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[start page 192]

**MEASURING THE REGIONAL ECONOMIC IMPACT OF MEGA-EVENTS:
WHAT ARE THE BENEFITS OF THE 2014 OLYMPICS FOR SOCHI?**

**ОЦЕНКА ВОЗДЕЙСТВИЯ КРУПНОМАСШТАБНЫХ СОБЫТИЙ НА
РЕГИОНАЛЬНУЮ ЭКОНОМИКУ: КАКУЮ ПОЛЬЗУ ПОЛУЧИТ СОЧИ ОТ
ОЛИМПИЙСКИХ ИГР-2014?**

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Abstract

The economic benefits of mega-events such as the Olympic Games are much touted but little quantified. This paper first presents a systematisation of the money streams associated with hosting the Olympic Games and then introduces basic concepts from regional economics. On this basis it outlines a general model that could be employed to estimate the regional economic impact of tourism associated with the Olympic Winter Games in Sochi in 2014.

Regional economics, regional development, Olympic Games, tourism

Об экономических плюсах таких крупномасштабных мероприятий как Олимпийские Игры много говорят, но реальную выгоду практически не подсчитывают. Данная работа (или научный труд) представляет собой систематизацию денежных потоков, связанных со столицей Олимпийских Игр, и затем вводит базовые понятия из региональной экономики. На этой основе выводятся основные принципы общей модели, которую можно применить для оценки влияния туризма, связанного с зимними Олимпийскими Играми-2014 в Сочи, на региональную экономику.

Ключевые слова: региональная экономика, региональное развитие, Олимпийские Игры, туризм

1) The economic impact of global mega-events

Global mega-events such as the Olympic Games, the FIFA World Cup or the Expo World's Fair potentially have a profound and long-lasting effect on the economy of the host cities [cf. Clark 2008]. Within a relatively short period of time, urban economies experience the influx of a disproportionate share of capital investment and consumption. By some estimates, [start page 193] the investment compression caused by the Olympic Games accelerates the urban development of the host city by up to 10 years [Preuss 2004b]. For the Chicago Olympic Games in 2016, studies forecast an economic impact in excess of USD 22 billion for the state of Illinois over 11 years, of which USD 13.7 billion are expected to be realised by the City of Chicago alone [Tootelian and Varshney 2008]. It is this economic boost which entices cities to bid for hosting the Olympic Games, along with the prospect of getting numerous infrastructural upgrades and a sparkling international image virtually *en passant* [Toohey and Veal 2007].

The economic effects of the Olympics vary considerably, however, depending on the exact circumstances in which the Olympic Games take place [Preuss 2004a; Solberg and Preuss 2007]. Crucial factors that influence economic effects are the total volume of investment and spending as well as their regional and sectoral pattern, the split between public and private funding and the structure of the regional economy. The complexity of the model and the number of variables involved make forecasting of the regional economic effects a highly delicate affair. In particular, it is challenging to separate the incremental effects created through mega-events and compare them to a hypothetical baseline scenario. This is the reason why many ex-ante estimates turn out to be seriously exaggerated when compared to ex-post studies [Matheson 2008; Porter and Fletcher 2008]. Biased results lead to wrong allocations of resources and misguided decision-making.

The variable economic effects of the Olympics spell out the case for individual and case-based examinations, founded on sound regional economic theory and data. However, there is a surprising want of scholarly work on the regional economics of the Olympic Games. Addressing this lack, this contribution wants to do two things: first, to work towards a systematisation of the regional economic impact of the Olympic Games and, second, to propose a method for estimating the regional economic impact of the most important component of economic impact: tourist spending.

