

# Experiences in estimating the macroeconomic impact of mega tourism events – the case of hosting the FIFA Football World Cup Germany 2006

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## ABSTRACT

Estimating the macroeconomic impact of hallmark events has been discussed manifold in economic literature. Besides the assessment of the additional event related investment expenditures during the pre-event phase one of the most striking challenges is the estimation of the event related consumption expenditures during the event phase. Furthermore, for estimating the net economy-wide impact it is also important to apply an adequate macroeconomic model, which takes into account all indirect intermediate consumption effects and induced income effects of the event-specific primary stimulus as well as the adjustments of prices and interest rates.

The paper describes the experiences in estimating the macroeconomic impact of hosting the FIFA Football World Cup Germany 2006 more precisely. Therefore various aspects concerning impact assessment will be discussed against the backdrop of the applied econometric intersectoral model INFORGE. A special focus is put on the consumption related effects. Within various pre-event studies the primary consumption stimulus has been estimated by plausibility based considerations or information coming from the German Tourism Satellite Account (TSA) whereas the final ex-post assessment study is based on a primary empirical measurement of the consumption patterns of tourists at the FIFA Football World Cup 2006 in Germany. Thus this measurement is explained in detail.

Using this new database, the calculated net economy-wide impact induced by the surveyed consumer spending at the World Cup has increased the German GDP by 3.2 billion € and created 34,800 “man years” of additional employment.

## TABLE OF CONTENTS

ABSTRACT.....	2
TABLE OF CONTENTS.....	3
1 Introduction.....	4
2 Requirements for impact assessment of mega sport events .....	5
2.1 Assessment of the primary investment stimulus .....	6
2.2 Assessment of the primary visitor consumption stimulus.....	7
2.3 Model for impact assessment .....	10
3 Experiences in estimating the impact of hosting the FIFA World Cup Germany 2006 – an overview of ex-ante studies.....	12
4 Estimating the impact of hosting the World Cup – the ex-post study for the FIFA World Cup Germany 2006 .....	14
4.1 Empirical measurement of the consumption pattern of visitors.....	15
4.2 Some empirical results of the visitor survey .....	16
4.3 Model based impact assessment.....	19
The model INFORGE .....	20
Classification of the INFORGE model .....	24
References for the model .....	25
4.4 Net-impacts of hosting the FIFA World Cup.....	25
5 Concluding remarks.....	27
References.....	28

## 1 Introduction

Hallmark events are mega sport events which attract tourists to the host destination (Hall 1992) and therefore have undoubtedly a considerable economic dimension. The spectators of these events buy admission tickets, use the transport system, buy souvenirs, do shopping and take advantage of the services at restaurants and hotels. Frequently the host cities, private industry as well as the event organizers spend money for renovation and extension of tourism facilities and traffic networks and invest in the event specific infrastructure which is necessary for a smooth staging of the worldwide broadcasted event. Besides the ticket revenues, the sale of TV rights and sponsorship rights are the most important sources of the organizing committee. However, the infrastructure must be provided by public authorities and staging an event is often a huge burden for the host region, in particular the upgrading of the overall traffic infrastructure. When planned well, the host region often gains accelerated urban development which is partly publicly financed. Last but not least even in case the infrastructural changes are not sustainable such as some of the sport infrastructure in Athens 2004 or stadiums built for the EURO 2004 in Portugal, the host regions' image can be improved and is basically freely advertised worldwide. Additionally the event can be used for signaling (Kurscheidt 2005, 2010).

The macroeconomic impact or socio-economic benefit of mega sport events has been estimated manifold in the run-up to the events by the responsible policy makers and organizers. There is a large and growing amount of international literature on the economics of major sport events and related topics. Most of the studies available on major football tournaments investigated the effects on the economic activity in the host region, including the tourism industry (Preuss, Kurscheidt and Schütte 2009; Ahlert 2006; Oldenboom 2006; Baade and Matheson 2004; Szymanski 2002; Rahmann et al. 1998). Except for this typically presented event specific impact- and/or cost-benefit-analysis there are also critical reflections with regard to their methodological weakness (Matheson 2009; Baade and Matheson 2004; Késenne 1999; Crompton 1995; Getz 1994).

Besides the assessment of the additional event related investment expenditures concerning the necessary extensions of the stadium infrastructure during the pre-event phase one of the most striking difficulties is the measurement of the additional event related consumption expenditures during the event phase. The latter is mainly caused by the temporary rise of inbound tourism which depends on the specific consumption pattern of

event tourists. The relatively small number of international literature on visitor surveys during sport events shows that the location, the type of the event as well as the socio-economic structure of the host city has a strong influence on the size of the total visitor spending (Preuss et al. 2010; Preuss et al. 2009; Lee and Taylor 2005; Daniels, Norman and Henry 2004; Mondello and Rishe 2004; Gelan 2003). This means that for the same mega sport event there are remarkably regional differences possible concerning the tourism related consumptive primary stimulus. The same is obviously the case for the size of the net economy-wide impact which depends on the country specific industry structures and economic multipliers. Thus for estimating the net economy-wide impact it is important to apply an adequate macroeconomic model, which takes into account all indirect intermediate consumption effects and induced income effects of the event-specific primary stimuli as well as the adjustments of prices and interest rates.

After a brief characterization of the main requirements for impact assessment of mega sport events the paper describes the experiences respective steps in estimating ex-ante and finally calculating ex-post the macroeconomic impact of the FIFA Football World Cup Germany 2006 more precisely. Besides discussing impact modeling aspects due to the use of the German forecasting and simulation model INFORGE (INterindustry FORecasting Germany) a special focus is given to the consumption induced impacts of the FIFA World Cup 2006 (Preuss et al. 2009). Within the various pre-event studies the primary stimulus has been estimated by plausibility based considerations or information coming from the German TSA (Tourism Satellite Account) whereas the final post-event study is based on a primary empirical measurement of the consumption patterns of tourists at the FIFA Football World Cup 2006 in Germany. The latter will be explained in deep detail.

## **2 Requirements for impact assessment of mega sport events**

Information about the overall net-economy wide impacts of mega sport events – with the related investments during the pre-event phase as well as the expenditures by visitors during the event – on income and employment cannot be obtained directly from the available statistics. First, the event-related primary stimuli have to be assessed accurately. Second, a thorough impact assessment of the primary stimuli is based on a profound macroeconomic model which estimates all resulting direct and indirect effects on production, income, prices and employment.

