The impact of the 2004 Olympic Games

on the Greek economy

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FOREWORD

Without a doubt, the 2004 Olympic Games in Athens and in the other four Olympic cities had a multiple impact on the Greek economy, on many levels and at various time periods. Nevertheless, despite the significance of the hosting of the Games, there has not been a thorough, scientific investigation of their total impact on the economy. This has resulted in the circulation of contradicting views, often not supported by sufficient evidence. The positive assessment of the Games is overshadowed by the perception that the fiscal problems of recent years are associated with the hosting of the Games. In addition, quite a few of the Olympic installations have not been adequately utilised, which is considered as an indication of the opportunities that the Games undoubtedly created, yet remained unexploited.

With the completion of ten years from the Olympic Games of 2004, this study attempts to contribute to the filling of the gaps. The elapsed time period provides data for an in-depth evaluation and assessment of the impact of the Games on the Greek economy, both during the preparation of the Games, and over the long term.

The objective evaluation of the economic impact of the Games, backed with sufficient scientific evidence, will further the understanding of the good practices, but also the lost opportunities, connected with the Games. The sober understanding of the country's experience with the Olympic Games could become a source of lessons on how the country can achieve significant national goals, but also on how to avoid losing significant opportunities that arise along the way.

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Acronyms and Abbreviations

AMECO	Annual Macro-Economic Database, European Commission
ATHOC	Organising Committee of the Olympic Games ATHENS 2004 S.A.
CES	Constant Elasticity of Substitution
DESOP	Inter-ministerial Committee for the Coordination of Olympic Preparation
ECM	Error-Correction Model
ELSTAT	Hellenic Statistical Authority
ESA	European System of Accounts
ETAD	Hellenic Public Properties Company
ETHEL	Thermal Bus Company
EU	European Union
FIFA	Fédération Internationale de Football Association
GDP	Gross Domestic Product
GIMF	Global Integrated Monetary and Fiscal Model
GSIS	General Secretary for Information Systems, Ministry of Finance
ILPAP	Electric Buses of Athens & Piraeus Area
IMF	International Monetary Fund
IOBE	Foundation for Economic & Industrial Research
IOC	International Olympic Committee
IP	Intellectual Property
ISAP	Athens–Piraeus Electric Railways
NAWRU	Non-Accelerating Wage Rate of Unemployment
NOC	National Olympic Committee
OAKA	Olympic Athletic Center of Athens "Spiros Louis"
OCOG	Organising Committee of the Olympic Games
OECD	Organisation for Economic Co-operation and Development
OEK	Worker's Housing Organisation
OKE	Economic and Social Council of Greece
PIP	Public Investment Programme
SEF	Peace and Friendship Stadium
UEFA	Union of European Football Associations
VAT	Value-Added Tax
YPEHODE	Ministry for the Environment, Physical Planning and Public Works

1   INTRODUCTION

Staging the 2004 Olympic Games in Greece, the birthplace of the Olympics, and earning global acclaim for successfully carrying out the event, were significant achievements for the country. The efforts of the management and the employees of the Organising Committee of the Athens 2004 Olympic Games were crucial for this success, as were the efforts of the officers and staff of the Civil Service and of the private sector companies involved in building the supporting infrastructure, along with the valuable assistance offered by 45,000 volunteers during the Games.

The Olympic Games influenced the Greek economy in a number of ways. Building the sporting facilities and the infrastructure necessary for the Games generated economic activity on a broad scale. In addition, major infrastructure projects that had started prior to the nomination of Athens to stage the Games were accelerated and were completed in time for the Games. Building this infrastructure, apart from boosting economic activity, yielded benefits for the everyday life of the residents of Athens and of the other cities where the 2004 Games took place. On many occasions, public administration agencies became faster and more efficient in carrying out their tasks, under the pressure to finish complex projects with strict deadlines. Modern and efficient management methods were applied in many departments of the Civil Service and in public enterprises involved in preparations for the Games. However, in many cases these efficiency improvements faded away after the Games.

Athens attracted great publicity, as the city hosting the Games, which improved the image of Greece abroad. This had beneficial effects on a number of economic sectors and consequently it had a positive impact on national output and employment. Tourism, for instance, benefited greatly from the improved image of the country, as well as from improvements in transportation and accommodation infrastructure.

Apart from benefits regarding the economy and the country's image abroad, the 2004 Olympic Games had a positive impact on many other aspects of everyday life in the country. For example, the public transport fleet in Athens was modernised, healthcare facilities in the capital and in other cities were renovated and upgraded, while tourism and culture infrastructure also improved. With the Olympic and Paralympic Games, the access of people with impairments to sport facilities, public transport and hotels improved significantly. The number of rooms suitable for use by disabled people increased as well. The capital's residents were remarkably accommodative to the needs of the Games, while Greeks were

keen to assist in carrying out the event as volunteers. Unfortunately, some of these positive effects also faded away after the Games.

A number of publications have examined the history of the preparation for the Games (Telloglou 2004, Bakouris 2014). However, until now the overall impact of the Games on the Greek economy has not been studied in detail. Indeed, conflicting views on the overall impact of the Games have appeared in the public discourse, often not properly substantiated. A widespread view is that the cost of the Games was excessive. This assessment, however, is usually not supported by a comprehensive evaluation of the overall cost of the Games, or by an account of the structure of that cost, while it usually ignores the revenues from the Games and the event's indirect beneficial effects.

It is true that many sporting facilities built for the Games have subsequently remained largely idle. Indeed, many such facilities are now completely abandoned. Furthermore, perhaps Greece did not take full advantage of the opportunities that sprung from the positive image of the country abroad, after successfully staging the Games. In addition, some commentators have attributed Greece's fiscal troubles of the past few years in part to the expenses for preparing and staging the 2004 Olympics.

At any rate, a thorough examination of the economic impact of the 2004 Olympics is particularly important, as the effects of such a major event are relatively more significant for a small country, like Greece, than they are for larger ones, such as the other countries that have recently hosted summer Olympics (e.g. South Korea, Spain, the United States, Australia, China, or the United Kingdom).

This study aspires to provide a thorough and dispassionate assessment of the overall impact of the Games on the Greek economy in the long run, on the basis of evidence and good scientific practice. The analysis includes an assessment of the total expenditure for the Games, as well as an assessment of the impact of the event on a number of areas, such as on investments before the Games, on tourism during the Games and on public finances and other aspects of the economy after the Games.

The study examines the cost of building infrastructure for the Games and the cost of staging the event, along with the benefits from the Games, including increased public revenue and the boost in economic activity resulting from building infrastructure for the event. The study also estimates the potential benefit lost by not making full use of Olympic sporting facilities after the Games. Moreover, the study discusses how the Greek economy would have

developed, had the Olympic Games not taken place in Greece, examining a number of alternative scenaria. On the basis of these considerations, the study performs an assessment of the overall impact of the 2004 Olympic Games on the Greek economy.

A decade after the 2004 Olympics, it is now possible to perform a thorough and objective investigation of the impact of the event. This time period provides the necessary data for a comprehensive evaluation of the significance of the Games for Greece and for an accurate assessment of the impact of the event on the Greek economy in the near term, as well as in the medium and long term.

This study was conducted in the period from July until December 2014. In conducting the study, IOBE benefited from valuable information and feedback provided by individuals who played significant roles in all phases of the process of staging the 2004 Olympics, from preparing the bid for the Games, to managing the Olympic facilities long after the event.

The study is structured as follows:

The second chapter presents a review of the international literature on the economic impact of Olympic Games. In particular, it presents accounts of the economic impact of Olympic Games staged in a number of cities over the past few decades, which include estimates of the gross expenditure for each of these events, as well as estimates of the overall effect of each event on the local economy of the host city and on the national economy of the host country. The third chapter presents financial and fiscal data regarding the 2004 Olympics. The fourth chapter investigates the economic impact of the global publicity that Greece attracted in staging the 2004 Games, using econometric techniques. The fifth chapter examines the overall effect of the Games on the Greek economy, using macroeconomic models to analyse the broader economic impact of the Games and examining a number of alternative sets of assumptions. The key findings of the study are outlined in the last chapter.

2   THE ECONOMIC IMPACT OF RECENT SUMMER OLYMPIC GAMES

The Olympic Games are a global sport event that promotes the hosting city and country. Staging the Olympic Games demands long-term preparation and planning, and requires efficient cooperation and significant managerial skills by all stakeholders involved.

The preparation for staging Olympic Games begins with filing an application/bid to the International Olympic Committee (Figure 2.1), nearly a decade before the Games take place. The application includes detailed planning for the construction of the necessary infrastructure, ex-ante economic impact studies, thorough estimates of the associated costs and other information regarding the candidate city.

