsiya transportnoy sistemy Rossii (2002-2010 gody)". (Sub-programme "Maritime transport" of the Federal Target Programme "Modernization of the transport system of Russia (the years of 2002-2010)"). Ministry of Transport of the Russian Federation, 2007. [http://www.programs-gov.ru/7_pod3_6.php].

Nemtsov, Boris, and Leonid Martynyuk. (2013). Zimnyaya olimpiada v subtropikah. (Winter Olympics in the Subtropics). An independent expert report, Moscow, 2013. [http://www.putin-itogi.ru/zimnyaya-olimpiada-v-subtropikax/].

Nemtsov, Boris, and Vladimir Milov. (2009). Sochi i Olimpiada. (Sochi and the Olympic Games). An independent expert report, 2009, 37 p.

Newsland. (2009). Olimpiyskie probki v Sochi ne rassosutsya do 2011 goda. (Olympic traffic jams will not disappear until 2011). // Newsland, 04 August 2009. [http://www.newsland.ru/News/Detail/id/393937/cat/86/].

Nureev, Rustem, and Yevgeniy Markin. (2008). Olimpiyskiy delovoy tsikl. (The Olympic business cycle). TERRA ECONOMICUS (Ekonomicheskiy vestnik Rostovskogo gosudarstvennogo universiteta), Volume 6, No.3, 2008, pp. 50-64.

Nureev, Rustem, and Yevgeniy Markin. (2009). Eti raznye olimpiyskie igry. (These different Olympic Games). TERRA ECONOMICUS (Ekonomicheskiy vestnik Rostovskogo gosudarstvennogo universiteta), Volume 7, No.3, 2009, pp. 10-28.

Nureev, Rustem, and Yevgeniy Markin. (2010). Izderzhki i vygody olimpiyskih igr. (Costs and benefits of Olympic Games). "Obschestvennye nauki i sovremennost", No.1, 2010, pp. 88-104.

Owen, Jeffrey G. (2005). Estimating the Cost and Benefit of Hosting Olympic Games: What can Beijing Expect from its 2008 Games? // The Industrial Geographer, Volume 3, Issue 1, 2005, p. 1-18.

Pilipenko, Igor. (2011). Ispol'zovanie analiza zatraty-vygody dlya otsenki effektivnosti gosudarstvennyh investitsionnyh proyektov (na primere zimnih Olimpiyskih igr-2014 v Sochi). (The use of cost-benefit analysis for assessment of state investment projects' efficiency (the example of the 2014 Winter Olympic Games in Sochi)). // "Voprosy ekonomiki", No.11, 2011, pp. 57-78.

Poltoranov, Vladimir; Slutskiy, Semen, and Ivan Kozlov (Ed.) (1986). Zdravnitsy Profsoyuzov SSSR: kurorty, sanatorii, pansionaty, doma otdyha. (Health Resorts of Labour Unions of the USSR: Resorts, SPA centres, Boarding Houses, Holiday Houses). 6th edition, Profizdat, Moscow, 1986, 704 p.

Pravda. (1935). Na sovetskoy Riviere. (On the Soviet Riviera). // “Pravda”, 17 March 1935. [http://sochived.info/pravda-ot-17-marta-1935-g/].

Presidium of the Supreme Council of the Russian Federation, the Government of the Russian Federation. (1993). "O gosudarstvenoy podderzhke funktsionirovaniya i razvitiya goroda-kurorta Sochi” (About the state support of the functioning and development of the resort city Sochi). Decree of the Presidium of the Supreme Council of the Russian Federation No.4766-1, Decree of the Government of the Russian Federation No.337 as of 12 April 1993.

Preuss, Holger. (2006). Economics of Staging the Olympics: A Comparison of the Games 1972-2008. Edward Elgar, Cheltenham, 2006, 332 p.

Rappaport, Jordan, and Chad Wilkerson. (2001). What Are the Benefits of Hosting a Major League Sports Franchise? // Federal Reserve Bank of Kansas City Economic Review, First Quarter 2001, pp. 55-86.

RBCdaily. (2013). Stoimost’ sochinskoy Olimpiady prevysila 1.5 trln rubley. (The costs of staging the Olympics in Sochi exceeded 1.5 trillion of roubles). // RBCdaily, 04 February 2013. [http://rbcdaily.ru/market/562949985651475].

Regnum. (2007). Olimpiada v Rossii: spravka. (The Olympiad in Russia: an information note). // Regnum, 05 July 2007. [http://www.regnum.ru/news/852581.html].

RIA Novosti. (2010). MPR vzyskalo so stroitelei olimpiyskigh obyektov v Sochi 1.8 mlrd rubley. (The Ministry of Natural Resources imposed a penalty of 1.8 billion roubles on construction companies building Olympic venues in Sochi). // RIA Novosti, March 16, 2010. [http://eco.rian.ru/business/20100316 /214729557.html].

RIA Novosti. (2011). Chetyre olimpiyskih ob’yekta posle OI-2014 pereedut v drugie goroda. (Four Olympic objects will be moved to other cities after the 2014 Olympics). // RIA Novosti – Sport, 04 January 2011. [http://ria.ru/sport/20110104/317513241.html].

Rodina, Irina. (2009). Gorod dlya zhizni ili mesto dlya tusovki? (The city for living or a place for partying?) // Vestnik Olimpiady, No.6, 2009.