2) Systematising the regional economic effects of the Olympic Games

The economic activity resulting from the Olympic Games can be divided into three broad categories (see Figure 1):

- 1) OCOG (Organising Committee of the Olympic Games) expenditure
- 2) Infrastructure expenditure (the so-called non-OCOG budget)
- 3) Tourist expenditure

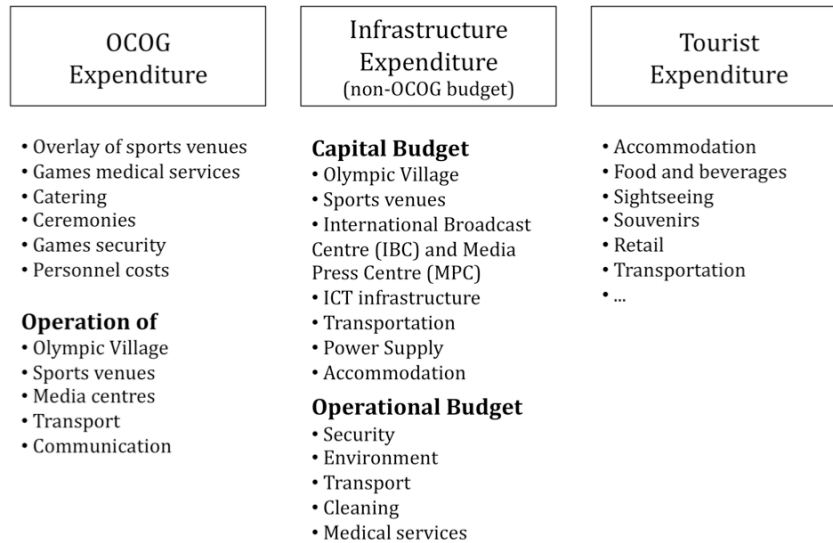


Figure 1: Major sources of Olympics-related expenditure

1) OCOG expenditure

OCOG expenditure typically comprises the budget required for the preparation and operation of the Olympic Games. Currently, the OCOG budget for the Winter Games hovers at around USD 1.5 billion. The largest chunk is usually reserved for the Games workforce, ICT as well as for the operation of the sports venues. Capital investments for sports venues, the Olympic Village and other major infrastructural projects are not included nor are the costs [start page 194] for operational expenses on the part of the city such as the expenditure for security operations which has skyrocketed over the past Olympic Games. This bill is often footed by the national government and does not appear as Olympic-related investment in the bid books of cities. The Vancouver Olympic Games, for example, projected CAD 175 million for security, whereas the total security costs are now estimated to amount to something like CAD 900 million, more than four times the original figure.

Since the Winter Games in Lake Placid, the OCOG budget has grown constantly in real terms (see Figure 2). The OCOG budget is funded from several sources: the most significant revenue comes from the auctioning of broadcasting rights and local sponsorship. Revenues from ticket sales, a proportion of the income from the global sponsorship programme and all of the local sponsorship monies also accrue to the OCOG.