The challenge regarding the evaluation of the primary impact is to precisely measure only the investments/ consumption that occur due to the event. Special care has to be given to all effects that would also have happen without staging the event and even better is to also take out all re-allocations. Re-allocation means that resources available for one project were taken to realize the other project, here the event. Furthermore the good measurement of the primary stimuli has to consider all crowding-out effects. As for the FIFA Football World Cup 2006 study we have taken care of these aspects with great care.

## **2.1 Assessment of the primary investment stimulus**

The awarding of hosting a mega sport event like the FIFA World Cup or the Olympic Games typically is a national impetus for the modernization, restructuring and extension of the infrastructure. For carrying out a reliable impact analysis of the event it is important to distinguish between investment activities that are directly event-specific and other supplementary non-event-specific anyway investments by formulating clear criteria. Normally the event-specific investment expenditures are promised to the awarding international sport association (e.g. FIFA, IOC) and are mainly related to the number of event stadiums, athlete accommodation, training facilities and media centers as well as their equipment standards and the additional costs for their optimal direct linking to the local traffic, communication and power system network. The non-event-specific anyway investments take place anyway and are only accelerated against the background of staging the event (e.g. updating and extension of the national transportation, communication and power system infrastructure, tourism infrastructure).

A reliable analysis of the overall net impact of the mega event takes only the event-specific investments into account. Thus the collection of data concentrates on the yearly event-specific investment expenditures in the run-up to the event as well as follow-up costs after staging the event (e.g. constructions to scale-down the event facilities, operating and maintenance costs). Due to the fact that the product structure of gross fixed capital formation is very specific it has also to be assessed in the detail of their main product specific cost categories (e.g. construction work, metal products, engineer services). Besides that the type of financing for the necessary event-specific investment projects has to be identified (e.g. by public funds, bank loans, private investors). This is important to consider whether exogenous money increases the impact or if it is just temporally seen re-distribution or not at all affecting the primary impact.

## 2.2 Assessment of the primary visitor consumption stimulus

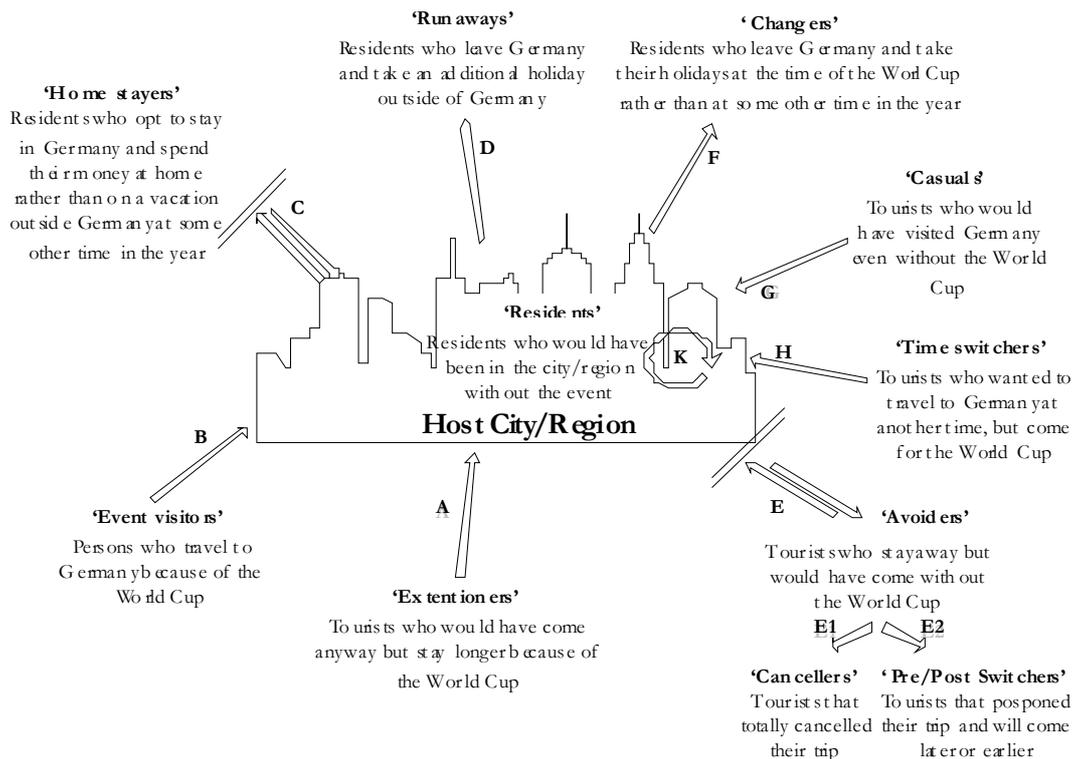
The assessment of the impact of World Cup visitors is not trivial due to the heterogeneous consumption pattern as well as due to the determination of which consumption can be seen as exogenous. In other words it must precisely be considered who just created a re-distribution of the money spent for the event (e.g. a citizen of the host city) or who has not at all to be considered (e.g. a tourist being in Germany irrespective of the World Cup who uses this coincident to attend a football match) and also the people must be considered that did not come to visit Germany but would have come without the World Cup being staged.

For the calculation of the primary visitor consumption we have to distinguish four variables:

### VARIABLE 1: The intention to travel

This variable divides the visitors into those that spend exogenous money in Germany and those that do not. The analysis is based on the visitor's individual intention to visit the World Cup (Preuss 2005). This constitutes a behavioral act as an important part of a macroeconomic impact model. In order to decide whether consumption has to be considered as exogenous or not the region under consideration has to be defined (here Germany as the host nation for the Football World Cup). Only then we can decide if a visitor's consumption is related to the World Cup exclusively or not.

“Extentioners” (A), “Event visitors” (B) and “Home stayer” (C) are the World Cup visitors with exogenous consumption creating the core visitor's primary impact. The “Home stayer's” (C) consumption can be seen as import substitution (Cobb and Weinberg 1993), and has to be added to the primary consumption stimulus, because the travel decision was based on the World Cup. Additionally, all persons accompanying someone from group (A) and (B) and also those that stayed home with group (C) have to be considered with their consumption – even though they may not have attended any World Cup match.