Rossiyskaya Gazeta. (2005). Moskva uhodit po-angliyski. Letnie Olimpiyskie igry 2012 goda primet London. (Moscow took a French leave. London will host the 2012 Summer Olympic Games). // Zarudny, Pavel, and Maksim Makarychev. / Rossiyskaya Gazeta, 07 July 2005. [http://www.rg.ru/2005/07/07/london.html].

Rossiyskaya Gazeta. (2009). Minister Igor Levitin proveril, kak stroitsya doroga Adler – Krasnaya Polyana. (Minister Igor Levitin checked the construction of the road Adler – Krasnaya Polyana). // Rossiyskaya Gazeta, 30 January 2009. [http://www.rg.ru/2009/01/30/levitin-anons.html].

Rossiyskaya Gazeta. (2010). Formula Sochi. Krasnodarskiy Krai polushil pravo na provedenie Gran-pri Rossii. (Formula of Sochi. Krasnodar Krai has received the right to host a Russian Grand Prix). // Rossiyskaya Gazeta, 14 October 2010. [http://www.rg.ru/2010/10/14/reg-kuban/formula.html].

Rossiyskaya Gazeta. (2012). Vlasti: Na ”olimpiyskoe pereselnie” potracheno 28 milliardov rubley. (The Authorities: For the “Olympic resettlement” 28 billion roubles were spent). // Rossiyskaya Gazeta, 30 October 2012. [http://www.rg.ru/2012/10/30/reg-ufo/proekt-anons.html].

Rosstat – Krasnodar Krai. (2012). Otsenka chislennosti naseleniya na 1 yanvarya 2012 goda po munitsipal’nym obrazovaniyam Krasnodarskogo kraya. (Estimation of population by municipality of Krasnodar Krai as of 1 January 2012), Rosstat – Krasnodar Krai, Krasnodar, 20 April 2012. [http://docs.pravo.ru/document/view/27239319/].

Rosstat. (2011). Rossiyskiy statisticheskiy ezhegodnik 2011. (The Russian Statistical Yearbook 2011). The Federal State Statistics Service, Moscow, 2011, 785 p. [http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/resources/18b7c6004bbf15618ccbdf0201bee476/zip.gif].

Rosstat. (2012). Chislennost' naseleniya Rossiyskoi Federatsii po munitsipal'nym obrazovaniyam na 1 yanvarya 2012 goda. (Population of the Russian Federation by municipality as of 1 January 2012). The Federal State Statistics Service, Moscow, 03 August 2012. [http://www.gks.ru/free_doc/doc_2012/bul_dr/mun_obr2012.rar].

Rosstat. (2013). Rossiya v tsifrah. (Russia in numbers). The Federal State Statistics Service, Moscow, 2013, 577 p. [http://www.gks.ru/free_doc/doc_2013/rusfig/rus13.rar].

Rosturizm. (2012). V'ezd inostrannyh grazhdan v Rossiyu. (The number of entries of foreign citizens in Russia). Federal Agency of Tourism of Russia, 2012. [http://www.russiatourism.ru/rubriki/-1124140228/].

Rosturizm. (2013). Naibolee populyarnye napravleniya po vyezdu rossiyan za rubezh v 2012 godu. (The most popular destinations abroad for the outbound tourism of the Russians in the year of 2012). Rosturizm, 2013. [http://www.russiatourism.ru/rubriki/-1124141037/].

Shaffer, Marvin; Greer, Alan, and Celine Maulboules. (2003). Olympic Costs and Benefits. A Cost-Benefit Analysis of the Vancouver 2010 Winter Olympic and Paralympic Games. Canadian Center for Policy Alternatives – BC office, February 2003, 33 p.

Siegfried, John, and Andrew Zimbalist. (2000). The Economics of Sports Facilities and Their Communities. // Journal of Economic Perspectives, Volume 14, No.3, Summer 2000, pp. 95-114.

SKMost. (2011). Stroitel'stvo sovmeschennoi avtomobil'noy i zheleznoy dorogi Adler – gornoklimaticheskiy kurort "Alpika-Servis". (The construction of a combined motorway-railway road Adler – mountain-climate resort "Alpika-Service"). SKMost, 2011, 34 p. [http://www.skmost2014.ru/files/brochure_skmost2014.pdf].

Sochi 2014 Olympic committee. (2007). Sochi 2014 Candidate City Bid books. 16 Themes, Sochi 2014 Olympic committee, 2007, 177 p.

Sochi City Administration. (2009). General'nyi plan Sochi. (Sochi Master Plan). Sochi City Administration, Sochi, 14 July 2009. [http://www.sochiadm.ru/about_the_city/gene_plan/].

Sochi City Administration. (2012). Analiticheskaya zapiska k monitoringu sotsial'no-ekonomicheskogo razvitiya goroda Sochi za 2011 god. (Analytical note for the monitoring of the social-economic development of Sochi in the year of 2011). Sochi City Administration, Sochi, 26 March, 2012. [http://www.sochiadm.ru/upload/iblock/44b/44b1fb8ed7f148965c1b7841fc 2c1a90.doc].

Sochi City Administration. (2013). Istoriya Sochi. (History of Sochi), 2013. [http://www.sochiadm.ru/about_the_city/history/].

Sochi.com. (2011). Pereselentsy predpochitayut den'gi. (Re-settlers prefer money). Sochi.com, 29 June 2011. [http://www.sochi.com/news/?id=23701].

Sochi-24. (2010). Olimpiada v Sochi oboydetsya Rossii v 950 mlrd rubley. (The Olympics in Sochi will cost Russia 950 billion roubles). // Sochi-24 – Information Agency, 04 June 2010. [http://sochi-24.ru/sochi-2014/olimpiada-v-sochi-obojdetsya-rossii-v-950-mlrd-rublej.201064.19179.html].