Figure 2.1: Stages of organising the Olympic Games
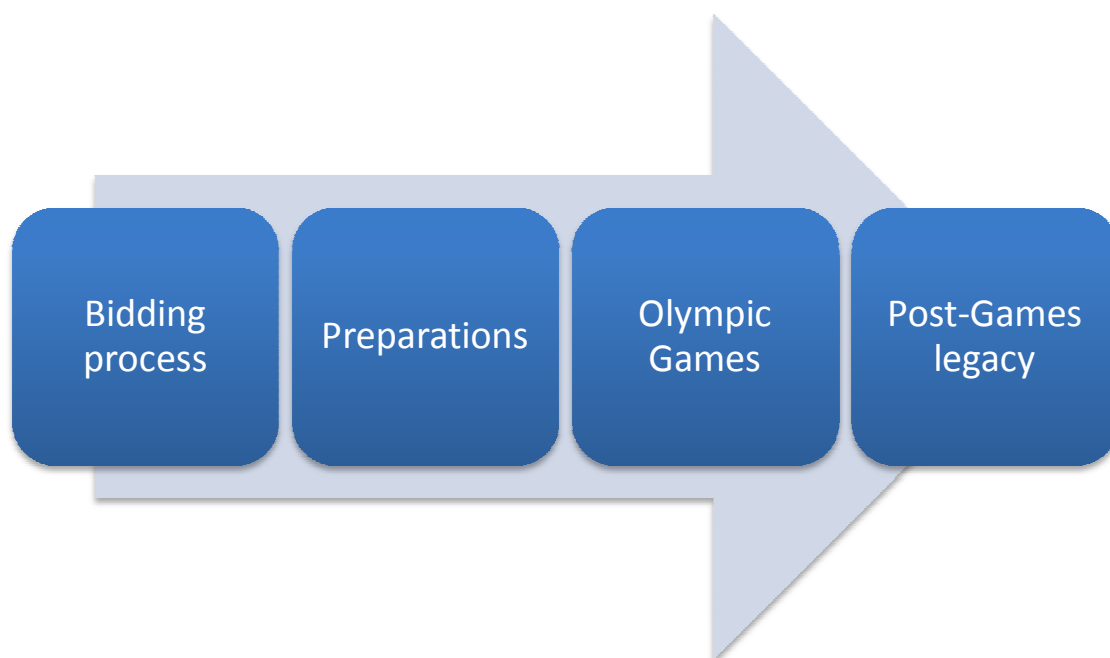
The cost involved in preparing a city's bid for the Games can exceed 20 million dollars (Figure 2.2). This is a rather significant cost to take part in a process, the outcome of which is, of course, uncertain. Moreover, a city that has filed a bid to stage Olympic Games and has failed, often files a bid to stage Olympics again (Brad R. Humphreys, "Rings of Gold," Foreign Policy, August 2008). For instance, Rio de Janeiro and Tokyo had each applied more than once to stage Olympic Games, before being nominated to host the 2016 and 2020 Olympics respectively.

Figure 2.2: Cost of preparing a bid to host the 2016 Olympic Games

in mil. dollars
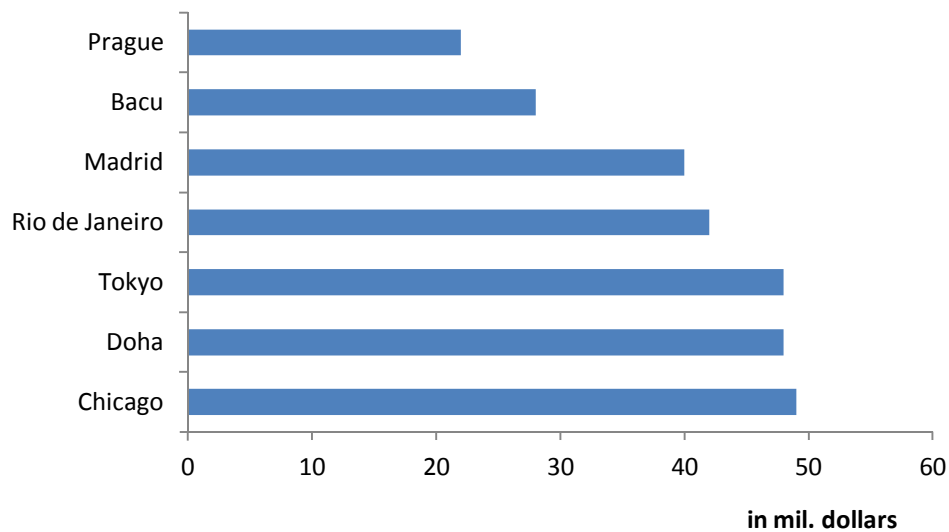
Source: Humphreys (2008)

The nomination of the host city (and country) is followed by a seven-year preparation period, during which the International Olympic Committee, the owner of the copyrights for the Olympic Games, conducts frequent checks. The nominated city conducts preparations for the proper organisation of the event, which involves hosting and supporting thousands of athletes, journalists and visitors. These preparations include building the necessary infrastructure, as well as carrying out global promotion campaigns for the event. As a result, host countries benefit from a boost in economic activity, not only in the preparation period, but also after the Games.

Staging the Olympic Games affects the economy of the host country long after the event ends. In the post-Olympic period the host country makes use of the infrastructure built for the Games and benefits from the publicity attracted during the event as well as from the experience and know-how acquired in preparing and staging the event. These factors are often referred to as the Olympic legacy and are major components of the overall economic and social impact of the Games on the host country.

This chapter presents a review of the international literature on the economic impact of staging Olympic Games. The studies discussed in the following sections examine the economic effects of preparing for and staging Olympic Games, as well as the effects of the managing the Olympic legacy. We focus on studies examining summer Olympics, to facilitate comparison with the results, regarding the 2004 summer Olympics in Athens. Winter

Olympic Games require fewer sporting facilities and are far less popular than summer Olympics. Therefore, preparing for winter Olympics has much smaller effects on a host city than preparing for summer Olympics, while the publicity summer Olympics attract, and the consequent economic benefit, is far greater than in the case of winter Olympic Games.

Different studies use different methodologies to estimate the economic impact of summer Olympic Games. Consequently, one cannot draw general conclusions on the typical economic effect of summer Olympics. In addition, some studies do not examine all the aspects of the long-term effects of staging summer Olympics, rather focusing on the impact of the preparations for staging the Games. Moreover, in some cases there are no reliable data that researchers could use to assess the impact of an event. For instance, the official financial data for the 2008 Olympics in Beijing are significantly different than what independent research suggests.

Summer Olympic Games can have a remarkable impact on the economy of the host city. Nevertheless, the extent to which staging Olympic Games affects local economies depends on a number of factors. Consequently, recently held summer Olympics have affected the economies of host cities in different ways. In the following sections we discuss the findings of studies on the economic impact of recent summer Olympic Games.

2.1   Barcelona Summer Olympic Games, 1992

Barcelona applied for staging the 1992 summer Olympics in October 1986. Hosting the Games was a great opportunity to promote Spain, shortly after the country had joined the European Economic Community. Barcelona's bid for the Olympics included ambitious plans for infrastructure projects to transform a declining industrial city to a modern urban centre (Alpha Bank, 2004). Hosting the Olympic Games was an excelent opportunity to reinvigorate the local economy and the city.

The gross cost[1] of the Barcelona Olympic Games was $9.3 billion (around €7.4 billion[2]). About $1.3 billion was spent for staging the opening and closing ceremonies, for advertising the Games and for services provided to athletes and other guests. The remaining $8 billion was spent primarily on infrastructure projects, such as roads, hotels, sports facilities, environmental protection projects, telecommunications and other projects (Brunet, 1995).

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[1] Gross cost includes the expenses for preparing and staging the Games, without deducing any income generated from the Games (i.e. tickets, TV rights, boost in tourism etc.).
[2] $1=€0.799

More than 36.8% of those expenses were sourced by private funds, almost a third of which came from foreign investors (Flyvbjerg & Stewart, 2012).

Direct investment between 1986 and 1992 amounted to $2.5 billion, higher than the investment expenditure for any preceding Olympic Games. The indirect, induced impact of the Barcelona Olympic Games on the Spanish GDP is estimated at $16.6 billion (Alpha Bank, 2004), using macroeconomic multipliers derived from the quantification of the interactions between the Spanish economic sectors. Therefore, the overall impact (direct and induced) of the Barcelona Olympics is estimated at around $26.0 billion for the period 1986-1992.

Regarding public finances, the increase in VAT revenue during the period of preparations for the Games is estimated to more than $1.1 billion, while the savings from reduced payments for unemployment benefits – due to the boost in employment while preparing for the Games - were estimated at $1.6 billion. The increase in direct tax revenue (increase in revenue from income taxes and social security contributions, as a result of the boost in economic activity) was estimated at $3.9 billion. In total, preparing for the Barcelona Olympics and staging the event, increased public revenue by approx. $6.6 billion. Moreover, public revenue in the years after the Barcelona Olympics is estimated to have increased by $190.2 million, as a result of hosting the Games, at least for the first five years after the event (Brunet, 1995).