**Figure 1: Movements of event-affected persons during event-time**

Source: Preuss (2005, 288)

Two groups of event-affected persons reduce the visitor's impact and have to be deducted from the above mentioned consumption. These are Cancellers (E1) and Runaways (D), both representing groups that do not spend money in Germany but would have without the World Cup being staged, so-called crowding-out. Crowding-out is any reduction in private consumption that occurs because of an increase in spending of others visiting the event. The methodological challenge related to crowding-out is to distinguish a person who is really not coming (crowded out) from someone who just time-switched the visit, so called "Pre-post switchers" (E2). Another challenge is to distinguish "Runaways" (D) from "Changers" (F). The latter just time-switch their trip from another time to the period of the World Cup and can economically be seen as neutral while "Runaways" create a leakage of resources from Germany because residents decided for an additional holiday trip abroad. Summing up, group F and E2 are not necessary to consider. "Runaways" (D) can only be identified by a survey after the World Cup, while "Cancellers" (E1) can only be identified by ex-post trend calculations (see Preuss et al. 2010).

Finally "Casuals" (G) and "Time Switchers" (H) are groups that are not seriously affecting the primary visitor's impact by their consumption. "Casuals" would also have spent

their money in the region even without the World Cup and “Time Switchers” would have spent their money in Germany but at another time. However, both types of visitors presumably spent more money than on holidays without attending the World Cup. While we did conservatively not consider the daily consumption we considered expenditures for merchandise and tickets, assuming that no substitution for these spending occurred.

**Tab. 1: Consideration of consumption elements for different visitor groups**

	World Cup Consumption Pattern						
	<i>merchandise</i>	<i>shopping</i>	<i>tickets</i>	<i>food/drinks</i>	<i>daily travel</i>	<i>Accommodation</i>	<i>others</i>
Event-Tourist	√	√	√	√	√	√	√
Event-Tourist (accompanying person)	X	√	X	√	√	√	√
Casuals & Time Switchers	√	X	√	X	X	X	X
Casuals & Time Switchers (accompanying person)	X	X	X	X	X	X	X

√ = consumption considered | X = consumption not considered

*Source: Preuss et al. (2009, 180)*

#### VARIABLE 2: Permanent residence of visitors

The FIFA Football World Cup attracted visitors from 212 nations (Preuss et al. 2009). Due to the impossibility of ascertaining samples from all nationalities, we grouped the nations based on considerations about the visitors’ consumption behavior. It is important to consider that the nationality of a visitor is not important for impact measurement but the visitor’s permanent residence. For example, Italians living in Frankfurt did not inject exogenous money in the German economy while a German living in Argentina coming to Germany, only due to the World Cup, spends exogenous money.

Grouping the World Cup visitors by permanent residence is not trivial. Analysis of the consumption data proved that the most homogeneous groups of consumption can be built by considering two variables, opportunity costs a visitor has to bear to attend the World Cup and per capita income of the nation (Preuss et al. 2009). For example, visitors “living in Germany” and “neighboring countries” have low opportunity costs (due to low travel costs and time) when attending a World Cup match, but non-Europeans bear high opportunity costs, because they had to travel to Germany, stayed more often in hotels and not with friends,

and were on average longer in Germany than e.g. European visitors (see also Preuss, Seguin and O'Reilly 2007). These high opportunity costs of non-Europeans can be seen as a “cost filter” which enables only wealthy persons to come to Germany irrespective of the per capita income in their home country. For European countries that is different. Due to lower opportunity costs because travelling is cheaper the “cost filter” is not high. For these Europeans we used the average per capita income to group the World Cup visitors.

#### VARIABLE 3: Overnight visitors versus same-day visitors

Another important variable which explains consumption behavior is the duration of stay in Germany, which can be an excursionist (same-day visitor) or a tourist (overnight visitor). Same-day visitors have much higher expenditures per day while they bear no accommodation costs. Excursionists purchase merchandise and a ticket for the one day being at the World Cup. Furthermore, all travel costs and also shopping expenditures count for that one day. Most tourists do not have tickets for every day, buy the event merchandise products once and do not shop every day. The consumption of visitors staying for several days is viewed in absolute terms higher than that of same-day visitors but on a day basis lower.

#### VARIABLE 4: Stadium versus public viewing visitors

The consumption behavior is also different among stadium visitors and public viewing visitors. Preuss et al. (2009) show that the socio-demographic profile of a stadium visitor is different from that of someone just attending a public viewing.

### **2.3 Model for impact assessment**

The instruments of the Input-Output analysis are generally used to estimate the direct and indirect effects of production and employment. Although the Input-Output analysis – at least as used in the simple static open Leontief model (Miller and Blair 1985) – affects the result with inaccuracies based on its restrictive assumptions, it is still the only method that permits the systematic documentation of all direct and indirect effects of value-added effects. Based on the heterogeneous product structure of tourism expenditures of inbound tourists, the economic model used should be able to differentiate explicitly between various product groups and the corresponding production sectors. This makes particularly sense because very different technologies are used to produce the desired touristic products at the sectoral level, which has significant influence on sectoral productivity. Moreover, the desired goods diverge

considerably with regard to price elasticity. In the end, both effects result in very specific costs and proceeds at the sectoral level. This applies particularly against the background of the increasing globalization of the product markets and the resulting international division of labor and product diversity. Based on varying factor productivity, the overall net-effects on income and employment of the demand for accommodation/catering services or passenger transportation industries differ considerably from those for construction services for stadium facilities.

In the economic model to be used, the net-economy wide impacts should be the result of the different adjustment responses within the factor and product markets at the sectoral industry level. With regard to the three targets (production, income and employment) it should reflect the following mechanisms simultaneously:

- (1) Direct production effects take into account only those effects connected to direct demand (primary stimuli). They develop exclusively in those sectors which benefit directly from the event related investments in stadium facilities during the pre-event phase as well as the expenditures of visitors of the mega sport event during the event-phase.
- (2) Indirect production effects appear via remuneration for purchased products in those companies which supply goods and services to the companies that produce the directly demanded equipment and consumer goods, i.e. in the corresponding suppliers and sub-suppliers for intermediate products.
- (3) [Income]-induced production effects are defined in accordance with Keynes, corresponding to the multiplier model: the partial re-disbursement of the direct and indirect income earned in the course of the production process trigger a multiplier process which induces further production.
- (4) On a sectoral level the production effects directly influence the unit costs. The latter directly affect relative prices of all dependent demand variables.
- (5) Production and price effects have a direct impact on wage formation and thus on employment.

Furthermore, at the macroeconomic level the model should also allow for the financing effects of additional event specific infrastructural investments (e.g. via changes in interest rates or tax rates) because they directly affect the overall investment and consumption behavior. Thus the national tax system should be depicted, too. To accomplish this, the burden of the sectoral cost structures on production and the burden on private households as

well as the application of taxes and charges as part of the government expenditure activity should be represented in relation to the macroeconomic model.