Soviet Union Information Bureau. (1929). The Soviet Union: Facts, Descriptions, Statistics. Soviet Union Information Bureau, Washington D.C, 1929, 288 p. [http://www.marxists.org/history/ussr/government/1928/sufds/sufds.pdf].

The Government of the Russian Federation. (1997). O Federal'noy Tselevoi Programme "Sotsial'no-ekonomicheskoe razvitiye goroda-kurorta Sochi na period do 2010 goda". (On the Federal Target Programme "The social-economic development of the resort city Sochi for the period till 2010"). The Decree of the Government of the Russian Federation, 30 April 1997, No.511.

The Government of the Russian Federation. (2001). O Federal'noy Tselevoi Programme "Modernizatsiya transportnoy sistemy Rossii (2002-2012 gody). (On the Federal Target

Programme “Modernization of the transport system of Russia (the years of 2002-2012)”). The Decree of the Government of the Russian Federation, 05 December 2001, No.848.

The Government of the Russian Federation. (2006). O Federal’noy Tselevoi Programme “Razvitiye g. Sochi kak gornoklimaticheskogo kurorta (2006-2014 gody)”. (On the Federal Target Programme “Development of the city of Sochi as a mountain-climate resort (the years of 2006-2014)”). The Decree of the Government of the Russian Federation, 08 June 2006, No.357.

The Government of the Russian Federation. (2010). O Federal’noy Tselevoi Programme “Modernizatsiya transportnoy sistemy Rossii (2010-2015 gody). (On the Federal Target Programme “Modernization of the transport system of Russia (the years of 2010-2015)”). The Decree of the Government of Russian Federation, 5 December 2001, No.848 (amended as of 18 April 2010).

The World Bank. (2009). Russian Economic Report No.18. The World Bank in Russia, March 2009, 25 p.

United Nations Environment Programme (UNEP). (2010). Sochi 2014. United Nations Environment Programme, Report of the UNEP 2nd Expert Mission, 28-30 January, 2010, 4 p.

Vechernyaya Ryazan’. (2005). Ledovy dvorets v den’ revolyutsii. (The Ice Palace on the Revolution Day). // Vechernyaya Ryazan’, 3 November 2005.

Voronkov, Vyacheslav. (2008). Lyudi odumaytes’! Ostanovites’! O stroitel’stve novoy dorogi po levoberezhyu Mzymty. (Think better, people! Stop! About the construction of a new road on the left river bank of Mzymta). // Delovoy Sochi, No.34, 26 September 2008. [http://www.bs-sochi.ru/node/1000].

Zimbalist, Andrew. (2010). Is It Worth It? Hosting the Olympic Games and Other Mega Sporting Events is an Honor Many Countries Aspire to – but Why? // Finance and Development, March 2010, pp. 8-11.

Annex 1. Costs and benefits of the 2014 Winter Olympics in Sochi

Costs	Benefits
Government financial account	
C.1.1. Federal Target Programme "Development of the city of Sochi as a mountain-climate resort (2006-2014)"- incremental costs of Scenario 1 in comparison to Scenario 2. C.1.2. Expenditures of the Olympic Committee of the 2014 Winter Olympics. C.1.3. Unbudgeted construction costs – a new multimodal road Adler-Krasnaya Polyana. C.1.4. Costs of maintenance, removal, and changing of specialization of athlete venues after the 2014 Winter Olympics. C.1.5. Interest payments on the public debt. C.1.6. Marginal excess tax burden of incremental costs of the government's Federal Target Programme.	B.1.1. Revenues of the Olympic Committee of the 2014 Winter Olympics. B.1.2. Avoided costs of construction of a new alternative road Sochi-Krasnaya Polyana. B.1.3. Revenues from the use of athlete venues after the 2014 Winter Olympics. B.1.4. Avoided costs of staging National Championships in ski jumping and bobsleigh abroad.
Resident/consumer account	
C.2.1. Disruption and congestion in the course of construction and during the 2014 Winter Olympics.	B.2.1. The moral aspect: pride and enjoyment of hosting the 2014 Winter Olympics. B.2.2. Opportunity to attend the sport events within the 2014 Winter Olympics. B.2.3. New housing, infrastructure and transportation facilities for residents of the city of Sochi.
Environmental account	
C.3.1. Damage on nature. C.3.2. Fines for breaking environmental laws.	
Economic development account	
C.4.1. Possible crowding out effect on local business before and during the 2014 Winter Olympics.	B.4.1. Creation of new continuing jobs. B.4.2. Increased number of foreign tourist arrivals during and after the 2014 Winter Olympics.
Social account	
C.5.1. Displacement of residents from their current housing.	B.5.1. Free tickets for local residents.

Source: Author's estimation based on five account's approach by Shaffer, Greer, Mauboules (2003).