During the preparation period, the revenues of the Barcelona municipality increased by $15.2 billion as a result of the boost in economic activity, while municipal revenue from property taxes increased by $22.8 million. Moreover, municipal revenue after the Games is estimated to have increased by $19.0 million annually, as a result of hosting the event.

Boosted economic activity increased employment in the host city and country. Between 1986 and 1992, unemployment in Barcelona was lower by almost 5 percentage points, compared to the period before 1986. Over 210,000 jobs are estimated to have been created in total during that period. The unemployment rate in Spain contracted to 17% in 1992, three percentage points lower than in 1986. The indirect impact of the preparations for the Games on employment was estimated at around 144,000 jobs during the period 1986-1992. The overall impact (direct and indirect) of the 1992 Olympics on employment is estimated at approximately 354,000 jobs (Brunet, 1995).

The Barcelona Olympics is a great example of how a mega-event can help a city overcome stagnation and turn to growth. Indeed, Barcelona is a benchmark case: the 1992 Olympics

were probably the Games with the greatest impact on the host city's economy after the event, and particularly on tourism.

The significant investment in infrastructure (transportation, hotels) and a comprehensive management plan for the post-Olympic period contributed to making Barcelona one of the top tourist attractions in the world. After the Games, Barcelona had 35% more hotel beds than before. The occupancy rate of the city's hotels increased from 70% to more than 80% after the Games, and remained at that level for several years after the event. The number of conferences and business events held in the city in the years after the Olympics increased more than fourfold, compared with 1992.

Tourist arrivals in Barcelona reached 20.7 million in 2001, while in 1992, when the Games were staged, no more than 10.0 million visitors had arrived in the city. Nine years after the Games, the total number of nights spent in Barcelona doubled, exceeding 8 million. Through staging the 1992 Olympic Games, Barcelona emerged as a major tourist destination, and still maintains that status (Preuss, 2004).

2.2   Atlanta Summer Olympic Games, 1996

Atlanta, the capital of the State of Georgia in the United States, was nominated as the host city for the 1996 Olympic Games in September, 1990. At that time, the economy of the State of Georgia, and the US economy in general, were in recession, which lasted until 1992 (Baade & Matheson, 2003).

The cost of the Games was covered mainly by private funds. Estimates for the gross cost of the event range from $1.6 to 2.2 billion (€1.3 to €1.8 billion)[3]. The cost for the Atlanta Olympics was among the lowest in the history of summer Olympics (at purchasing power parity). This is commonly attributed to the fact that the Atlanta Games were, for the most part, privately funded (Preuss, The Economics of Staging the Olympics, 2004). Nonetheless, the Atlanta Games recorded a cost overrun of 147% (Flyvbjerg & Stewart, 2012). It should be noted, however, that the Games took place in a developed US state, where most of the infrastructure necessary for the event had already been in place before Atlanta was nominated as a host city.

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[3] $1=€0.800441

Almost $1.0 billion was spent on the construction of athletic venues, with the rest of the cost being mainly the expenses of the Olympic Committee. State funds (approx. $354 million) were used for the construction of the Olympic Rowing Centre. Few facilities were constructed from scratch for the Atlanta Olympics. In most cases, existing infrastructure was refurbished and upgraded, thus avoiding the construction of new facilities and keeping costs low. Moreover, some sports were hosted in temporary facilities, with low construction cost, which were disassembled after the Games.

The financial balance of the Atlanta Organising Committee is positive, even when the broader economic impact of the event is not taken into account. Total revenues are estimated at around $1.7 - $2.0 billion, about $300 - $500 million more than the expenses of the Committee. Most of the revenues came from sponsorships (32%) and ticket sales (23%). Revenues from television broadcasting rights exceeded $700 million, slightly higher than in previous Olympics (Preuss, The Economic Dimension of the Olympic Games, 2010).

Figure 2.3: Revenues of the Organising Committee, Atlanta 1996
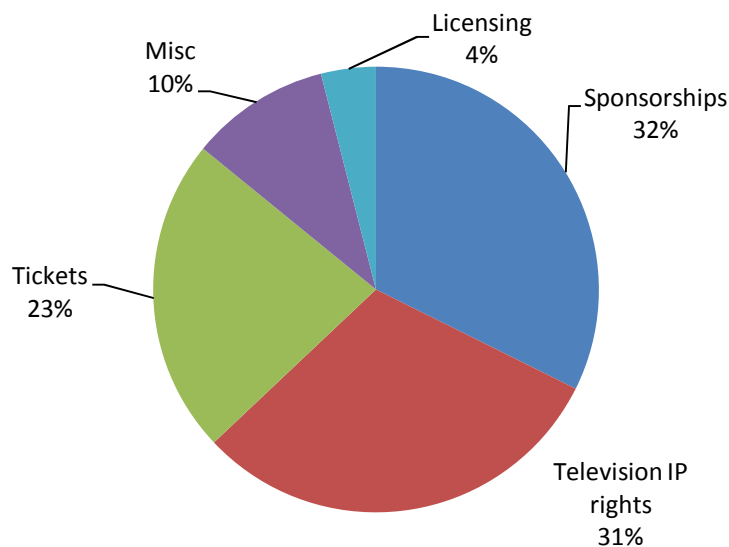
Source: Preuss, The Economics of Staging the Olympics, (2004)

In the period before the Games, as well as during the event, unemployment in Atlanta was already very low. As a result, the Atlanta Olympics did not significantly affect local employment. The additional demand for labour the Games created was covered by workers from other states (Matheson & Baade, 2004). Most of the jobs created for the Games were temporary. In contrast to other summer Olympics (such as the Games in Barcelona), the Atlanta Games had a limited impact on employment after the event.

On the other hand, the preparations for the Atlanta Olympics had some negative social effects. Public shelters were demolished to allow the construction of athletic venues. As a result, more than 15,000 residents of such buildings were evicted. Some shelters for homeless people were converted to low budget hotels for visitors during the Games (indeed using subsidies from public funds - Malfas, Theodoraki, & Houlihan, 2004). Public funds of almost $350 million, initially earmarked for low income families and homeless people, were eventually used in the preparations for the Games. In fact, this was almost the entire contribution of the public sector to the Games.

The overall impact of the event on tourism, both during and after the Games, has been under question, despite the two million tourists reported to have visited the city during the Games (Preuss, The Economics of Staging the Olympics, 2004). The number of the available hotel beds grew by 9.1% against the years prior to the Games, however the occupancy rates of the hotels contracted to 68% in 1996, compared with 1995 (72.9%).

The Atlanta Games have arguably caused some crowding-out effects regarding tourism. In the period from 1995 to 1996, the number of conferences held in Atlanta decreased by almost 10%. Moreover, tourism in the State of Georgia contracted significantly in that period. Nevertheless, the turnover of the hotels near the Olympic Park increased, which suggests higher prices for accommodation (Baade & Matheson, 2003).

2.3   Sydney Summer Olympic Games, 2000

Sydney was nominated as the host city of the 2000 Olympic Games in 1993. The city's nomination was followed by a significant effort to build the necessary infrastructure for the Games. The gross cost of the Games reached $4.8 billion (approx. €3.8 billion[4]), almost double the initial cost estimates. About 35% of this cost was funded by the State.

The greatest part of the cost was expenses for the construction of new infrastructure and athletic venues, as well as for the renovation and expansion of existing infrastructure (such as the Sydney international airport) and for the modernisation of public transportation networks. New hotels were built, increasing the number of available beds by 25%. Only a small part of the constructions built for the Games were temporary structures. Instead, the organisers of the Sydney Olympics favoured the construction of permanent infrastructure, anticipating beneficiary effects on the local economy in the years after the Olympic Games.

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[4] $1=€0.800632

Regarding the revenues of the Organising Committee, revenues from television broadcasting rights were high, exceeding $1.1 billion, as were revenues from tickets sales (more than 91% of the tickets issued were sold - Figure 2.4).

Figure 2.4: Sydney 2000, Revenues of the Organising Committee
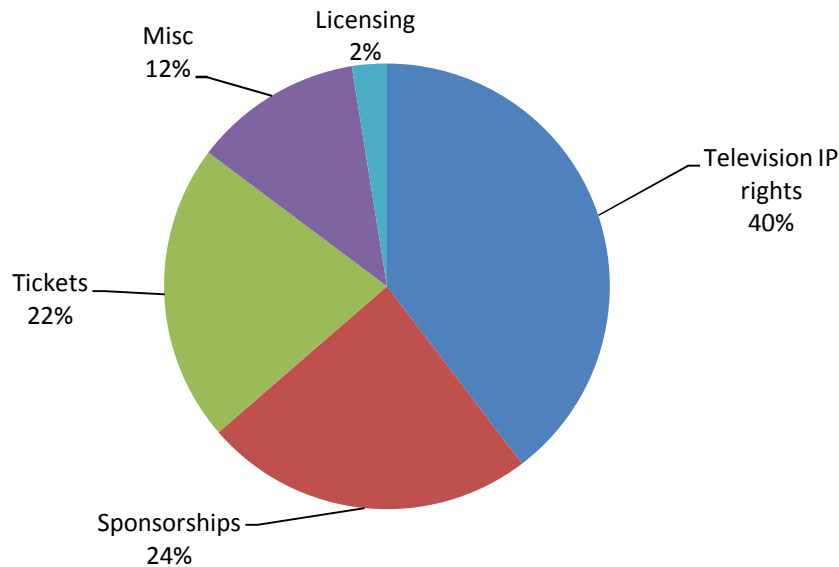
Source: Preuss, The Economics of Staging the Olympics, (2004)

The impact of the Sydney Olympics on GDP is estimated at $6.2 – $8.0 billion, without taking into account the long-term benefits to the economy from boosted tourism. Over the period of the preparations for the Games, the growth of private consumption slowed down. However this effect was counterbalanced by an increase in government spending. The preparations for the Games, as well as the staging of the event, boosted demand for products and services, thus increasing the turnover of the economy by an estimated $3 billion.