### **3 Experiences in estimating the impact of hosting the FIFA World Cup**

#### **Germany 2006 – an overview of ex-ante studies**

In Germany several studies have been prepared for estimating the social and economic impact of hosting the FIFA World Cup 2006 in Germany. In the following a short overview of the different types of studies for the national, regional and sectoral level of the economy is given.

Within the framework of the evaluation and feasibility study commissioned by the German Football Association for the FIFA World Cup in 2006, Rahmann et al. (1998) documented the socio-economic benefit of the event on the methodical foundation of the cost-benefit-analysis (comp. Kurscheidt and Rahmann 1999). The main figure in the cost-benefit analysis is the so-called net present value. It summarizes all quantifiable positive and negative effects of the project in one single monetary value. It is calculated by adding up all discounted net benefits over the course of a defined planning horizon. Its value must be greater than zero for the recommendation of a project. In terms of the World Cup 2006, four influencing factors have been identified in particular: (1) the amount of the stadium investments in the pre-event phase, (2) the expenditures of foreign tourists during the event-phase, (3) the expenses of the local organizing committee before and during the event (4) the (often negative) net result of the stadium operation in the post-event phase. The analytical advantage of the cost-benefit-analysis compared is that the inter-temporal aggregated net-present-value includes the full effects of pre-periods at a discounted rate. Although the presented optimistic scenario forecasted a significant positive sustainable welfare growth over an analysis period of 15 years, the presented results suffer from the fact that the estimation of the overall economic investment and consumption effects was only the result of a rudimentary multiplier analysis.

This methodological weakness was an incentive for the work of Meyer and Ahlert (2000). They include the event-specific primary stimuli on event-specific infrastructural investments and on consumption by foreign World Cup visitors, investigated by Rahmann et al. (1998), in the more complex Input-Output based econometric forecasting and simulation model SPORT, which incorporates the results of a sport specific satellite account. The latter accounts in great detail all direct effects of sport-specific activities to GDP within the German

economy and is a sport-specific extension of the German Input-Output table. The model SPORT is a sport-specific extension of the German INFORGE model (comp. par. 4.3) which accounts not only for the expansive demand effects but also for the accompanying contractive financing effects. Meyer and Ahlert estimated the overall net impact on GDP and employment for the period 2002 to 2010 due to the necessary investments in event-specific infrastructure during the pre-event phase with regard to alternative financing strategies for these investments and the additional consumption expenditure of foreign World Cup visitors (comp. Ahlert 2001).

Due to the fact that the World Cup was staged only in 12 major German cities the economic impact was not allocated evenly over the country. By using the special regional modelling approach LÄNDER, Meyer and Ahlert analysed in 2002 how the overall macroeconomic impact of hosting the FIFA World Cup 2006 on income could be spread out to the regional level of the individual federal states (in German: Länder). The model LÄNDER (Ahlert 2006a) includes information from the macroeconomic model INFORGE as to Germany as a whole (prices, wages, employees, gross value added) as well as specific information on the individual federal states. The data of the model LÄNDER is based on the National Accounts of the federal states (without having regional Input-Output tables). The model LÄNDER is connected with the model INFORGE and serves to forecast the structural change on the level of the 16 German federal states. The total system INFORGE and LÄNDER is designed in a manner that full congruence is guaranteed with the information given in the overall macroeconomic model INFORGE about Germany as a whole. Within the model calculation, the primary investment and consumption stimuli have been directly attributed to the hosting regions whereas the indirect GDP effects calculated by means of INFORGE/SPORTS have been adapted indirectly to the regional level of the federal states by the model LÄNDER.<sup>1</sup>

The impact analysis of staging the FIFA World Cup by the Institute for World Economics (Boss et al. 2005) has been carried out within a panel model. Based on an empirical quarterly analysis for 18 large sport events, the 1963II to 2004IV period was examined to determine whether and to what extent the GDP actually could grow due to the additional visitors during the 2006 World Cup. The authors identified the infinitesimal positive overall impact as weakly significant because they could not observe significant

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<sup>1</sup> This LAENDER model was also used to predict the economic impact of Olympic Games on the Rhein-Main Region, when Frankfurt was bidding to stage the 2012 Olympic Games (Preuss and Weiss 2003).

empirical connections between GDP and foreign guests. The latter is not particularly surprising since, at least in the 60s and 70s, large sport events in Germany were not particularly well attended by foreign visitors. The only positive exceptions were the FIFA World Cup (1972) and the Summer Olympic Games (1974).

In 2005 several experts published new figures (Madeja 2005, Bargel 2005) concerning the potential average expenditure of foreign World Cup visitors. Due to the fact that the author expected quite different average visitor expenditure per day in a range between 100 and 200 Euro the foreign World Cup visitor induced impact assessment with the already mentioned INFORGE model has been updated (Ahlert 2006b). Two separate scenarios have been formulated on the base of tickets sold to foreign World Cup visitors and their expected average duration of stay for the lowest as well as the highest average value. For the reason that the mentioned studies did not provide detail information concerning the product specific expenditure structure the relevant structural information has been taken from the German Tourism Satellite Account (TSA) table on inbound tourism expenditure (Ahlert 2003). Besides not knowing which of the two scenarios could be realistic the main shortcoming of this approach was, that the assumed expenditure structure did not reflect the product specific consumption pattern of foreign World Cup visitors. In general, the empirical data quality of data on inbound visitor consumption with regard to product specific detail is rather weak in Germany. Whereas in most of the countries having a national TSA the Central Bank conducts a detailed inbound visitor survey this is not the case for Germany.

#### **4 Estimating the impact of hosting the World Cup – the ex-post study for the FIFA World Cup Germany 2006**

Due to the fact that no alternative reliable empirical data sources were available for estimating the expenditure of foreign World Cup visitors an empirical measurement of the consumption pattern had been carried out during the staging of the World Cup 2006. The results of this survey were the base for a net impact analysis with the German INFORGE model.

#### 4.1 Empirical measurement of the consumption pattern of visitors

The following empirical data are all based on the study of Preuss et al. (2009) on the FIFA Football World Cup 2006 in Germany which was financed by the BISp (Bundesinstitut für Sportwissenschaft). A sample of 9,456 interviews by questionnaire was collected using a randomized multistage cluster sampling. The database consists of 18 subsamples collected in front of the stadiums (47.4% of the total sample), 15 subsamples collected at public viewings (29.8%), 10 subsamples based on selected nations or special evaluation methods (19.2%) and a residual group (3.6%). This randomized multistage cluster sampling was selected because no information about the population of the public viewing visitors was available and only very few information about the stadium visitors.