Annex 2. List of compulsory and incremental athlete venues in Sochi

Venue	Sports/ Disciplines	Current use	Post-WOPG use	Start of use	Post-WOPG ownership	Capacity, seats
Incremental Olympic venues – public ownership						
"RusSki Gorki" Jumping Centre	Ski-Jumping, Nordic Combined	New	International competition centre and national training centre	2012	Rossport	7500
Adler Arena Skating Centre	Speed Skating	New	Trade and exhibition centre	2012	Krasnodar Krai Region	8000
Iceberg Skating Palace	Figure Skating, Short Track	New	Skating centre in another Russian city	June 2012	N/A	12000
“Ice Cube” Curling Center	Curling	New	Curling centre in another city	2012	Rossport	3000
“Shayba” Arena (Maly Ice Palace)	Ice Hockey	New	Ice palace in another city	2012	N/A	7000
“Fisht” Olympic Stadium	Opening and closing ceremonies, medal ceremonies	New	Venue for the Russian national football team matches; training centre; centre for mass and entertainment events	2013	Krasnodar Krai Region	40000
Incremental Olympic venues – private ownership						
“Roza Khutor” Extreme Park	Snowboard, Freestyle	Ski Resort	International competition venue, training facility and year-round tourist resort	Sept. 2012	Interros	6250
Compulsory FTP-2006 athlete venues – public ownership						
Sanki Olympic Sliding Center	Bobsleigh, Skeleton, Luge	New	International competition centre and national training centre	2012	Rossport	5000
“Bolshoy” Ice Dome	Ice Hockey	New	Multi-purpose sports, concert and entertainment centre	2013	Krasnodar Krai Region	12000
"Laura" Cross-country Ski & Biathlon Center	Biathlon, Cross-Country Skiing	Ski Resort	Russian National Training Centre	June 2013	Gazprom	7500
Compulsory FTP athlete venues – private ownership						
“Rosa Khutor” Alpine Resort	Alpine skiing	Ski Resort	International competition venue, training facility and year-round tourist resort	Dec. 2011	Interros	7500

Source: Based on Sochi 2014 Olympic committee, Theme 8, p.25; Sochi 2014 official website [http://www.sochi2014.com/en/games/places/objects/sea/].

Annex 3. Calculation of incremental public expenditures in the Federal Target Programme "Sochi 2006-2014"

SCENARIO 1,	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**TOTAL**
Total expenditures of the Federal Target Programme, nominal prices, RUB millions	**5099**	**29012**	**41530**	**42746**	**44285**	**46189**	**38280**	**36960**	**32241**	**316341**
The Federal budget	697	19938	31430	27286	22180	27153	26270	22119	8386	185461
The Krasnodar Krai region budget	24	1633	1290	1467	1234	1824	1214	548	0	9235
Private investments	4377	7441	8810	13993	20871	17211	10796	14292	23855	121646
Total public expenditures (federal and regional)	**722**	**21571**	**32719**	**28753**	**23414**	**28978**	**27484**	**22668**	**8386**	**194696**
Consumer price index (annual inflation rate)	0.0%	11.9%	13.3%	8.8%	8.8%	6.1%	6.6%	5.5%	4.5%	-
Deflator index by 2006	1.00	1.12	1.27	1.38	1.50	1.59	1.70	1.79	1.87	-
Total public expenditures adjusted for inflation, RUB million	**722**	**19277**	**25807**	**20845**	**15601**	**18198**	**16191**	**12658**	**4481**	**133782**
Total public expenditures converted into USD at the exchange rate of 27.57 RUB/USD, USD million	**26**	**699**	**936**	**756**	**566**	**660**	**587**	**459**	**163**	**4852**
SCENARIO 2,	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**TOTAL**
Total expenditures of the Federal Target Programme, nominal prices, RUB millions	**9675**	**22442**	**24257**	**19647**	**14886**	**13905**	**10169**	**7816**	**73**	**122868**
The Federal budget	4913	13481	15191	8058	2037	4179	5380	3528	73	56839
The Krasnodar Krai region budget	384	1540	1216	1008	1118	1630	1007	468	0	8371
Private investments	4377	7420	7850	10582	11731	8095	3782	3820	0	57658
Total public expenditures (federal and regional)	**5298**	**15021**	**16407**	**9065**	**3155**	**5809**	**6387**	**3995**	**73**	**65210**
Consumer price index (annual inflation rate)	0.0%	11.9%	13.3%	8.8%	8.8%	6.1%	6.6%	5.5%	4.5%	-
Deflator index by 2006	1.00	1.12	1.27	1.38	1.50	1.59	1.70	1.79	1.87	-
Total public expenditures adjusted for inflation, RUB million	**5298**	**13424**	**12941**	**6572**	**2102**	**3648**	**3763**	**2231**	**39**	**50017**
Total public expenditures converted into USD at the exchange rate of 27.57 RUB/USD, USD million	**192**	**487**	**469**	**238**	**76**	**132**	**136**	**81**	**1**	**1814**
Incremental expenditures for WOPG (Scenario 1 public expenditures less Scenario 2 public expenditures), USD million	-166	212	467	518	490	528	451	378	161	3038
Less government transfer to OCOG, USD million	0	4	22	26	10	0	0	32	245	338
Adjusted incremental expenditures for WOPG	**-166**	**208**	**445**	**492**	**480**	**528**	**451**	**346**	**-84**	**2700**

Sources: Author's calculations based on: [The Government of the Russian Federation, 2006; Rosstat, 2013; Ministry of Economic Development…, 2012; Sochi 2014 Olympic committee, Theme 6, p. 99, P.107].