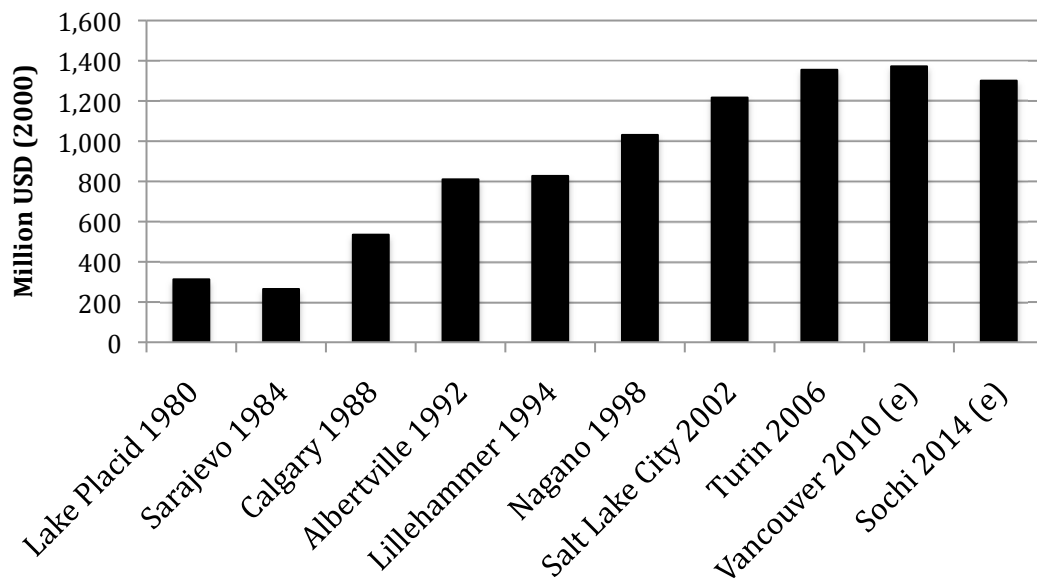


Figure 2: OCOG budget of the Olympic Winter Games 1980 to 2014 (e) in USD (2000 values)
(Source: Chappelet 2002; bid books; news sources)

2) Infrastructure expenditure

Hosting the Olympic Games puts high demands on a city's infrastructure. The following minimum infrastructure is typically required [Preuss 2004b]:

- ICT infrastructure based on a fibre-optic cable network
- Public transportation system capable of handling at least an additional 200,000+ trips per day by tourists, volunteers and security personnel
- 42,000+ hotel beds
- Olympic village for about 15,000 athletes and officials
- Media centre for international media
- Reliable power supply

Solberg and Preuss [2007] distinguish between hard and soft infrastructure: hard infrastructure comprises all investments into the built environment such as for transport, energy, tourism, water and sewage as well as special facilities such as sport venues. Soft infrastructure, by contrast, refers to increases in human capital through the acquisition of new skills in the regional workforce. Cab drivers learning to speak English or hotels adopting a professional marketing or reservations management would qualify as upgrades in soft infrastructure.

Although all host cities are required to present budgets for the non-OCOG expenditure in the bid books with which they apply to the IOC for hosting the Games, estimates of the real size of non-OCOG expenditure ex-post are difficult to obtain. For one thing, non-OCOG expenditure is often subject to severe cost overruns so that ex-ante projections from the bid book seldom match the ex-post figures. Vancouver, for example, initially projected some CAD 360 million for the construction and upgrading of sports venues, a figure now, half a year before the Games, pegged at CAD 580 million. For another, it is often difficult to distinguish between projects that are related to the Olympics – and should therefore be [start page 195] included in the non-OCOG budget – and projects that are not and would have been realised anyway. Like many other host cities before, Vancouver is taking advantage of the big infrastructure push for the Olympics to launch a number of other infrastructure projects that might not have been realised otherwise.

Improvements to the Sea-to-Sky-Highway, the major north-south artery running through Greater Vancouver, a new convention centre and Canada Line, a rapid transit line linking Vancouver airport with downtown Vancouver and the Olympic Village. Though not included in the official non-OCOG budget, it is commonly believed that these projects would not have been tackled in the absence of the Olympics. Even so, it remains unclear what percentage of the costs should be attributed to the Olympic Games. Since infrastructure projects have added utility after the Games and a long depreciation period, not all costs should be included in the Olympic account [Maennig 2006].

While the OCOG budget shows a constant, upward-sloping curve over the years, the non-OCOG budget varies greatly from host city to host city, depending on the infrastructure investment a city wants to or has to pledge. Large urban areas in wealthy countries will usually be able to host mega-events with a minimum of investment but often want to realise ambitious urban development projects with the Olympics as a catalyst. Sochi, by contrast, will have to make significant upgrades to its infrastructure in order to fulfill the basic requirements set out above. Its metropolitan area is considerably smaller than that of Vancouver (335,000 inhabitants compared to 2,116,000 inhabitants) and its infrastructure is less well-developed. It is not surprising, then, that the original non-OCOG budget of Sochi's bid was set at USD 10,300 million, twenty times the original Vancouver budget of USD 512 million (2006 values, deflated)!