In contrast to many other major sport events a Football World Cup attracts different visitor groups for each match and further more the matches were played all over Germany. This fact made every of the 64 matches an event in itself attracting visitors with diverse consumption behavior to locations with different economic conditions. Therefore the investigation of the economic impact from the consumption of World Cup visitors means to collect and extrapolate data from 64 different events and more than 300 Public Viewing Sessions, each of them having its economic specialties.

The questionnaires were administered in German, French, Portuguese, Spanish and English language. The survey was conducted personally. On average eight trained research assistants were working on-site to ensure both continuity in interview technique and randomly selected interview locations. The pre-selection of the matches was based on various hypotheses to avoid biases through particular locations of the host cities (east-west, agglomeration-countryside, small-big etc.), nationalities, time of the match (afternoon-evening, weekend-week), attractiveness of the match (nations competing, preliminaries-finals etc.), and others. At each chosen host city the researchers were positioned at a randomly picked location somewhere around the stadium or public viewing. Then they tried to interview as many visitors as possible in their cluster (multistage cluster sampling, see Kromrey 1998, 286-288). There is no reason to believe that the randomly picked locations attracted special groups of visitors with different consumption. The only specialty of visitors interviewed was that they all were in stage of waiting and willing to participate in the survey. The rejection rate was below 1%.

The interview corridor was between four hours to half an hour before each match. The questionnaire consisted of 18 questions and took 7-10 minutes to complete. The research design was based on a socio-economic foundation pre-tested at the FIFA Confederations Cup

2005 (n=2,422). A second pre-test was administered at the first match in Munich. The reliability of the questionnaire was tested by conducting a large number of oral interviews and a precise observation of the visitors filling in the questionnaires. Finally, the 252 questionnaires from the first match were analyzed if any questions were not answered, wrongly answered or comments were added.

Theoretical roots on the method to ascertain consumption patterns from event tourists draw back to Gratton et al. (2000) as well as to several empirical studies from Preuss, such as on the 2002 Manchester Commonwealth Games, the Olympic Games in Athens 2004 (football tournament) or the FIFA Confederations Cup in Frankfurt 2005.

The representativity of the sample collected from stadium visitors can be checked through several variables. First, we compared the sample with information available. The only reliable data about stadium spectators was the total number of tickets sold (2.155 million) and its distribution of the tickets by category (A-D). In a second step we compared the socio-demographic data of our sample with another data collection by Bogusch et al. (2009), who conducted 6,282 oral interviews in six World Cup cities.

## **4.2 Some empirical results of the visitor survey**

The calculation of the direct economic effect of the visitors of the World Cup 2006 is based on Germany as region and the time span of one month before and after the World Cup.

To determine the primary consumption stimulus of the spectators we first had to work out the relevant number of visitors at the World Cup, which were 973,000 in stadiums (only 421.000 of them were foreign stadium visitors) and 4.1 million at public viewings (without having any ticket for attending a match at a stadium, only 924.000 of them were foreign visitors). Then we needed to distinguish those contributing to the primary effect. This quantity was multiplied with the number of days each particular subgroup with similar consumption patterns stayed in Germany (see Preuss et al. 2009 for detailed calculation).

The data clearly showed that there were great differences in consumption and socio-demographic data between those with residence in Germany and foreign visitors. While the differences between visitors of public viewings and stadiums are not significant among foreign residents, remarkable differences can be seen among those living in Germany (see details in Preuss et al. 2009).

To calculate the primary economic effect for Germany the above mentioned four variables have to be considered to avoid multiplying wrong consumption patterns with the various groups of visitors.

As shown in Table 2 only 20.9% of the foreign visitors are important to be considered from an economic point of view. Altogether, 924,000 foreign visitors were attracted to Germany for the purpose to solely attend a public viewing without holding any stadium ticket.

**Tab. 2: Differentiation of visitors by intention to visit in per cent**

	<i>Public viewing</i>	<i>Stadium</i>
German Residents	48.3	36.4
“Home Stayer”	5.8	7.0
Changer	6.6	10.0
Event Visitors	18.7	27.2
Casuals	12.7	8.7
Time Switcher	7.8	10.7

Table 2 provides a rough overview of VARIABLE 1. The share of the “intention to visit” was done for each “group of residence” (VARIABLE 2) and by differentiating the duration of stay (VARIABLE 4). Finally, for simplicity reasons we did not use all possible consumption patterns but 40 in our model.

An important result is that VARIABLE 1 alone reduced the number of economically relevant exogenous consumption to only 33.3% of the stadium visitors and 26.5% of the public viewing visitors. Knowing who has to be considered with what part of consumption is only a first step and has to be followed by the other 3 relevant variables. Having identified 40 groups we needed to consider their different consumption behavior.

We evaluated the consumption pattern based on seven elements. The inquiry about the consumption was based on two considerations. What consumption element can the interviewee best remember/guess (daily versus total expenses of the trip) and what expenditures most likely appear daily in a rather constant amount (accommodation, food & drinks, local transportation) versus what expenditures appears only a few times during the overall stay (tickets, merchandise, shopping).

Preuss et al. (2009, 136-138) shows the detailed average daily expenditure for various groups. In summary the consumption patterns show that visitors from countries with high per capita income purchase more than those from European countries with lower per capita income. Irrespective of their nationality and per capita GDP the non-Europeans spent on average more than all other groups.

Another finding is that the World Cup visitors consumed significantly more than usual tourists and therefore can be seen as a type of convention visitors (see Solberg, Andersson and Shibli 2002). This provides evidence that impact studies that made use of consumption patterns from “ordinary city tourists” could not calculate the true primary economic effect on the World Cup or other events. Another important result is that the distribution of each single consumption element displayed in Preuss et al. (2009, 136-138) had a (very) high standard deviation. Therefore, the mean of expenditure by consumption element is a figure that cannot describe the consumption behavior of the visitors. Despite the high number of questionnaires the standard deviation kept high and Kolmogorov-Smirnov-Tests proved a missing normal distribution. In other words, the visitors of the World Cup – even structured in 40 consumption groups – were not a homogeneous consuming group. However, the purpose was to measure the most reliable primary consumption effect from World Cup visitors. Therefore, the mean values on consumption elements have an analytical value. The simple multiplication of the average expenditure with the number of visitors and days they stay provides exactly the same result than adding all single expenditures individually – irrespective of the standard deviation. Therefore, using average expenditures is an appropriate way for extrapolating the primary consumption effect irrespective of the standard deviation. Furthermore, we avoided double counting and also considered re-distributions of tickets due to the black market.