The Sydney Olympics also had significant effects on employment. Ex-ante studies on the potential economic impact of the Games had projected that the Sydney Olympics would boost employment by about 100,000 new jobs across the Australian economy (Preuss, The Economics of Staging the Olympics, 2004). However, ex-post studies estimate that hosting the 2000 Olympics led to the creation of at least 120,000 new jobs between 1995 and 2000, about 40,000 of which were in construction (European Institute for Construction Labour Research, 2011). Yet, according to other sources, hosting the Games generated 85,000 new jobs in Australia between 1996 and 2000 (Madden, 2002). Remarkably, most of these new jobs were maintained over the medium and long term.

The primary goal of the organisers of the Sydney Olympics was to stimulate tourism, by promoting Sydney and Australia as tourist destinations. The Australian Tourist Commission, an agency of the Australian government, designed and implemented a four-year action plan to make the most of the potential for tourism growth after the Olympics. Indeed, Australia enjoyed a remarkable growth in tourism after the Games.

According to the Australian Bureau of Statistics, during the period of the preparations for the Games the number of visitors to Sydney was growing by an average annual rate of 7.0%. In 2000, when the Games were staged, Sydney had 8.7% more visitors than in the previous year. It should be noted that throughout the period of the preparations for the Games, as well as during the event, tourist arrivals from Asian countries (such as Thailand, South Korea, the Philippines, Japan and others) were very low, mostly as a result of the economic downturn in these countries at the time. It has been estimated that, if it weren't for the economic downturn in Asia, the average annual increase of visitors to Sydney during that period would have been around 12% (Preuss, The Economics of Staging the Olympics, 2004).

According to the official data published by the Australian Tourist Commission, tourist arrivals continued to increase in the months after the Olympics. In the last quarter of 2000, tourist arrivals were 15.0% higher than in the corresponding period of 1999 (Woodward, 2001). It is estimated that Sydney attracted a total of 1.6 million more visitors because of the Games. These visitors spent more than $3.5 billion during their stay.[5] Moreover, the publicity Sydney attracted during the Games significantly boosted the city's business profile. However, during the Games conference tourism in Sydney significantly declined, most likely as a result of the "crowding-out effect". Nevertheless, conference tourism in the city recovered after the Games (Preuss, The Economics of Staging the Olympics, 2004).

2.4   Beijing Summer Olympic Games, 2008

In 2001 Beijing was selected to host the 2008 Olympic Games. The organisers' main goal in hosting the Games was to promote China as a tourist destination (Minnaert, 2012). The decision to have the 2008 Olympics staged in Beijing attracted much criticism at the time. Social inequality and widespread poverty in China gave rise to ethical questions, regarding the opportunity cost of Beijing hosting the Olympics. Remarkably, the cost of the opening ceremony alone was about $100 million, while at the time about 100 million Chinese people lived on less than $1 a day (Rose & Spiegel, 2009). On the other hand, some commentators

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[5] Australian Tourist Commission (2001)

suggested that staging the Olympics in Beijing, apart from yielding significant social benefits, would stimulate tourism, investment and private consumption, thus helping improve the standard of living of the Chinese population (Martin, 2008).

The impact of the 2008 Olympics on the Chinese economy was bound to be small. With the Chinese GDP at around $3.6 trillion in the period before the Games and annual growth rates exceeding 10%, the economic impact of the Games would inevitably be limited. In particular, hosting the Games was not expected to have a significant impact on Chinese construction, a sector that is usually boosted in the period of the preparations for the Olympics, as construction output in China was more than $388 billion in the second half of 2008.

Assessing the impact of the Beijing Olympics on employment is difficult. At the time, employment in China was high and rising, because the economy was growing fast. Therefore, it is not easy to accurately estimate how many new jobs were the result of preparing for, and staging, the Olympics. Nevertheless, the preparations for the Games involved considerable investments, which boosted employment mainly in construction and services.

Estimates of the gross cost of hosting the 2008 Olympic Games vary significantly. According to the Organising Committee for the 2008 Olympics, the cost of the Beijing Games was "… *nearly that of the Athens 2004 Games".* The cost of building athletic venues and other facilities required for staging the Games (e.g. the media village) is estimated at around $2.1 billion. According to ex-ante estimates, the total cost of the Beijing Games, including the cost of facilities required for the Games and the cost of building and upgrading infrastructure to support staging the Games (e.g. upgrading transport networks, including road construction works and works in the Beijing airport, expenses related to protecting the environment etc.), would be about $14.3 billion – or €11.3 billion (Owen, 2005). However, the actual cost of staging the Olympic Games usually exceeds initial forecasts. Thus, the actual cost of the Beijing Olympics was probably higher than $14.3 billion.

Revenues from television broadcasting rights were significantly higher in the Beijing Games, than in previous Olympics, making up 41% of the Organising Committee's total revenues. On the other hand, the share of ticket sales in total revenues was notably small in the Beijing Olympics (3%), probably because ticket prices were much lower than in previous Olympics.

Almost 4.5 million tourists were expected to visit Beijing during the Games, including about 550,000 foreign visitors. These Chinese and foreign visitors were expected to spend about

$4.5 billion during their stay in the city. Such expectations led to the construction of new hotels. By the summer of 2008, hotel capacity in Beijing was 38% higher than in 2000.

However, tourist arrivals during the Beijing Games were significantly fewer than anticipated. About 3.9 million tourists are estimated to have visited Beijing, including about 390,000 foreign visitors (European Tour Operators Association, 2009). According to China's National Bureau of Statistics, foreign tourist arrivals in Beijing increased in 2008, yet at half the rate they had increased in 2007. Meanwhile, Chinese tourist arrivals in Beijing decreased by 1.5%. Moreover, the statistics of tourist arrivals in Beijing suggest that the 2008 Olympics did not have any significant long-term effect on tourism in the city.

Figure 2.5: Beijing 2008, Revenues of the Organising Committee
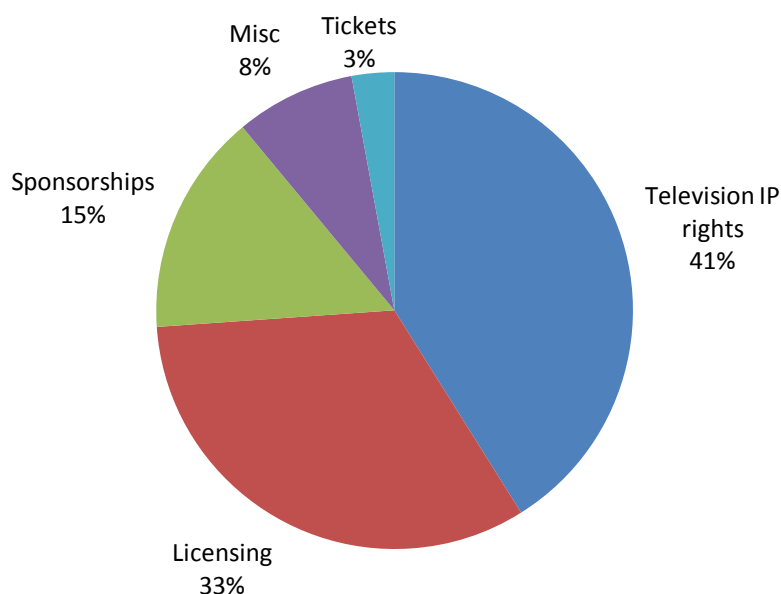
Source: Brunnet & Xinwen (2008)

2.5   London, Summer Olympic Games, 2012

London was selected as the host city of the 2012 Olympic Games in 2005, just a few years before the recent global economic crisis. In the period before the Games, the United Kingdom was implementing a broad programme of fiscal consolidation, aiming to reduce the deficit of the government budget. Under these circumstances, it was clear that the preparations for the Games should be carried out in a very efficient manner, minimising costs, and the organisers should make the most out of the opportunity of staging the event to maximise social and economic benefits.