Annex 4. Cash flows of costs and benefits in constant 2006 USD

USD million	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Total benefits and costs												
Total benefits	**0.0**	**0.0**	**2.0**	**452.1**	**484.4**	**564.4**	**525.0**	**768.1**	**286.1**	**44.6**	**42.7**	**3169.4**
Total costs	**-166.0**	**239.3**	**495.7**	**1924.7**	**1972.3**	**1932.9**	**1826.5**	**1726.3**	**679.5**	**171.4**	**169.5**	**10972.1**
Government financial account												
Benefits	***0.0***	***0.0***	***2.0***	***452.1***	***484.4***	***564.4***	***525.0***	***768.1***	***286.1***	***44.6***	***42.7***	***3169.4***
B.1.1. OCOG revenues, including:												
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	0.0	0.0	23.0
IOC contribution	0.0	0.0	0.0	0.0	6.2	74.4	15.5	89.9	124.0	0.0	0.0	310.0
TOP sponsorship	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	15.8	9.6	9.6	43.8
Other income	0.0	0.0	2.0	2.1	28.2	40.0	59.5	219.4	123.3	6.4	4.4	485.5
B.1.2. Avoided costs of construction of a new road Sochi-Krasnaya Polyana	0	0.0	0.0	450.0	450.0	450.0	450.0	450.0	0.0	0	0	2250.0
B.1.3. Revenues from the use of athlete venues after the 2014 Winter Olympics	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	28.6	57.2
B.1.4. Avoided costs of staging National Championships in ski jumping & bobsleigh abroad	No data available											
Costs	***-166.0***	***239.3***	***495.7***	***1740.6***	***1759.7***	***1773.4***	***1676.9***	***1726.3***	***679.5***	***171.4***	***169.5***	***10266.3***
C.1.1. Incremental costs of the FTP-2006 – Scenario 1 vs. Scenario 2	-166.0	208.3	444.9	492.0	479.8	527.7	450.8	346.6	-84.1	0.0	0.0	2700.1
C.1.2. OCOG expenditures, including:												
Operations	0.0	4.0	23.7	27.8	44.2	62.1	124.4	352.7	531.3	4.9	2.2	1177.3
Bank credit line	0.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	0.0	0.0	216.0
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	11.9	23.0

C.1.3. Unbudgeted construction costs - a multimodal road Adler-Krasnaya Polyana	0.0	0.0	0.0	1193.8	1097.2	1034.2	970.1	919.6	0.0	0.0	0.0	5214.9
C.1.4. Costs of maintenance, removal, and changing of specialization of athlete venues after the 2014 Winter Olympics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	205.3	155.4	155.4	516.0
C.1.5. Public debt service	0.0	0.0	0.0	0.0	5.8	6.4	5.4	4.2	0.0	0.0	0.0	21.8
C.1.6. Marginal excess tax burden	0.0	0.0	0.0	0.0	105.6	116.1	99.2	76.3	0.0	0.0	0.0	397.1
Environmental account												
Costs	***0.0***	***0.0***	***0.0***	***0.0***	***43.5***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***43.5***
C.3.1. Damage on nature	No data available											
C.3.2. Fines for breaking environmental laws (1.8 bln RUR in 2010)	0.0	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0	0.0	0.0	43.5
Social account												
Benefits												
B.5.1. Free tickets for local residents	No data available											
Costs	***0***	***0***	***0***	***184***	***169***	***159***	***150***	***0***	***0***	***0***	***0***	***662.3***
C.5.1. Displacement of residents from their current housing	0	0	0	184	169	159	150	0	0	0	0	662.3
Economic development account												
Benefits												
B.4.1. Creation of new continuing jobs	Creation of 59,700 new permanent jobs before the 2014 WOPG; however taking into account a possible decrease in employment after the Olympics the overall impact of the WOPG 2014 on new jobs creation is ambiguous.											
B.4.2. Increased number of foreign tourist arrivals during and after the Olympic Games	No data - a temporary increase during the WOPG 2014 might be expected plus a positive impact of a Russian Grand Prix in Formula One can be envisioned.											

Costs	
C.4.1. Possible crowding out effect on local business before and during the 2014 Olympic Games	No data – the overall impact is ambiguous.
Resident/consumer account	
Benefits	
B.2.1. The moral aspect: pride and enjoyment of hosting the 2014 Winter Olympics	No data – a substantial positive impact can be expected.
B.2.2. Opportunity to attend sport events within the 2014 Winter Olympics	No data – a positive impact can be expected.
B.2.3. New housing, infrastructure and transportation facilities for residents of the city of Sochi	No data – a substantial positive impact can be expected.
Costs	
C.2.1. Disruption and congestion in the course of construction and during the 2014 Winter Olympics	No data – a negative impact was seen during 2009-2011.

Source: Author's calculations and estimations based on: [Shaffer, Greer, Mauboules, 2003; The Government of the Russian Federation, 2006; Rosstat, 2013; Ministry of Economic Development…, 2012; Sochi 2014 Olympic committee, Theme 6; Ministry of Finance…, 2010b; Rossiyskaya Gazeta, 2009; INTERFAX, 2010; Nemtsov, Milov, 2009; Vechernyaya Ryazan', 2005; RIA-Novosti, 2011; RIA Novosti, 2010; Rossiyskaya Gazeta, 2012; Sochi.com, 2011].