3) *Tourist expenditure*

Tourist expenditure is the one source of Olympics-related expenditure that is most difficult to predict and gauge. In contrast to OCOG and infrastructure expenditure, it has a highly diffuse character, it is not centrally budgeted and it cannot be controlled. At the same time it presents perhaps the most sizable economic impact related to the Olympics. Vancouver, for example, estimates that the most significant economic impact will come from additional tourist revenues created by the Olympic Games: for the years 2007-2011 the incremental economic impact under a medium scenario is predicted to be CAD 2.4 billion over a period of 14 years [Intervistas 2002]. What is more, the incremental cash inflow associated with international tourism is a true net gain for the country and the region. This is something that cannot be said about investments for infrastructure which often present a re-allocation of resources rather than an inflow of additional capital to the region.



Figure 3: Inbound tourism during the different stages of the Olympics [modified from Freyer and Gross 2006]

Tourist expenditure can typically be classified into three stages (Figure 3): pre-Olympic tourism, event-time tourism and post-Olympic tourism. *Pre-Olympic tourism* is typically dominated by visits associated directly with the preparation of the event: coordination meetings of the OCOG, sponsors and the media, test events for athletes as well as [start page 196] preparation

trips of tourist agencies fall under this category. Calculations for the Atlanta 1996 Olympics yielded approximately 70,000 visitor days associated with pre-Olympic tourism alone. *Event-time tourism* comprises athletes, officials, media representatives and volunteers which are all involved in the successful staging of the Games. *Post-Olympic tourism*, finally, is created from two important sources: private tourism and so-called MICE (meetings, incentives, conventions, events) tourism. Both tourism streams are motivated by the publicity and improved image of the host city and the upgraded tourism products and infrastructure [Preuss 2005]. If the Olympic Games are leveraged well by the host city and the host country, the effects from post-Olympic tourism may lift the city on a higher growth path for decades. Due to the importance of visitor spending for the regional economy and the difficulties in forecasting the economic impact associated with it, the remainder of the paper shall be devoted to developing a basic model for economic impact forecasting.

3) What is the relevant tourist expenditure to be considered?

Due to frequent terminological confusion in regional economics a few preliminary remarks, following Watson et al. [2007], are in order. An overview of the terminology can be found in Table 1. In this paper, I shall speak of *economic activity* when referring to the money spent within a region that is attributable to the Olympic Games. *Economic contribution* denotes the gross change in economic activity associated with the Olympic Games. It includes all expenditure that is somehow associated with the Games. In so doing, it does not take into account that some of the expenditure would have occurred anyway, regardless of the Olympic Games. *Economic impact* analysis is more conservative in this respect. Economic impact denotes the net change in *new* economic activity and therefore includes exclusively *new* revenues brought into the region and revenues kept in the region that would otherwise be spent outside the region. In the case of the Olympics, this would mean constructing a baseline scenario of 'business-as-usual', comparing it against the mega-event scenario and then calculating the additional economic activity, or expenditure, the event creates. In particular, economic impact analysis is sensitive to opportunity costs, which occur when visitors or residents are crowded out of the region due to the event. Figure 4 provides a graphic illustration of the diverse movements of event-affected persons.