Two years after the London Olympics, a number of reports have been published, regarding the cost of the Games and their economic impact. However, one should keep in mind that reports published shortly after the Olympics may not fully account for the long-term economic impact of the event.

Estimates of the cost of the London Olympics vary significantly, depending on which particular expenses are taken into account. For instance, in calculating the total cost of the Games, some studies do not take into account the expenditure for purchasing the land on which the Olympic park was built (£766 million), or the cost of some other projects related to the Olympic legacy (Hughes, 2012). Estimates on the total gross cost of the London Olympics are in the range of £8.9 billion to £11.0 billion (€11.3 - €14.0 billion),[6] about twice the cost forecasted when London bid for the Olympics (Flyvbjerg & Stewart, 2012).

In the third quarter of 2012, the British GDP is estimated to have increased by 1%, against negative growth rates in previous quarters. Almost 30% of this growth is attributed to the 2012 Olympic Games. However, there are significant indications that the Games' impact on retail trade, a sector which affects strongly the British economy, was negative (Hughes, 2012).

The impact of the Games, however, is not limited to boosting economic activity only when the event is staged. The total impact of the Games on GDP between 2005 and 2016 is expected to exceed £16.5 billion (Oxford Economics, 2012). Almost 82% of the impact of the Games comes from activities during the preparation period, mainly in the Constructions sector, while 12% of the impact stems from additional tourism. About 6% of the total impact comes from other expenses, necessary for staging the event.

The Constructions sector benefited significantly from the preparations for the Games. For the needs of the Games, 34 facilities were constructed, eight of which were permanent. The temporary facilities were decommissioned after the end of the Games, as it was decided that these facilities would not have significant contribution in the post-Olympic period. The local Olympic Committee conducted thorough studies before the construction of the Olympic facilities, in order to avoid building facilities that would damage the British economy in the long run. This long-term planning of the use of the constructed facilities is one the most significant characteristics of the London 2012 Olympic Games. It should be noted that

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[6] 31/10/2014 exchange rate, £1=€1.27369

there are plans for some of the temporary facilities used in the London Olympics to be sent to Rio de Janeiro, in order to be used again for the 2016 Games.

The impact of the London Games on tourism is also significant. According to data published by the UK Office for National Statistics, arrivals in the UK from foreign countries increased by 3 million (9%) from 2007. During the same period, the tourist expenditure per capita doubled (£1,290 from £650). The long-term effect on tourism is also expected to be significant. Tourist arrivals are expected to increase by 10.8 million in the period from 2015 to 2017, because of the London Olympics, contributing an additional £1.9 billion to the British GDP (Humphreys, August 2008).

The additional economic activity had a positive impact on employment in the UK. During the preparations for the Games, unemployment is estimated to have decreased by 1.2%, as a result of the creation of 354,000 jobs, most of which in the construction sector (78%), followed by tourism. According to other sources, 18,000 new jobs were expected to be created between 2012 and 2015, contributing significantly to the reduction of unemployment in the medium term (Hughes, 2012).

2.6   Summary

The gross cost of preparing and staging Olympic Games varies significantly, from $2 billion in Atlanta to $14 billion in Beijing (Table 2.1). The level of expenses is driven mainly by the already existing infrastructure prior to the Games, the private sector's contribution to the necessary investments and the ambition of the organisers promote the host city and improve its infrastructure.[7]

The ambition of the organisers is manifested by their preference towards permanent facilities, instead of temporary ones. The organisers of the Barcelona and Sydney Olympics invested heavily in permanent facilities. In contrast, the organisers of the London and Atlanta Games in many cases opted for temporary facilities, since they estimated that the use of these facilities after the end of the Games would be limited. Besides, most of these facilities are highly specialised with limited exploitation possibilities. Often, the maintenance costs are high and, in case that these facilities continue to be owned by the government, the

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[7] The different approaches of the organising committees towards urban and operational planning are analysed in a report of the department of Urban and Spatial Planning, University of Thessaly, 1997.

burden for the State budget in the years after the Games can be significant (Humphreys, August 2008).

The impact of the Games on tourism is also significant, due mainly to the promotion of the host city abroad. In most cases, tourism moderately increases before the Games, a result of the visits of organisers, sponsors and foreign workers (Preuss, 2004). Tourist arrivals peak during the Games. Often the impact of the additional tourist stays on the local economy is notable in many economic sectors.

The Games may lead to a significant increase of tourism over the years, as it happened in the case of the Barcelona 1992 Olympics. However, this is not often the case: tourist arrivals did not significantly increase in the case of Atlanta - neither during the Games nor in the period after the event. In some cases (e.g. London 2012) tourists visiting a city to watch the Olympics spent significantly more than the other visitors of the city.

On the other hand, even when staging the Olympics does boost tourism, there may be significant "crowding-out" effects. Higher prices, for instance, may discourage some potential visitors, as appears to have been the case in the Atlanta Olympics.

The external balance of the economy could also be affected. Staging the Olympics improves the image of the host country. This can help boost the country's exports by up to 30% (Rose & Spiegel, 2009). However, in economies with low productive capacity, a significant growth of imports could also be recorded.

Stronger investment, tourist arrivals and exports stimulate GDP and employment in the host country. The impact of the Games on GDP and employment was significant in Barcelona and in Sydney, but was rather limited in Atlanta and in Beijing.

The gross cost and the economic impact of the Olympic Games depend on the extent to which new infrastructure is necessary to support staging many athletic events simultaneously. Accommodating a significant number of additional visitors in a time span of less than a month is another great challenge. The gross cost of the Games is also affected by the ambition of the organisers to build permanent infrastructure and use it long after the Olympics, instead of temporary facilities. Part of the cost of the Games can be covered from private funds. On the other hand, when a city hosts the Olympics as part of a comprehensive strategy for urban development, the Games can have remarkably beneficial effects on the local economy.

Thus, hosting the Olympics may have a moderate cost and moderate economic impact (Atlanta), higher cost, accompanied with significant benefits for the economy (Barcelona) or high cost and an uncertain result for the economy (Beijing). Therefore, the total impact of hosting the Olympic Games cannot be judged ex-ante as necessarily positive or negative, since it strongly depends on the goals that the hosting country sets, the planning and the implementation of the construction projects and the extent to which countries take advantage of the opportunities that such mega events create in the long run.

Table 2.1: Synopsis of the chapter's findings

Event	Gross Cost	Investment in permanent infrastructure	Tourism	Employment	Impact on GDP
Barcelona 1992	$9.3 billion (€7.4 billion)	Higher investment compared with other summer Olympics (€2.5 billion)	Tourism increased during the Games and after the event - an example of successfully staging the Olympic Games.	Significant impact on employment, especially in the city of Barcelona.	The total impact (direct and induced) on Spain's GDP was estimated at $26.0 billion (the broader impact from Barcelona becoming an international tourist destination is not taken into account).
Atlanta 1996	Very low cost with low contribution of the public sector: $1.6 – $2.2 billion (€1.3 – €1.8 billion)	From private funds. Limited new constructions, mostly renovations.	Positive, but not large impact on tourism during the Games. No reference of any significant impact after the Games.	Moderate increase of employment, no impact after the Games.	Limited impact on the country's GDP, because of the size of the American economy and the weak post-Olympic effects.
Sydney 2000	$4.8 billion (€3.8 billion)	Many permanent facilities	Implementation of a comprehensive plan for tourism growth. Increase of arrivals both during and after the Games.	Around 120,000 jobs, 40,000 of which in the construction sector.	The impact on GDP was estimated at $6.2 – $8.0 billion (the broader impact from boosted tourism is not taken into account).
Beijing 2008	$14.3 billion (€11.4 billion)	Limited impact of investment on the already developed Chinese Constructions sector.	Significant number of tourists (3.9 million), lower than initially anticipated.	Impact on employment not recorded yet.	Limited impact on the country's GDP, because of the size of the Chinese economy.
London 2012	£8.9 – £11.0 billion (€11.3 – €14.0 billion)	Many temporary facilities	Higher by almost 3 million arrivals. Considerable increase of the per capita tourism receipts. Almost 10.8 million visitors are expected between 2015 and 2017.	Almost 354,000 jobs during the Games. Additionally, 18,000 jobs are expected to be maintained after the end of the Games.	Total impact on GDP is estimated at £16.5 billion, plus £1.9 billion if the long term effects from boosted tourism are taken into account.

3   OVERVIEW OF THE 2004 OLYMPIC GAMES

Athens was selected by the International Olympic Committee to host the 28th Olympic Games on September 5th of 1997 in Lausanne, where the contract between the two parties - the IOC and Athens, as the host city – was signed. In the past, Athens had unsuccessfully bidden for the Olympic Games of 1996, which coincided with the 100th anniversary of the Modern Olympics. Seven years of preparations followed the award of the Games, with the preparation effort intensifying from 2000 onwards. The preparations for the Olympics led to a substantial improvement of urban infrastructure in Athens and ultimately to the successful staging of the Olympic Games.