What was measured here is solely the primary economic effect based on the consumption of the World Cup visitors and accompanied persons. We also considered potential crowding-out effects. Various official statistics prove that crowding-out did not have a significant effect on the German territory, but on the host cities.

Based on the above indicated scheme the calculated additional primary consumption stimulus from visitors to the World Cup was approximately 2.8 billion Euros for the year 2006. This figure includes 1.47 billion Euros from visitors at stadiums, 1.09 billion Euros from visitors only attending public viewings and 0.3 billion Euros from “Home Stayers”. Table 3 shows the expenditure structure in detail.

**Tab. 3: Expenditure structure of the additional primary consumption stimulus**

<i>product category</i>	<i>Mio. Euros</i>
<i>Food</i>	199.0
<i>Non-alcoholic beverages</i>	122.6
<i>Beer, wine and spirits</i>	215.1
<i>Tobacco</i>	14.7
<i>Garments and clothing materials etc.</i>	273.1
<i>Footwear</i>	48.4
<i>Household appliances</i>	45.3
<i>Glass, tableware and household utensils</i>	198.4
<i>Domestic services and home care services</i>	15.3
<i>Medical and pharmaceutical products</i>	1.4
<i>Maintenance and repairs of motor vehicles</i>	14.8
<i>Fuels and lubricants</i>	163.1
<i>Transportation services</i>	133.0
<i>Communications</i>	5.7
<i>Photographic equipment etc.</i>	200.5
<i>Other major durables for recreation and culture</i>	60.6
<i>Recreational and cultural services</i>	295.6
<i>Books, newspapers and periodicals</i>	100.9
<i>Accommodation and catering services</i>	614.9
<i>Personal care</i>	48.7
<i>Personal effects</i>	67.7
<i>Other personal services</i>	8.5
<b>TOTAL</b>	<b>2 847.0</b>

Source: Preuss et al. (2009, 223)

### 4.3 Model based impact assessment

The analysis of tourism expenditures and its impact on the total economy in general is a topic which many researchers and destination managers find to be interesting. During the last two decades the research on this topic has been analyzed by different methods. There has been an emphasis in analyzing the macroeconomic impact of tourism in the context of a macroeconomic modeling framework using an Input-Output-model (IO) (e.g. Fletcher 1989; Smeral 1995; West and Gamage 2001) or using a complex Computable General Equilibrium model (CGE) (e.g. Zhou et al. 1997; Dwyer, Forsyth, and Spurr 2000, 2006).

## The model INFORGE

The sectorally disaggregated macro-econometric model INFORGE has been developed in the mid 1990s in the context of processing the economy-energy-environment 3E-model PANTA RHEI (e.g. Meyer and Ewerhart 1998; Schleich et al. 2005).

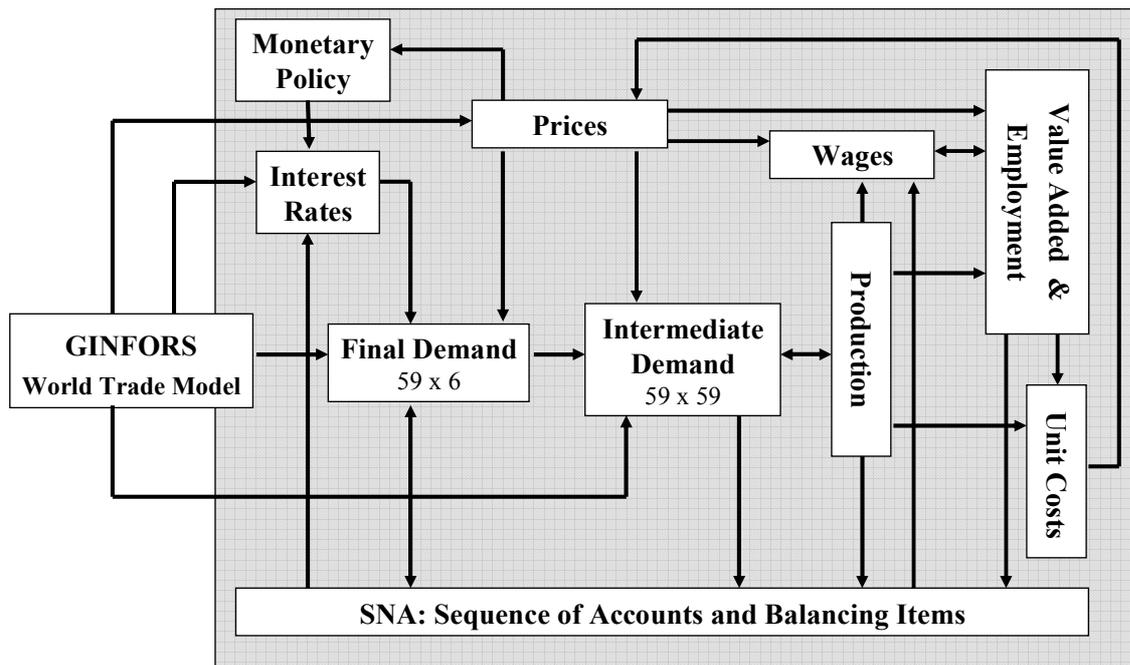
The specific ability of INFORGE is based on two principles of construction: bottom-up modeling and full integration, which are typical of the INFORUM (INterindustry FORecasting at the University of Maryland) philosophy (Almon 1991). Bottom-up means that each sector of the economy is modeled in great detail in the context of the Input-Output framework and that macroeconomic variables such as GDP, disposable income and the consumer price index are calculated by explicit aggregation within the model. Full integration implies a complex and consistent modeling within the System of National Account (SNA) framework of sequence of accounts and balancing items. It contains the complexity and simultaneity of income creation and distribution in its five institutional sectors, the redistribution among these sectors as well as its use for the different intermediate and final products which the several industries produce in the context of global markets.

The flow chart shown in Figure 2 provides an insight into the structure of the overall model system. The GINFORS (Global INterindustry FORecasting System) model is used to integrate the national economic situation in the context of the global economy (e.g. Meyer, Lutz and Wolter 2005, 2010). This model of global trade supplies the vector for the world import demand and the vector of world market prices by commodity groups to the German INFORGE model within the blue marked area. Obviously the model shows a very high level of endogenization and is highly interdependent. In principle the population development, tax rates, labor supply and the global market variables of the international GINFORS system are determined exogenously. The latter can be linked with the INFORGE model directly in one complete system, too (Meyer et al. 2007; Ahlert et al. 2009).