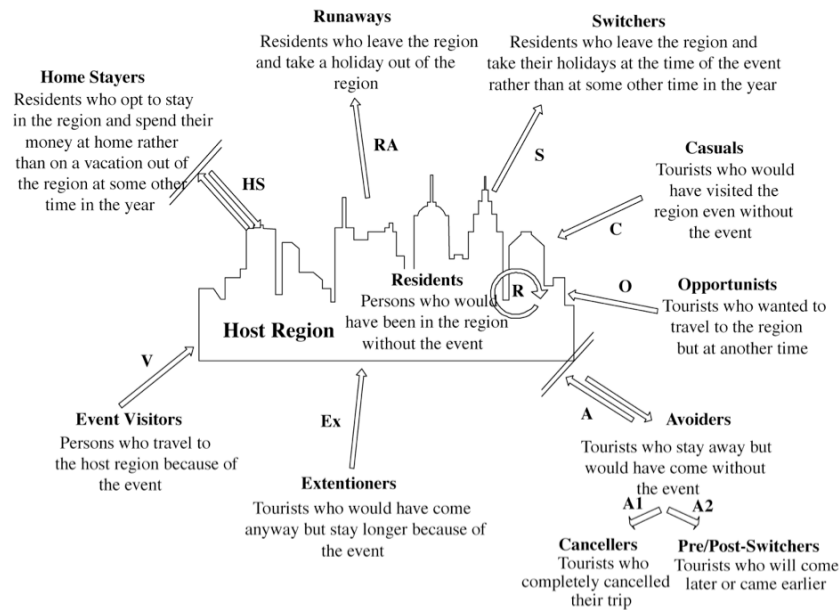


Figure 4: Relevant groups when considering visitor expenditure during mega-events (adapted from Preuss 2004a: 52)

[start page 197] Only Extentioners, Event Visitors and Home Stayers create true positive net changes in economic activity according to the economic impact analysis, whereas Runaways and Cancellers reduce net economic activity by causing opportunity costs. Pre-/Post-Switchers, Opportunists, Casuals and Residents are only relevant in so far as their consumption patterns change due to the event. If the event induces those groups to spend more money than they would have otherwise, this will result in a positive economic impact. Switchers, finally, are neutral to the economic impact, because the outflow of money associated with them would have occurred anyway, only at another time [cf. Preuss 2005].

The relevant expenditure that underlies economic impact studies of tourism can then be calculated as following:

$$\text{Expenditure} = (Ex + V + HS) - (RA + A1) + \Delta(A2 + O + C + R)$$

It is obvious from the degree of differentiation in this model that the costs of acquiring empirical data are rather high. In contrast to economic contribution studies, which can often draw on available secondary data, economic impact studies almost always require augmentation with primary research [Watson et al. 2007]. For this reason, economic contribution studies dominate the field, although the results they yield are of little immediate relevance for regional economic policy.

4) The multiplier effect in a regional economy

The expenditure of visitors is not equal to the income that accrues to the region. Some of the expenditure is used for intermediate inputs, for example, which come from outside the region. This means that a share of the initial expenditure will flow out of the region and not be converted into regional income. It is this income, however, which is of primary interest for decision-makers

when balancing the monetary costs and benefits of hosting an event. In order to gauge the effects on regional income economic impact analysis looks at how monies cycles through the regional economy along the linkages between economic sectors. Every unit of money spent within a region sets off several rounds of economic activity.

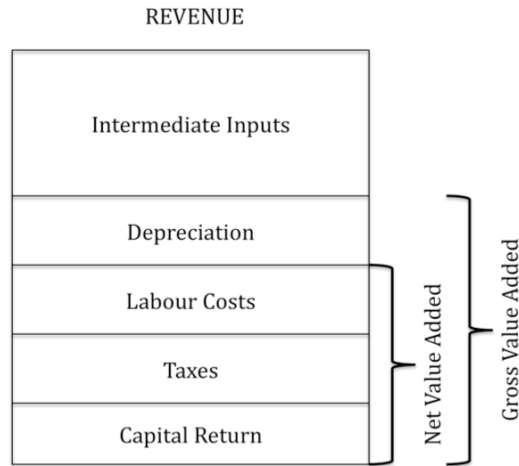


Figure 5: Break-down of business revenue

Suppose an international tourist coming to Sochi in 2014 spends RUB 6,000 for a hotel night. As illustrated in Figure 5, this tourist spending creates a certain value-added with the hotel, reflected in components such as labour income, taxes and returns on capital. But not only. In order to create its output the hotel will need to spend part of the RUB 6,000 on intermediate inputs, for example for the furniture in the room. If the furniture supplier comes from within the Sochi region its value-added in turn creates income for the region. This furniture supplier will need wood to manufacture the furniture. If this wood comes from forests within the target region ... This principle of value-added is captured in Figure 6. The initial tourist expenditure creates *direct income* in the region, which, in turn, through intra-regional linkages, translates into demand in other sectors and creates *indirect income*. Regional economics knows a third type of income, *induced income* (see Figure 6). This is the change in economic activity resulting from in-region household spending of income earned as direct or indirect income. The employees of the furniture company, for example, spend money on housing, clothing, groceries and so on, which counts as induced income. [start page 198]