This chapter presents the organisational structure and operational aspects of the Games, together with an analysis of the expenditure for new infrastructure (buildings, sport facilities, other infrastructure) and of the total revenue from the Games (ticket sales, sponsorships, broadcasting rights, etc.).

3.1 Preparations for the 2004 Olympics

Hosting the 2004 Olympic Games was, for many reasons, a true challenge for the country. Greece was the smallest country, in terms of population, to have staged Olympic Games in recent history (Figure 3.1). In particular, the country's entire population is smaller than or near the population of the metropolitan areas of other cities that have hosted the Games in the recent past or will do so in the near future, such as Tokyo (36 million inhabitants), Rio de Janeiro (12 million inhabitants), Beijing (21 million inhabitants) and Seoul (26 million inhabitants).

In general, the population size of the host city has an impact on the successful staging of the Games. For instance, the small population of a host city is associated with lower utilisation of the Olympic venues during the staging of the Games (the demand for tickets comes mainly from the local residents), as well as after the Games. Meanwhile, despite the smaller population of Greece, the specifications with regard to the Olympic venues remained practically unchanged, compared with previous Olympic Games.

Additionally, the 2004 Olympic Games were the first event with such a large number of sports or spectators to be held in Greece. In contrast, other countries that in the recent past hosted the Games had the experience of organising other world-class sports events, such as the FIFA World Cup (Figure 3.2). This indicates the existence of expertise and infrastructure

(sport facilities, backup network, etc.) in these countries, in contrast to Greece that, for the first time, undertook the implementation of a project with such complexities.

Figure 3.1: Population of the countries that hosted Olympic Games recently
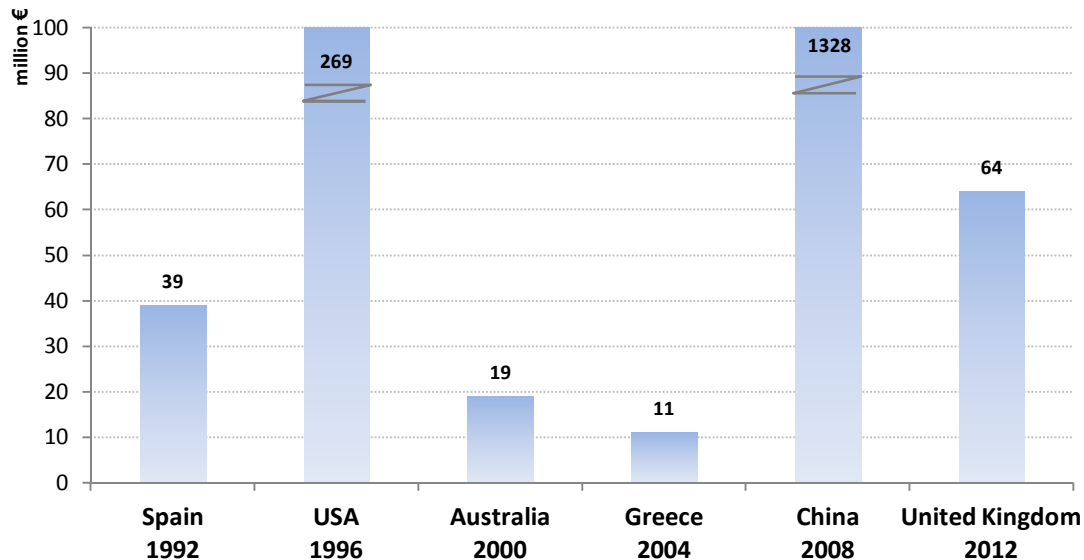
Source: Eurostat

Figure 3.2 Prior major sport events in Olympic Games host countries

Spain
- FIFA World Cup (1982)

USA
- Olympic Games (Los Angeles, 1984)
- Winter Olympic Games (New York, 1980)
- FIFA World Cup (1994)

Australia
- Olympic Games (Melbourne, 1956)
- Commonwealth Games(1982, 1990, 2006)
- Rugby World Cup (1987)
- Swimming World Cup (1991, 1998)

United Kingdom
- FIFA World Cup (1966)
- UEFA European Football Championship (1996)
- Commonwealth Games(2002)

A further difficulty sprung from the fact that, for the first time in history, the 2004 Olympic Games had to fully comply with the strict EU regulations. In contrast, the 1992 Olympic Games in Barcelona took place during the early years of Spain's membership in the EU,

which allowed for some temporary exemptions from the application of the EU regulatory framework. The EU regulations did not allow Greece to pass special legislation for the organisation of the Games in Athens, as was the case in other host countries, regarding special arrangements for the Olympic projects, such as the exclusion from appeals for public tenders, VAT exemptions on tickets, etc.

3.1.1   Olympic venues

The Athens 2004 Olympic Games included 301 medal ceremonies (one more than the Sydney Games) in 28 sports, being the first Olympics to include women's wrestling. Apart from Athens, another four Olympic cities, Thessaloniki, Volos, Patras and Heraklion, hosted football games. In Athens, two large complexes of athletic venues hosted most of the events of the 2004 Olympics: the Olympic Athletic Centre of Athens and the Hellinikon Olympic Centre (Table 3.1).

The largest number of sport events was held at the Olympic Athletic Centre of Athens "Spiros Louis" (OAKA), where the opening and closing ceremonies of the Olympics and Paralympics were also staged. The Hellinikon Olympic Centre hosted the games of Baseball, Softball, Canoe-Kayak, Fencing, Hockey and Sailing, together with the Basketball qualifying games and the Handball final. The Taekwondo competition and the Handball preliminary games were held at the Faliro Sports Pavilion, while the Volleyball tournament took place in the Peace & Friendship Stadium. The Table Tennis and Rhythmic Gymnastics events were hosted at the Galatsi Olympic Hall, whereas the Pentathlon and Badminton tournaments were held in the Goudi Olympic Complex.

The Games were held in 32 venues, of which 18 were newly constructed, 12 were renovated and 2 were temporary facilities.[8] The relatively large number of new sport facilities was part of the country's plan at the time to make Athens a centre of world-class sport events in the future (e.g., World and European championships, Mediterranean Sports). Unfortunately, this plan did not bring the expected results. Only a few major sports events were hosted in Athens after 2004 (e.g. the UEFA Champions League final in 2007).

Besides, in most cases the construction cost of temporary venues does not differ substantially from that of permanent facilities. However, permanent facilities have maintenance costs. If the revenues from using a permanent facility after the Olympics do not

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[8] Utilisation of Olympic Venues and Infrastructures, Technical Chamber of Greece, 2009

cover its maintenance costs, then this facility will be making a loss in the long run. Therefore, temporary venues are often preferable.

Table 3.1: Venues hosting competitions of the Athens 2004 Olympic Games

Venues	Sport Facilities
Athens Olympic Sport Complex (OAKA)	o Olympic Stadium «Spiros Louis» o Olympic Velodrome o Olympic Tennis Centre o Olympic Aquatic Centre o Olympic Indoor Hall
Helliniko Olympic Complex	o Helliniko Indoor Arena o Olympic Baseball Centre o Olympic Canoe / Kayak Slalom Centre o Olympic Hockey Centre o Olympic Softball Centre o Agios Kosmas Olympic Sailing Centre
Faliro Coastal Zone Olympic Complex	o Olympic Beach Volleyball Centre o Faliro Sports Pavilion o Peace and Friendship Stadium (SEF)
Schinias Olympic Centre	o Schinias Olympic Rowing Centre
Markopoulo Olympic Complex	o Markopoulo Olympic Shooting Centre o Markopoulo Olympic Equestrian Centre
Dytiki Attiki Olympic Complex	o Peristeri Olympic Hall (Boxing) o Nikaia Olympic Weightlifting Hall o Ano Liosia Olympic Hall (Wrestling and Judo)
Goudi Olympic Complex	o Goudi Olympic Hall (Badminton) o Olympic Modern Pentathlon Centre
Other sport facilities	o Galatsi Olympic Hall (Rhythmic Gymnastics) o "Georgios Karaiskakis" Stadium o Panathinaikon stadium (Marathon finish and Archery) o Vouliagmeni Olympic Centre (Triathlon)
Sport facilities in other cities	o Pampeloponnisiako Stadium (Patras) o Pankritio Stadium (Herakleion) o Panthessaliko Stadium (Volos) o Kaftantzoglio Stadium (Thessaloniki) o Stadium in Ancient Olympia (Shot put)

The plan for the Athens Olympics to that for the Sydney Games, where the construction of permanent facilities aimed to facilitate the staging of the Games and the development of a long-term sport legacy for the city[9] Most of the facilities constructed in Beijing for the 29th Olympiad in 2008 were also for permanent use. In general, the construction of large-scale facilities to improve urban infrastructure (which partly explains the significant number of applicant cities to host the Olympic Games)[10] was the main trend in the past. This trend was

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[9] The Sydney 2000 Olympic and Paralympic Games, A report on the financial contribution by the New South Wales Government to the Sydney 2000 Games.
[10] Urban and Regional Planning Workshop (1997), Essex and Chankley (2004).

partly reversed in the London 2012 Olympic Games, where quite a few sport venues were dismantled after the Games.