Final demand has the six components private consumption, government consumption, equipment investment, construction, inventories and exports. Each component is analyzed in the detail of 59 product groups. On the basis of a macroeconomic consumption function for private households, which is explained with regard to the disposable income of private households in constant prices and the interest rates for consumer credits, the shares of 43 COICOP (Classification of Individual Consumption by Purpose) categories are explicated with respect to the respective relative price, the 10 year treasury bond rate and a time trend. The expenditures in constant prices for the utilization purposes result from multiplication of the estimated shares with the aggregate consumption of private households. A bridge matrix

converts the consumption expenditures by the 43 individual consumption purposes in the consumption expenditures by 59 product groups. The public consumption is subdivided into social security benefits and government consumption. Both components are explained differently: Whereas social security benefits by product group depend on the development of overall government expenditures of the latter due to demographic change and the relevant relative prices, the government consumption by product group is a function of GDP. The starting point for the separate simulation of equipment and construction investments by product groups is the investing industry. For both investment categories the expenditures of an industry depend on its gross production in constant prices, its capital stock as well as the actual interest rate. The resulting two investment vectors by 59 industries are converted by two different bridge matrices into two investment vectors structured by 59 product groups. The most important determinants of exports are the world trade variables of the GINFORS system.

**Figure 2: The structure of the model INFORGE**



Intermediate demand of the firms is also depicted in great detail by using the Input-Output framework. In general, the input coefficients are variable and depend on relative prices and time trends. The variability of the input coefficients is not considered as the result of factor substitution, but the effect of the cost-push induced technological progress which leads to an improvement of limitational processes. Concerning intermediate demand the

presumption of substitutional technologies seems to be doubtful, since intermediate inputs are part of the product. If there is an alteration of the intermediate inputs it redefines the product.

Final demand and intermediate consumption less imports are determining the total production. The imports in the disaggregation of 59 product groups are a function of the sectoral gross production as well as the proportion of the domestic prices to the import prices. The latter are calculated within the model GINFORS.

The results of the Input-Output module then flow into the labor market and the sequence of accounts, which in turn influence the cost structure and the final demand. The employment module consists of an aggregated section and a disaggregated one. In the aggregated section, the macroeconomic labor supply is exogenous. This, together with the macroeconomic demand, results in the number of unemployed people. To calculate the macroeconomic labor demand, a macroeconomic wage function is estimated in a first step. The average total annual wage of an employed person depends on the macroeconomic labor productivity, consumer price development and the labor market situation. The resulting value serves as an indicator for the development of the disaggregated labor market, which is broken down into 59 industries. The respective average annual wage in each industry is correlated with the general macroeconomic development as well as sector-specific variables. The most significant determinants of the sectoral labor demand are the gross production and the real labor costs of the respective sector. The vector for labor remuneration as well as for the profits results from definition whereas the other components of primary inputs (net product taxes and depreciation) are explained econometrically.

In a next step the sectoral unit costs are calculated via definition using the sectoral results for the primary inputs. Along with the development of prices of similar imported commodities, the unit costs are the crucial determinants of prices within the basic price concept. The basic prices are the result of a mark-up calculation of the companies. Due to the fact that the supply-side related basic prices do not directly determine the demand-side, the model contains the complete transition from production prices to final demand market prices for all 6 components of final demand in a differentiation between 59 products. Such a detailed modeling makes it possible to evaluate the effects of commodity specific tax changes (Bach et al. 2002).

Besides, the aggregate results of the primary inputs are inserted into the sequence of accounts. The sector-based loop is thus closed: the results of the final demand, which include aspects of supply as well as demand, together with production technologies, determine the level of production, which in turn influences the primary distribution of income.

The sequence of accounts with its five institutional sectors and seven functional accounts is part of the model and consistently linked with the Input-Output system. The behavioral equations of this system explain its expenditures; the revenues are given by definition. The total revenues of one type of transaction as well as the account balances are always determined by definition. The system comprises the complete redistribution of income including social insurances and taxation between government, private households and corporations, thus allowing the calculation of disposable income which is a significant determinant of final demand. Moreover, the financing account balances are ascertained. Therefore, the model especially includes government budget constraints. As a result the entire fiscal policy of the state is an endogenous part of this system.

Finally, with respect to the monetary market, a reduced form of equilibrium is estimated, in which the government bond yield is explained by the US interest rate for government bonds and the German Central Bank base rate. The latter is determined as a policy rule by the rate of inflation.

The model has a highly interdependent structure. Apart from the regular interdependencies of the economic cycle, the interdependencies of prices and volumes as well as those of prices and wages are represented.

The specification of the econometric founded simulation and forecasting model is a quite time consuming iterative multistage process (Meyer et al. 2007, 41) and goes in a way as it is mentioned briefly by Dixon (2006, 21) to more econometrically founded CGE-models. In a first step the parameters of the behavioral equations were estimated using the robust OLS procedure for the estimation period 1991 to 2005. With respect to the size of the model, more sophisticated estimation methods are not possible anyway. Due to German reunification, data before the year 1991 cannot be used. Otherwise there would be a grave structural break in the data base which also makes the application of more sophisticated estimation methods problematic. In a next step the selection of alternative regressions is based on a plausibility check, theoretical a priori information regarding the preceding sign and magnitudes of the coefficients. In other words, economically implausible estimates were taken out. The remaining estimations were tested for autocorrelation of the residual values using the Durbin-Watson statistic and for significance of the estimated parameters using the t-test. If discrimination among the competing approaches was not possible on this basis, the estimation with the best coefficient of determination was taken. However, the specification of the model is not completed with the single equation estimate. Weaknesses in the system are revealed only when the non-linear interdependent and dynamic model is solved using an iterative

solution procedure given by the Gauss-Seidel algorithm. The solution methods must converge and the model must be able to explain the observable development of the main economy variables satisfactorily in a historical simulation. The final test for the model is the ability to forecast a plausible and robust ex-ante development for a set of key scenarios in a period of about 20 to 25 years. As long as this is not the case, the initial single equation specification phase will be repeated in an iterative process.

### **Classification of the INFORGE model**

According to the classification of West (1995) the INFORGE model is an “econometric + Input-Output model” that belongs to the family of national inter-industry models of the INFORUM family, but a Leontief-type model with constant structures is not given. The INFORGE model represents a logical development of the simple Leontief model insofar as the sectoral Input-Output variables are calculated in a complex and simultaneous dual quantity and price modeling framework. In this context all technological coefficients are dealt with as variables, which are changed by the cost-push induced technical progress. The sectoral Input-Output results are consolidated via explicit aggregation to form macroeconomic variables. Besides, these aggregate variables are consistently assigned to the relevant macroeconomic variables in the sequence of accounts and balancing items of the SNA within the modeling framework.