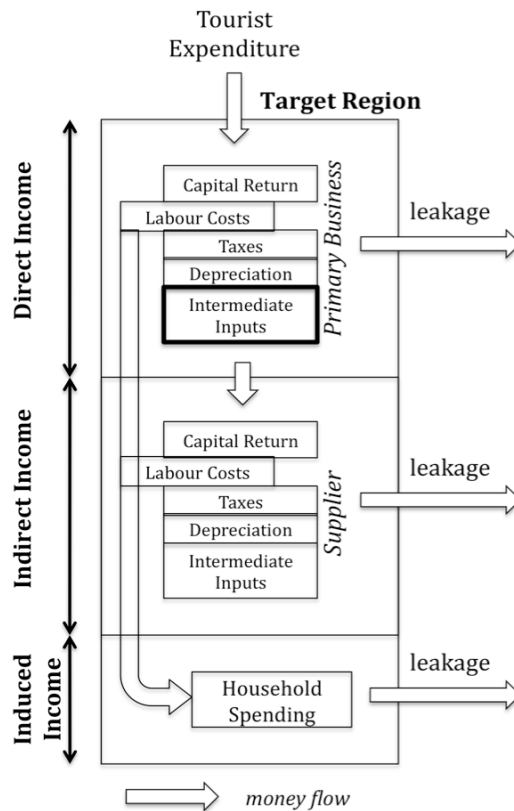


Figure 6: Model of initial tourist expenditure cycling through the regional economy

Of course, not all money stays within the region. Business will source inputs from outside the region, tax revenues will go to federal authorities or employees spend their salaries outside the region. The outflow of money is called *leakage*. The total income (direct, indirect and induced) retained in the regional economy is commonly expressed as a ratio of the total income to the initial expenditure, the so-called *multiplier* [Archer 1984; Archer and Owen 1971]. The higher the leakage, the lower this multiplier. Let's suppose from the above example that of the RUB 6,000 two-thirds, that is RUB 4,000, accrue immediately to the hotel that accommodates the visitor as direct income. Of the remaining RUB 2,000, RUB 1,100 leak outside the region for taxes and outside inputs and RUB 900 are spent on intermediate inputs from supplying businesses. Here, again, we assume that two-thirds, i.e. RUB 600, accrue as indirect income to the supplying businesses. Finally, we assume that household spending resulting from the initial RUB 6,000 amounts to RUB 1,000. This leaves us with RUB 4,000 (direct income) + RUB 600 (indirect income) + RUB 1,000 (induced income) = RUB 5,600. The multiplier is therefore $\text{RUB } 5,600 \div \text{RUB } 6,000 = 0.93$. This principle of regional economics can be applied to a variety of empirical cases to study the economic impact of events or policies [see e.g. Job et al. 2008 for a study of tourism in national parks].

Two important factors influence the size of the multiplier [Wall 1997; Watson et al. 2007]. First, the size of the study region: the larger the study area, the less will it have to import inputs. The leakage will be smaller and, consequently, the multiplier higher. The size of a multiplier therefore should always be cited in conjunction with the size of the region it refers to. Second, the degree of integration of an economy. Cities will have less leakage than rural areas, because inputs are more likely to be sourced locally. The income multiplier thus provides a measurement of the degree of interconnectedness and the sectoral diversity of a regional

economy. For the case of the Olympics this means that big cities in developed countries, because they have a high population and a highly integrated, diverse economy, will be able to capture more of the initial expenditure than smaller cities. Sochi, with a metropolitan area of 335,000 inhabitants, will experience a higher leakage than Vancouver, with a population of 2.1 million. Moreover, Sochi also faces the problem of leakage, because – unlike larger, more developed urban areas – it is unable to offer a high proportion of the relevant inputs locally: building works designed by engineering offices from Moscow, carried out by workers [start page 199] from Turkey and Central Asia with construction equipment imported from Germany and Japan significantly reduce the regional economic impact of tourist expenditure. The degree of utilisation of endogenous resources is thus a crucial factor in determining the size of multipliers