Annex 5. Policy option 1.1: Cash flows of costs and benefits discounted to 2006

USD millions, discount rate 6.5%	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
NPV – Policy option 1.1	***166.0***	***-224.7***	***-435.3***	***-1219.1***	***-1156.6***	***-998.8***	***-891.9***	***-616.6***	***-237.7***	***-71.9***	***-67.5***	***-5754.2***
Total benefits	***0.0***	***0.0***	***1.8***	***374.3***	***376.5***	***411.9***	***359.8***	***494.3***	***172.8***	***25.3***	***22.7***	***2239.5***
Total costs	***-166.0***	***224.7***	***437.0***	***1593.3***	***1533.1***	***1410.8***	***1251.8***	***1110.9***	***410.6***	***97.3***	***90.3***	***7993.7***
Government financial account												
Benefits	***0.0***	***0.0***	***1.8***	***374.3***	***376.5***	***411.9***	***359.8***	***494.3***	***172.8***	***25.3***	***22.7***	***2239.5***
B.1.1. OCOG revenues, including:												
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	0.0	0.0	13.9
IOC contribution	0.0	0.0	0.0	0.0	4.8	54.3	10.6	57.9	74.9	0.0	0.0	202.5
TOP sponsorship	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	9.5	5.5	5.1	25.7
Other income	0.0	0.0	1.8	1.8	21.9	29.2	40.8	141.2	74.5	3.6	2.4	317.2
B.1.2. Avoided costs of construction of a new road Sochi-Krasnaya Polyana	0.0	0.0	0.0	372.5	349.8	328.4	308.4	289.6	0.0	0.0	0.0	1648.8
B.1.3. Revenues from the use of athlete venues after the 2014 Winter Olympics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	15.2	31.5
B.1.4. Avoided costs of staging National Championships in ski jumping & bobsleigh abroad	No monetised data											
Costs	***-166.0***	***224.7***	***437.0***	***1441.0***	***1367.8***	***1294.4***	***1149.3***	***1110.9***	***410.6***	***97.3***	***90.3***	***7457.2***
C.1.1. Incremental costs of the FTP-2006 – Scenario 1 vs. Scenario 2	-166.0	195.6	392.3	407.3	373.0	385.2	309.0	223.1	-50.8	0.0	0.0	2068.5
C.1.2. OCOG expenditures, including:												
Operations	0.0	3.8	20.9	23.0	34.4	45.3	85.2	226.9	321.0	2.8	1.2	764.6

Bank credit line	0.0	25.4	23.8	22.4	21.0	19.7	18.5	17.4	16.3	0.0	0.0	164.4
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.3	12.6
C.1.3. Unbudgeted construction costs - a multimodal road Adler-Krasnaya Polyana	0.0	0.0	0.0	988.3	852.9	754.8	664.9	591.7	0.0	0.0	0.0	3852.6
C.1.4. Costs of maintenance, removal, and changing of specialization of athlete venues after the 2014 Winter Olympics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	124.0	88.2	82.8	295.0
C.1.5. Public debt service	0.0	0.0	0.0	0.0	4.5	4.7	3.7	2.7	0.0	0.0	0.0	15.6
C.1.6. Marginal excess tax burden	0.0	0.0	0.0	0.0	82.1	84.7	68.0	49.1	0.0	0.0	0.0	283.8
Environmental account												
Costs	***0.0***	***0.0***	***0.0***	***0.0***	***33.8***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***33.8***
C.3.1. Damage on nature	No monetised data											
C.3.2. Fines for breaking environmental laws (1.8 bln RUR in 2010)	0.0	0.0	0.0	0.0	33.8	0.0	0.0	0.0	0.0	0.0	0.0	33.8
Social account												
Benefits	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
B.5.1. Free tickets for local residents	No monetised data											
Costs	***0.0***	***0.0***	***0.0***	***152.4***	***131.5***	***116.4***	***102.5***	***0.0***	***0.0***	***0.0***	***0.0***	***502.8***
C.5.1. Displacement of residents from their current housing	0.0	0.0	0.0	152.4	131.5	116.4	102.5	0.0	0.0	0.0	0.0	502.8
Economic development account												
No monetised data												
Resident/consumer account												
No monetised data												

Source: Author's calculations.