Additionally, preparations for the Athens Olympic Games included the construction of auxiliary facilities. Among these was the Olympic Village which hosted the athletes and officials, the Media villages (seven in total, of which two were privately owned), the International Broadcast Centre (IBC) for the Games and the Main Press Centre (MPC)[11]. There were also other infrastructure projects associated with the preparations for the Games - mainly road works to facilitate access to the Olympic venues (e.g. Interchange in Kifissias Avenue, connection of OAKA with the Olympic Village, Kimis Avenue and Spyros Louis Avenue, the interchange of Kifissou-Poseidonos Avenue, Varis-Koropiou, Marathonos avenue, etc.).

Figure 3.3: Basic infrastructure before and during the preparation period for the 2004 Olympic games in Athens

Before 2000
- OAKA
- SEF
- Karaiskakis Stadium
- ISAP, ETHEL, ILPAP

2002
- Initiation of works related to the preparations for the Olympic Games

2004
- Olympic Venues(completion)
- Suburban Railway
- Tram line
- Renovation of ISAP stations

2001
- Attiki Odos
- Attiko Metro (Line 1)
- Athens International Airport "El. Venizelos"

2003
- Faliro Sports Pavillion
- Olympic Equestrial Centre
- Varis-Koropiou Avenue

Finally, many infrastructure projects were completed in the period before the Games (such as the Tram, the suburban railway, the renovation of ISAP stations) that were not classified as Olympic works in the State Budget, yet they contributed substantially to the modernisation of the city and the entire region of Attiki, improving at the same time the Athens transportation system.

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[11] According to Helexpo, the HELEXPO PALACE was transferred in June 2003 to the General Secretariat of Sports in order for the Secretariat to convert it and operate it as the Main Press Center of the 2004 Olympic Games.

Planning for some of these projects had started before Athens was nominated to host the Games, yet the prospect that such projects would be complete by 2004 was a strong asset in the city's bid for the Olympics. In a sense, the Olympic Games may have contributed to the timely construction or the acceleration of these construction projects. The substantial number of projects (sport facilities and other infrastructure) completed before the Games, compared with the infrastructure available in the late 1990 to early 2000s in Athens, is an indication of the urban development of the city during that period (Figure 3.3).

3.1.2   Organisational structure

According to the IOC Olympic Charter, the hosting of the Olympic Games is entrusted to the National Olympic Committee (NOC) of the host country and to the host city. In this context, the NOC forms an Organising Committee for the Olympic Games (OCOGs), with which the IOC is in communication for guidelines regarding the preparations for the event. Throughout its operation, the OCOG must comply with the Olympic Charter, with the contract between IOC, the National Olympic Committee and the host city (Olympic Host Contract), and with the instructions of the Executive Board of the IOC.[12]

The Athens Olympic Games Organizing Committee (ATHOC) – with the distinctive name "Athens 2004 S.A." – was a private legal entity with the legal form of a *société anonyme*. The entity was established in March 1998 with Law 2598/98, with the Greek government as the sole shareholder, and was dissolved in May 2005. The initial share capital of the legal entity was €3 million in 100,000 shares.

The Greek government was responsible for supervising Athens 2004 S.A., through an Inter-ministerial committee. The Athens 2004 Organising Committee, according to the Host City Contract, was responsible for planning and coordinating the preparation and the management of the Olympic and Paralympic Games. Among its main responsibilities was to ensure that the construction of the facilities associated with the Games complied with the applicable specifications and time schedules, in accordance with the regulations set by the IOC.

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[12] http://www.olympic.org/ioc-governance-organising-committees

Figure 3.4: Organisational structure for coordinating the preparations of the 2004 Olympic Games
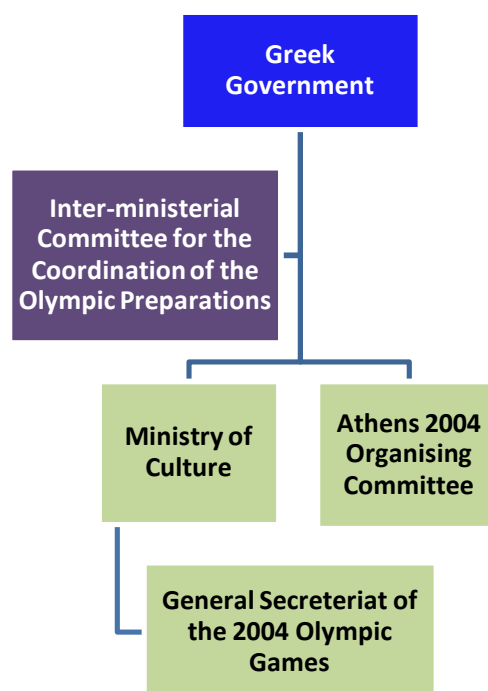
The implementation of construction projects was the responsibility of the Greek government. From 2000 onwards the Organising committee signed memoranda of understanding with each ministry separately, aiming to accelerate the execution of projects that had fallen behind schedule. The memoranda contributed to the timely implementation of the preparations.

The Organising Committee consisted of 52 divisions, each one responsible for a particular organisational aspect of the Olympic Games (e.g. Ticketing, Accommodation, Technology, Infrastructure & Installations, NOC Relations, Volunteers, Olympic Torch Relay, Sports, Transport, Ceremonies & Culture, Marketing, Sponsoring, etc.). During the Games, the Organising committee was fully responsible for the operation of 105 Olympic facilities (sport and other facilities, the Olympic Village and other residential property). The Organising committee had 14,056 employees (63.3% were trainees, of whom 68.5% were hired for the period between June and August of 2004) and also used the services of 45,000 volunteers.

In addition, the Inter-ministerial Committee for the Coordination of the Olympic Preparation (DESOP)[13] undertook the coordination and supervision of the works from various government agencies. DESOP was also responsible for resolving legal, financial and other issues that would emerge during the preparations for the Games.

The General Secretariat for the Olympic Games, supervised by the Ministry of Culture, operated as a technical secretariat of the inter-ministerial committee. Among the main responsibilities of the General Secretariat was the support of DESOP and the co-ordination between the Ministry of Culture and the legal entities of the public sector involved in the preparations for the Games.

3.2 Staging of the Games

The 2004 Olympic Games were held in Athens between 13 and 29 August, with about 10,600 athletes from 201 National Olympic Committees – approximately as many as in the Sydney Olympics (Figure 3.5). The Paralympic Games were held between 17 and 28 September with 3,800 athletes, accompanied by 3,200 team officials of the National Paralympic Committees. The athletes came from 136 countries, 17 of which were competing for the first time in the 2004 Paralympic Games.

Due to the vast number of athletes and accredited participants during the Games, food services were provided on a 24-hours basis. In the Olympic Village, for instance, 6,000 meals per hour could be served, whereas the total consumption of water and soft drinks exceeded 1 million bottles. Respectively, from 1 August until 20 September more than 2,150 waste collection itineraries were performed and more than 1,650 tonnes of waste were recycled.

The attendance rate (i.e., tickets sold over the total number of tickets issued) in the 2004 Olympics reached 72%, substantially lower compared with other Games such as Beijing 2008 and London 2012, where attendance rates exceeded 95% (Figure 3.6). This was mainly due to the large number of competitions and the large capacity of the sports facilities (as required by the specifications set by the IOC), in combination with the small population of the country.

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[13] The composition of DESOP during the period 1998-2000 and of the ATHOC 2004 during the preparation period is analytically presented in the Official Report of ATHOC 2004, whereas information regarding the composition of DESOP between 2000 and 2004 exists in OKE (2003).