Calculating multipliers requires highly specific economic data on inter-industry linkages at the regional level. In order to determine how the initial expenditure cycles through the economy it is necessary to know where the intermediate inputs come from. In regional economics the most common method is to employ input-output tables in order to model the supply linkages between economic sectors [Fletcher 1989]. Frequently, however, input-output tables are not available at the regional level. In Russia, for example, input-output tables from the national level have to be regionalised by adjusting them to the regional interindustry balance [Sayapova 2008]. A hybrid approach to constructing regional input-output models uses available secondary data but supplements them with specific primary surveys to better capture the regional interindustry relations [Lahr 1993]. Alternatively, several non-survey methods for calculating regional input-output tables may be applied [see Kronenberg 2009]. Matheson [2009], however, cautions against applying regional multipliers, calculated during times of business-as-usual, to the case of mega-events. He provides evidence that the specific situation of mega-events leads to lower multipliers and therefore an overestimation of the regional economic impact.

Beyond the empirical difficulties of implementing input-output analysis at the regional level, there is a serious analytical limitation: input-output analysis assumes a free flow of resources such as labour, land and capital at constant factor prices [Porter and Fletcher 2008]. Economic activity in the tourism sector triggers additional economic activity in supplying sectors and this is seen as desirable. This assumption ignores, however, that in order to produce this additional economic activity, resources may need to be allocated to this sector from somewhere else and are not just freely available. If an increased demand for hotel rooms triggers an increased demand for furniture, furniture makers may need to hire new workers – workers that may be coming from other sectors of the economy. Alternatively, in the face of high demand hotels may raise prices, thus violating the assumption of constant factor prices. In general, input-output analysis elides that the economy is an equilibrium and counts only the positive effects of increased demand without figuring in the negative effects stemming from factor re-allocations [Dwyer et al. 2004].

In order to handle the feedback effects within an equilibrium-state economy computable general equilibrium (CGE) models have been developed. CGE analysis incorporates an input-output framework but in addition models factor markets, consumer spending and a host of other equilibrium effects which constrain the free flow of resources. By including these limitations CGE analysis is able to model the economy better than input-output analysis and produce more realistic results for economic impacts. Specifically, it is able to take into account the negative feedback effects of additional economic activity. CGE analysis calculates several output variables, aggregate and split into different industries, which may be useful for policymakers. Besides the net change in the GDP, CGE provides indicators for employment, imports and exports or output. What has limited the spread of CGE modelling is the high cost of constructing such a model in the first place. Moreover, for regional economies the limitations of input-output analysis are not as serious as for national economies: typically, regional economies are open to factor flows and

prices can be assumed to be set outside these regions. All in all, a regionalised input-output model appears to be the most cost-efficient and realistic approach to calculating the regional economic impact of Olympic tourism.

Table 1: Important concepts in regional economics [adapted from Watson et al. 2007 and Stynes 2008]

Term	Definition
Economic activity	Money spent within a region that is attributable to the Olympic Games
Economic contribution	Gross change in economic activity in a region associated with the Olympic Games
Economic impact	Net change, i.e. <i>new</i> economic activity in a region, associated with the Olympic Games
Direct income	Change in income in those businesses of the region that directly receive the demand (= first round)
[start page 200] Indirect income	Changes in income in those business that supply businesses of the first round
Induced income	Household spending in the region from direct or indirect income
Leakage	Money from the initial cash injection that leaves the region
Multiplier	Proportion of initial expenditure captured as income (direct, indirect or induced) within the region
Input-Output analysis	A matrix representation of a region's economy used to predict the effect of changes in economic activity in one industry on others under the assumption of constant factor prices
Computable General Equilibrium (CGE) model	Model of a regional economy allowing for resource constraints and variable factor prices