While the Input-Output approach is commonly classified as demand oriented, this is not the case for INFORGE (Meyer et al. 2007, 41). It is true that the demand determines production in the INFORGE model, but all demand variables depend among other things on relative prices. The latter are determined by the unit costs of the industries in the form of a mark-up pricing hypothesis, which is typical for oligopolistic markets. Obviously, the difference between neoclassical CGE models and INFORGE is the assumed market structure and not in the accentuation of either side of the market (West 1995, 216). Consumers react on price signals with their decisions, which then determine the production. Supply and demand elements are thus equally present.

The INFORGE model is non-linear, because there are many multiplicative linkages of variables in definitional as well as many behavioral equations estimated in double-logarithms. Besides, the model is dynamic due to capital stock adjustments and the lags in behavioral equations. The modeling scope of the INFORGE simulation and forecasting model closely resembles the neoclassical CGE approach described by Dwyer et al. (2006). The general

structure of the model is similar in a sense that there is a system of non-linear price dependent factor demand and consumption functions. Due to the fact that bounded rationality on imperfect markets is assumed, these functions cannot be explicitly derived from neoclassical production functions and utility functions. There are alternative plausible decision-making routines and the specification of the model can only be done by empirical selection, which needs econometric testing.

## **References for the model**

Over the last decade, the INFORGE model has constantly become updated and further developed every year. It has been used to analyze economic issues in a wide range of fields.

Thus, the INFORGE model was used by the German Institute for Labor Market Research of the German Federal Employment Agency, among others, to formulate responses to employment policy issues (e.g. Distelkamp et al. 2003; Meyer et al. 2007; Ahlert et al. 2009). Furthermore, the INFORGE model was used in studies for various German Federal Ministries in order to complement the direct macroeconomic significance of a cross-section activity (e.g. environment, sports) calculated within a satellite accounting framework by adding policy simulations to estimate the net-economy wide impacts of policy changes (e.g. Lutz et al. 2005; Ahlert 2000, 2008).

## **4.4 Net-impacts of hosting the FIFA World Cup**

The expenditure vector of foreign World Cup visitors as shown in Table 3 has been consistently integrated into the INFORGE model within the module on domestic household consumption with regard to purchases on the domestic territory by non-residents. The increase in economic performance takes place against the background of complex sectoral and macroeconomic adjustment mechanisms which can be reproduced in the context of the INFORGE simulation and forecast model used here. The following table 4 gives an overview concerning the overall net impact due to the primary consumption stimulus of foreign World Cup visitors for the years 2006 and 2007.

Initially the primary consumption stimulus of 2.8 billion Euros has stimulated direct production effects within the directly affected industries (e.g. accommodation services, catering services, transportation services) as well as indirect production effects resulting from the additional needed intermediate consumption in other industries (e.g. laundry services,

food products, energy). Furthermore, the increased macroeconomic demand for goods within the national economy stimulates additional wage and profit revenues as well as employment and slight price effects due to changes of the unit costs in the affected industries via the production effects. The rise of income leads to additional consumption and the rise of gross production positively influences the development of gross capital formation. Price-wage and price-volume interdependencies go slightly against the expansive production and circular-flow-effects. The expansive cyclical effects as well as the changes of relative prices have influenced the entire national economy. As a result of the increased domestic demand and price-level the imports have grown, too. However, the rise in gross production leads not only to higher wages and profit income and thus to an increase in the disposable income of private households, but also to a general growth in government revenues due to ascending tax revenues.

**Tab. 4: The overall impact of staging the football World Cup Germany 2006**

	<b>2006</b>	<b>2007</b>	<b>TOTAL</b>
	<i>Mio. Euros</i>		
<b>Gross Domestic Product</b>	3 231	574	3 805
- Final consumption expenditure	3 827	621	4 448
- Gross capital formation	324	128	452
- Exports	311	91	424
- Imports	1 232	265	1 497
<b>Output</b>	5 916	987	6 903
<b>Tax revenue</b>	1 002	228	1 230
	<i>jobs in full time equivalents</i>		
<b>Employment</b>	34 762	820	35 582

Source: Preuss et al. (2009, 224)

In 2006 the overall impact on the GDP of Germany was 3.2 billion Euros and equals 0.13% of the GDP in 2006. This increase of GDP went along with additional production to an amount of more than 5.9 billion Euros generating more than 34,000 jobs (measured in full-time equivalents). The supplier of services (trade, transportation, accommodation, catering, and business activities) and the manufacture of food products and beverages have been the major beneficiaries of this positive employment impact. The German government benefited by more than 1 billion Euros from additional tax revenues in 2006.

## 5 Concluding remarks

This paper explains the experiences in estimating the macroeconomic impact of hosting the FIFA Football World Cup Germany 2006. Obviously the insufficient information on foreign World Cup visitor expenditure significantly influences the quality of the impact assessment within pre-event studies. This weakness has been overcome within the official ex-post study by conducting a very large sample survey at foreign World Cup visitors concerning their specific consumption pattern. The collected primary stimulus vector on foreign World Cup visitor expenditure has been consistently implemented within the German INFORGE model. This economic Input-Output based macro-econometric model has been used for the measurement of the net economic impact. With regard to the empirical results the following findings can be summarized:

1. The measurement of the primary stimulus is very complex and has to avoid counting things double but also to consider crowding-out effects. However, a top-down measurement is not possible due to the white noise not allowing to measure such generally small effects on various single industries nor can top-down get any insights on jobs created or additional taxes earned from the event.
2. The evaluation of the primary stimulus is the beginning of the study. Indirect and induced effects can only be measured by state-of-the-art models such as the presented INFORGE model for the German economy.
3. Each mega event and each location (region) creates a different consumption vector. Therefore, it is not clear ex-ante whether an event vector will have a weaker or stronger impact on the local economy than the opportunity investment of the money into another industry.
4. The impact of a mega event such as the football World Cup is immense for a region and city but very small for a national economy. It is a rumor that mega events are a panacea for economic growth at national economy level.

Consequently, a football World Cup may be perceived primarily as a public investment in the national image and, thereby, be used as a signaling tool for the host as a business location and tourism destination aiming at the reduction of informational deficiencies with regard to potential investors (Ahlert 2006b; Kurscheidt 2007). However, then the here measured economic impact which is closely and directly related to the World Cup is rather a side effect than the very goal, however it is a legitimacy for public subsidies.

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