Annex 6. Policy option 1.2: Cash flows of costs and benefits discounted to 2006

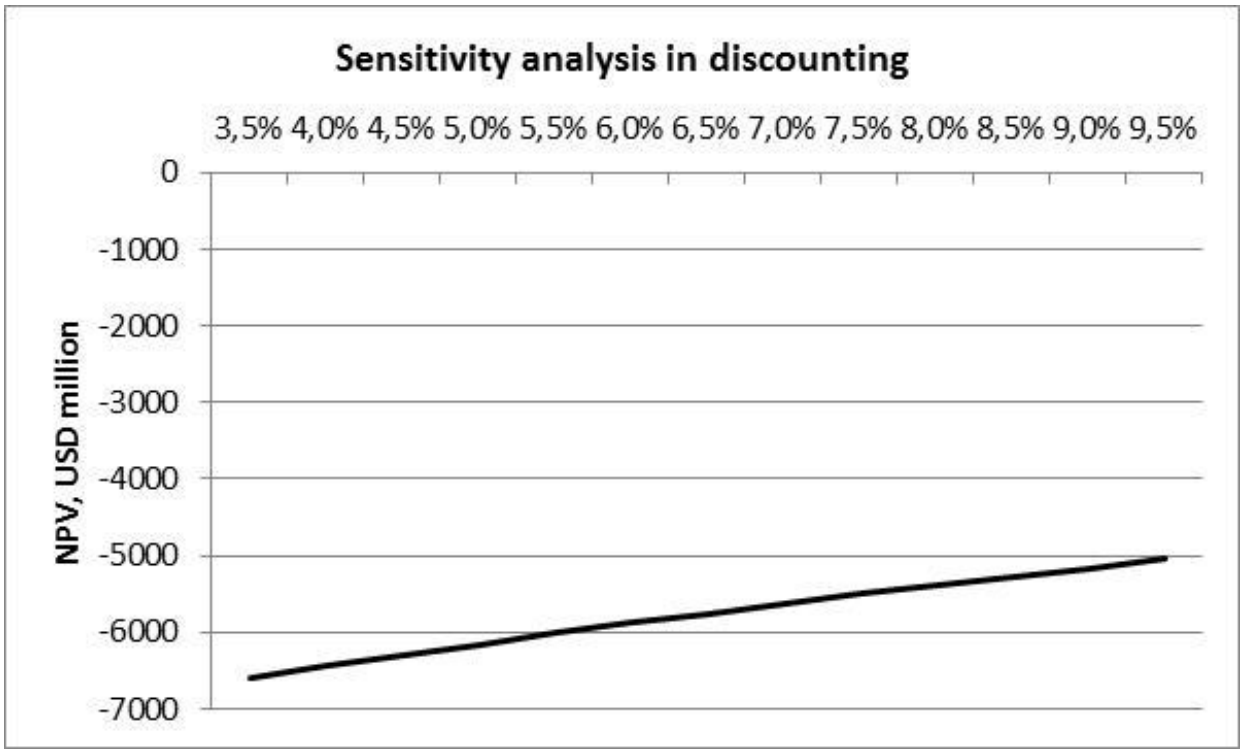
USD millions, discount rate 6.5%	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
NPV – Policy option 1.2	***166.0***	***-224.7***	***-435.3***	***-975.8***	***-1003.3***	***-900.9***	***-843.9***	***-604.0***	***-237.7***	***-71.9***	***-67.5***	***-5199.1***
Total benefits	***0.0***	***0.0***	***1.8***	***1.8***	***26.7***	***83.5***	***51.4***	***204.7***	***172.8***	***25.3***	***22.7***	***590.8***
Total costs	***-166.0***	***224.7***	***437.0***	***977.6***	***1030.0***	***984.4***	***895.3***	***808.7***	***410.6***	***97.3***	***90.3***	***5789.9***
Government financial account												
Benefits	***0.0***	***0.0***	***1.8***	***1.8***	***26.7***	***83.5***	***51.4***	***204.7***	***172.8***	***25.3***	***22.7***	***590.8***
B.1.1. OCOG revenues, including:												
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	0.0	0.0	13.9
IOC contribution	0.0	0.0	0.0	0.0	4.8	54.3	10.6	57.9	74.9	0.0	0.0	202.5
TOP sponsorship	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	9.5	5.5	5.1	25.7
Other income	0.0	0.0	1.8	1.8	21.9	29.2	40.8	141.2	74.5	3.6	2.4	317.2
B.1.3. Revenues from the use of athlete venues after the 2014 Winter Olympics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	15.2	31.5
B.1.4. Avoided costs of staging National Championships in ski jumping & bobsleigh abroad	No monetised data											
Costs	***-166.0***	***224.7***	***437.0***	***825.2***	***864.7***	***868.0***	***792.8***	***808.7***	***410.6***	***97.3***	***90.3***	***5253.3***
C.1.1. Incremental costs of the FTP-2006 – Scenario 1 vs. Scenario 2	-166.0	195.6	392.3	407.3	373.0	385.2	309.0	223.1	-50.8	0.0	0.0	2068.5
C.1.2. OCOG expenditures, including:												
Operations	0.0	3.8	20.9	23.0	34.4	45.3	85.2	226.9	321.0	2.8	1.2	764.6
Bank credit line	0.0	25.4	23.8	22.4	21.0	19.7	18.5	17.4	16.3	0.0	0.0	164.4
Bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.3	12.6

(B.1.2. in Policy option 1) Costs of construction of a new alternative road Sochi-Krasnaya Polyana	0.0	0.0	0.0	372.5	349.8	328.4	308.4	289.6	0.0	0.0	0.0	1648.8
C.1.4. Costs of maintenance, removal, and changing of specialization of athlete venues after the 2014 Winter Olympics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	124.0	88.2	82.8	295.0
C.1.5. Public debt service	0.0	0.0	0.0	0.0	4.5	4.7	3.7	2.7	0.0	0.0	0.0	15.6
C.1.6. Marginal excess tax burden	0.0	0.0	0.0	0.0	82.1	84.7	68.0	49.1	0.0	0.0	0.0	283.8
Environmental account												
Costs	***0.0***	***0.0***	***0.0***	***0.0***	***33.8***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***33.8***
C.3.1. Damage on nature	No monetised data											
C.3.2. Fines for breaking environmental laws (1.8 bln RUR in 2010)	0.0	0.0	0.0	0.0	33.8	0.0	0.0	0.0	0.0	0.0	0.0	33.8
Social account												
Benefits	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
B.5.1. Free tickets for local residents	No monetised data											
Costs	***0.0***	***0.0***	***0.0***	***152.4***	***131.5***	***116.4***	***102.5***	***0.0***	***0.0***	***0.0***	***0.0***	***502.8***
C.5.1. Displacement of residents from their current housing	0.0	0.0	0.0	152.4	131.5	116.4	102.5	0.0	0.0	0.0	0.0	502.8
Economic development account												
No monetised data												
Resident/consumer account												
No monetised data												

Source: Author's calculations.