5) Research design for measuring the economic impact of Olympics-related tourism

The theoretical model from the preceding pages can serve as a basis for developing a research design that captures the economic impact stemming from Olympics-related tourism in Sochi. It is well-nigh impossible, however, to capture every effect included in the model. This calls for a simplification of the theoretical approach which focuses on the main components. A basic approach to estimate the regional economic impact from tourist expenditure is to forecast incremental visitation, multiply with consumption expenditures and then model the regional economic effects in an input-output model. A simplified research design may consist of the following steps:

1) Estimating incremental visitor numbers

The number of visitors is the decisive variable for determining total visitor expenditure. Estimating the number of incremental visitors excludes visitors who would have come even without the Olympics and includes visitors crowded out by the Olympics. This requires to quantify the size of the groups from Figure 4, not only for event-time tourism but also for pre- and post-Olympic tourism (see Figure 3). The incremental visitation associated with journalists, athletes, volunteers and officials is relatively easy to predict, since these tourist streams are directly linked to the event via the number of sold tickets, issued accreditation passes for journalists and so

on and do not fluctuate significantly from one Olympics to the next. Forecasting the additional visitation by private or business tourists is considerably more difficult and is best done by referring to the experience of previous host cities and adapting it to the local conditions in Sochi.

2) *Estimating the size and pattern of tourist expenditure*

Different types of tourists spend different amounts of money: volunteers staying with friends and relatives will leave less money in the region than spectators staying in the five-star Radisson. In order to obtain a reliable estimate of total tourist expenditure, a representative cross-section of visitors needs to be surveyed to determine the share of different visitor types, their length of stay and their daily expenditure. In order to transform tourist expenditure into a suitable input for the input-output model it needs to be differentiated according to economic sectors. Input-output tables do not have a separate tourism sector but they have the sectors – such as accommodation, catering, retail – the tourism industry is composed of. The tourism sector can then be specified as a particular composition of different existing sectors in which consumption increases.

3) *Constructing the regional input-output model*

Russia does not provide regional input-output tables which represent the interindustry linkages within a given region. Input-output tables therefore need to be constructed from national data. There are two principal ways of doing this. The first is a non-survey method which employs different factors to transform the national table into a regional one. Possible transformation factors include location quotients or the commodity balance within a region [see Kronenberg 2009 for details]. The second is a hybrid approach which would collect survey data from businesses within the region in order to analyse their sourcing system. Once the input-output table is compiled, the table needs to [start page 201] be converted into a technical coefficients matrix which yields the appropriate multipliers [Fletcher 1989].

A standard input-output model is static and therefore does not incorporate shifts in interindustry relations over time. When the time periods surveyed are long enough to warrant significant changes in interindustry relations and production functions, a dynamic model is preferable. This is the case with the economic effects of the Olympics which, according to most sources, are spread out over a period of ten years and more. Moreover, the income effects of different years need to be discounted to a base year to obtain the net present value. In any case, it is advisable to construct several different scenarios representing a worst case, a best case and perhaps two intermediate cases in order to allow for variations in the critical input variables of the model.

6) **Conclusion**

The Olympics present a unique opportunity to boost the economic development of a region. Unlike any other event, it prompts a considerable inflow of autonomous monies. The most significant cash flows come from IOC revenues (which form the basis of the OCOG budget), inbound tourism spending and subsidies from the central government, which make up a substantial part of the Sochi non-OCOG budget. Not all of these monies stay within the regional economy, as some are used towards imports from outside the region. Moreover, crowding out effects can occur, especially if the utilisation of resources in the region is high. Nonetheless, if managed wisely, the Olympics can benefit the regional economy tremendously.

This paper has presented a systematisation and sketched a methodology for forecasting the regional economic impact of the Olympics. Carrying out such a study is important and is done by the majority of candidate cities: not only does it provide transparency about the utilisation and benefit of public monies used towards the Olympics, but it also quantifies the economic impact of

the Games. Since this impact accrues to the region, it is a benefit to the local people who, at the same time, have to bear a significant share of the costs: they have to live with consumer price increases and see themselves drawn into the international limelight whether they want it or not. Quantifying the monetary benefit of such a mega-event may contribute towards a higher awareness and, eventually, greater acceptance of the Olympics.

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