Annex 7. Policy option 1.1: Sensitivity analysis

NPV, USD million	-6,597	-6,445	-6,298	-6,156	-6,018	-5,884
Discount rate	3.5%	4.0%	4.5%	5.0%	5.5%	6.0%
NPV, USD million	-5,754	-5,628	-5,506	-5,387	-5,271	-5,159
Discount rate	6.5%	7.0%	7.5%	8.0%	8.5%	9.0%

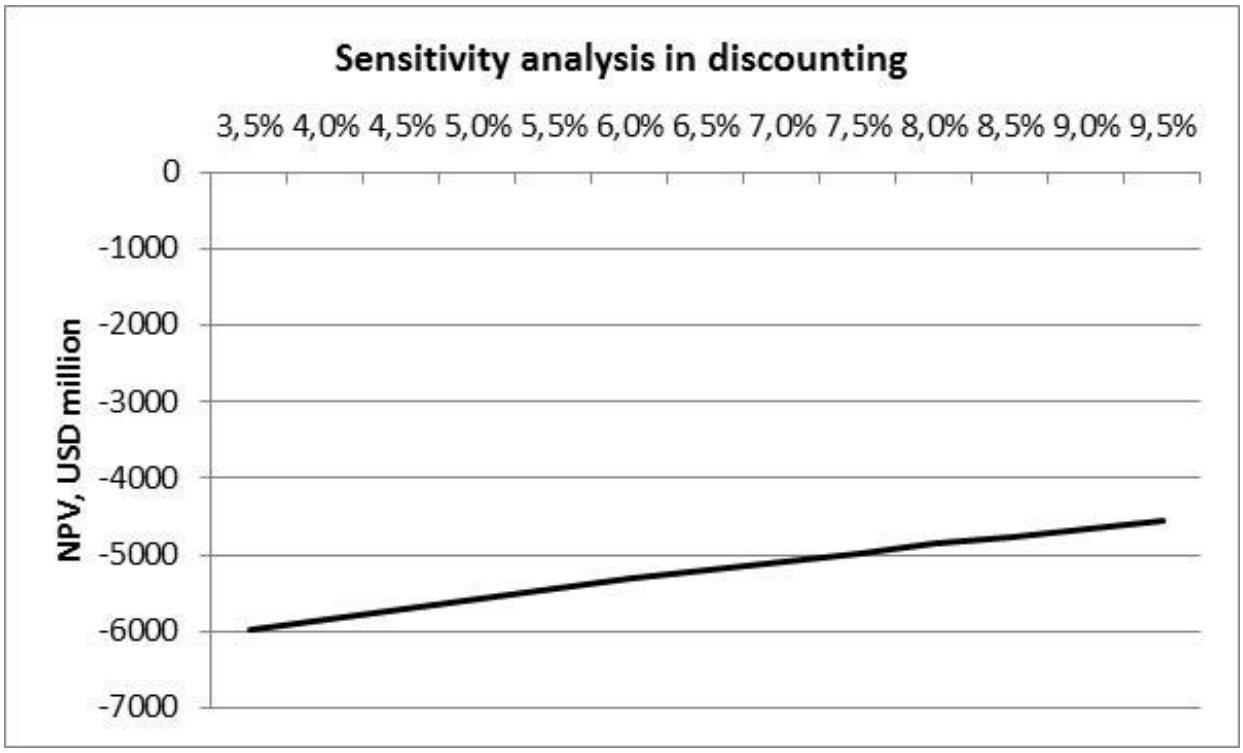


Internal rate of return = 219%.

Source: Author's calculations.

Annex 8. Policy option 1.2: Sensitivity analysis

NPV, USD million	-5,974	-5,835	-5,700	-5,569	-5,442	-5,319
Discount rate	3.5%	4.0%	4.5%	5.0%	5.5%	6.0%
NPV, USD million	-5,199	-5,083	-4,971	-4,862	-4,756	-4,653
Discount rate	6.5%	7.0%	7.5%	8.0%	8.5%	9.0%



Internal rate of return = 210%.

Source: Author's calculations.

Electronic publications of the Pan-European Institute in 2011-2013

Freely available at http://www.utu.fi/pei

2013

3/2013
Koivisto, Leena (ed.)
Baltic Rim Economies Expert Articles 2012

2/2013
Tsachevsky, Venelin
Energy management in South East Europe (Achievements and Prospects)

1/2013
Shadrina, Elena
Russia's state capitalism and energy geopolitics of Northeast Asia

2012

7/2012
Wilk, Paulina
Cross-border energy infrastructure in the Baltic Sea Region

6/2012
Koivisto, Leena (ed.)
Baltic Rim Economies Expert Articles 2011

5/2012
Liuhto, Kari
A liquefied natural gas terminal boom in the Baltic Sea region?

4/2012
Mäkinen, Hanna (ed.)
Selected articles on modernisation and innovation in Russia

3/2012
Mäkinen, Hanna
Innovations in the Baltic Sea region

2/2012
Tsachevsky, Venelin
Five years of Bulgaria's membership into the European Union – the slow absorption of EU funds slackens Bulgaria's europeanization

1/2012
Tamulyte, Julija
The determinants of capital structure in the Baltic States and Russia

2011

6/2011
Hanson, Philip
Risks in Russia – is the environment changing?

5/2011
Liuhto, Kari
The Inauguration Address on the Occasion of Receiving the Honorary Doctorate at the Saint Petersburg State University of Economics and Finance

4/2011
Valdaytsev, S. – Sergeyev, A.
Technological innovations in Russia

3/2011
Agibalov, S. – Kokorin, A.
Copenhagen Agreement – A new paradigm for the climate change solution

2/2011
Laaksonen, Eini (ed.)
Baltic Rim Economies Expert Articles 2010

1/2011
Tsachevsky, Venelin
Bulgaria, the Balkans and the Pan-European infrastructure projects

pan-european institute

www.utu.fi/pei