Figure 3.5: Number of athletes in the summer Olympic and Paralympic Games

A. Olympic Games
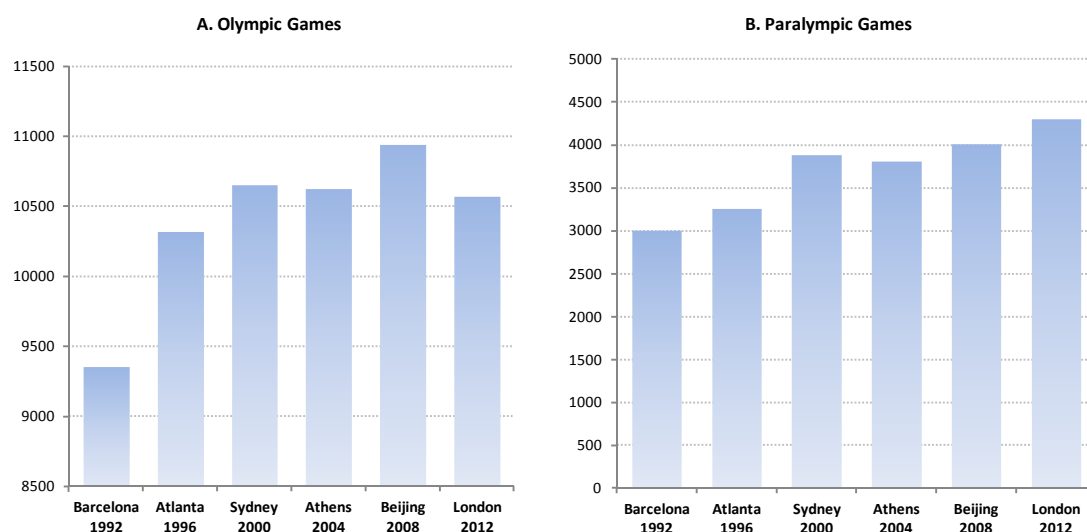
B. Paralympic Games

Source: International Olympic Committee

In addition, 3.9 billion viewers – 300 million more, compared with the 2000 Games in Sydney - from 220 countries had access to broadcasts of the Athens Olympic Games, with a total of 35,000 hours of dedicated coverage (higher by 24% from the 2000 Games), whereas for the first time live coverage of the Games was also available on the Internet (Table 3.2).

Figure 3.6: Attendance rate of the Summer Olympic Games, 1992-2012
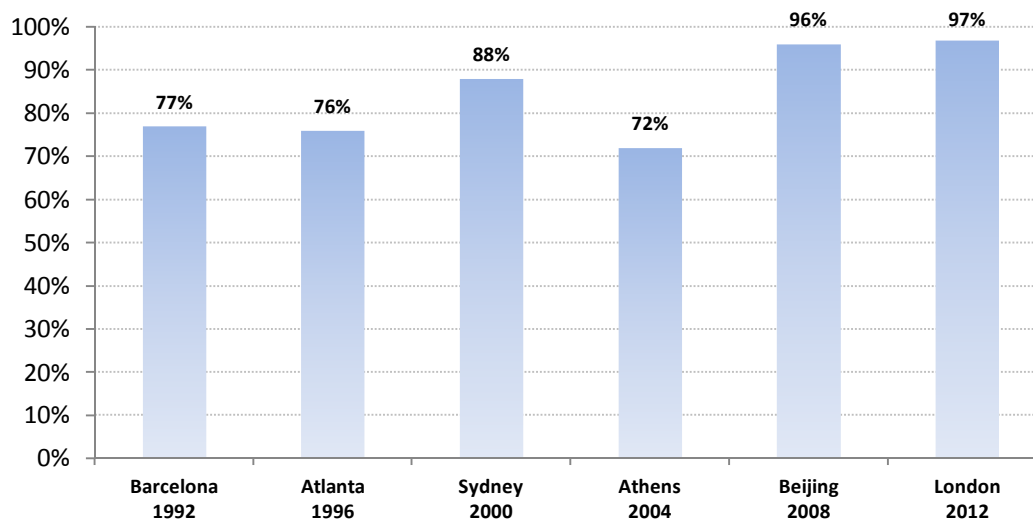
Source: IOC

Table 3.2: 2004 Olympic Games TV coverage

Description	Estimation
Number of viewers watched the Games	3,9 billion
Countries	220
Hours of dedicated coverage	35,000 hours (+)
Average view per person	12 hours

Source: IOC

Additionally, the preparations for the Games took place under uncertainty regarding security, due to the terrorist attacks of 2001 in New York, the war in Iraq (March 2003) and the terrorist attack in Madrid, just a few months before the start of the Games (March 2004). The negative sentiment was also exacerbated by reports in the international press, according to which Athens would be unable to complete the preparations on time, while criticism was also expressed about the city's infrastructure, such as the heavy traffic congestion that could inhibit the timely transportation of athletes and spectators to the sports venues.

Despite these developments, it was widely recognised, both in Greece and abroad, that the 2004 Olympics and Paralympics Games in Athens were highly successful. The Games were a national effort that motivated a significant part of the country's productive forces, with the participation of many local businesses and employees. The citizens of Athens, with their positive response to the call for the proper functioning of the city during the period of the Games (e.g. by reducing their use of private vehicles for transportation), and with their attendance of the sports events, given that most tickets were bought by Greeks, also contributed to the successful staging of the Games. Finally, the preparations for the Games promoted significant virtues, and especially volunteering, as about 45,000 people offered their services for no pecuniary remuneration, contributing crucially to the successful outcome of the Games.

3.3 The Olympic legacy

Another significant challenge for the host city and country, apart from successfully staging the Games, is to make the most out of the legacy of the Games over the long term. Part of this legacy is associated with the proper utilisation of the human resources and the facilities constructed during the preparations for the Games.

In this context, the legal entity Olympic Properties S.A. was established to manage the facilities constructed for the Games. The company was responsible for the management of the facilities however it did not own them. The organisational structure of the company was set by Law N. 3342/2005, which also contained provisions with regard to the use of the Olympic venues.

According to the company's incorporation charter, Olympic Properties S.A. was responsible for the management of 22 facilities and 15 Olympic venues in Athens, Patras, Volos and Heraklion. In 2011, Olympic Properties S.A. merged with the company "Hellenic Tourist Properties S.A." to form the "Hellenic Public Properties Company" (ETAD S.A.). Since then, the Hellenic Public Properties Company manages the Olympic facilities that are still not allocated to other public-sector agencies or leased to the private sector.

The Olympic venues can be grouped in four main categories, according to their post-Olympic use (Figure 3.7). The first category includes facilities, which were leased to private and municipal enterprises under long-term concessions. For instance, the Goudi Olympic Hall venue has been operating as an entertainment venue (Badminton Theatre) since January 2007. Similarly, the International Broadcasting Centre was leased to Lamda Development Group for commercial use and is now operating as a shopping mall (Golden Hall). These venues were among the first facilities that were converted for further utilisation.

Additionally, the Main Press Centre was converted to host the headquarters of the Ministry of Health, while the Pankritio and Pampeloponnisiako stadiums are used by the municipalities of Heraklion and Patras respectively, operating as the home ground of local football clubs. Furthermore, the Olympic Weightlifting venue in Nikaia has been leased to the University of Piraeus for 40 years.

Furthermore, this category includes facilities which were not financed by the Public Investment Programme, such as the Olympic Village in Thrakomakedones, the media villages in Maroussi and Pallini and the "Georgios Karaiskakis" stadium. The residences of the Olympic Village were granted to beneficiaries of the Workers' Housing Organisation, which financed its construction. Despite the reported poor maintenance of public spaces in the Olympic Village,[14] the residences are currently in use. Respectively, the media villages in Maroussi and Pallini were transformed to residential complexes (ILIDA and Lofos Edison

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[14] G. Papadopoulos, "Olympic misuse 10 years after the Games", Kathimerini, 15-8-2014

respectively), with the majority of the apartments sold to the residents. Finally, the "Georgios Karaiskakis" stadium, which is used as the home ground of Olympiakos football club (and of the National Football Men Team as well), hosts football games of the Greek championship and international football tournaments (for instance, UEFA Champions League, European and World Cup qualification games).

Figure 3.7: Olympic venues and facilities according to their post-Olympic use
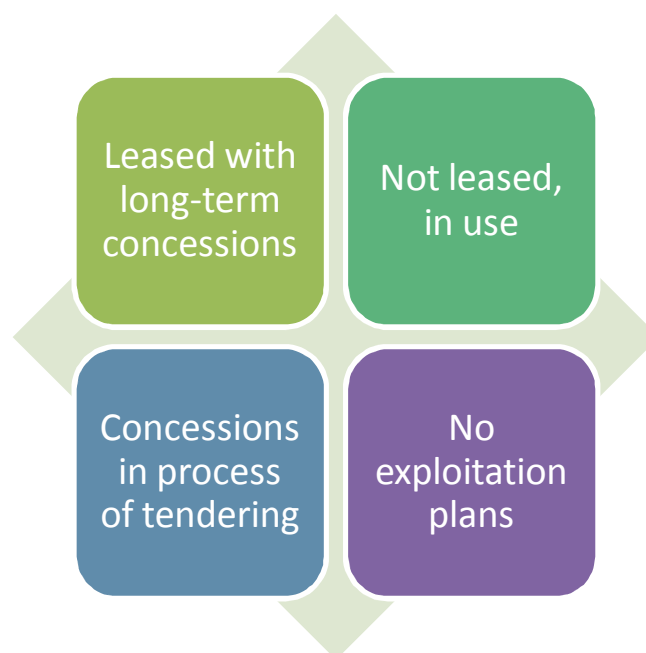
The second category, includes facilities which remain under the management of central administration agencies, such as ETAD S.A., yet they are in some use. An example here is the Faliro Sports Pavilion (Tae Kwon Do stadium), which hosts concerts, festivals, conferences and other such events. In the past, a tender was launched in order to transform the venue to an international conference centre, but it was eventually cancelled. Another facility in this category is the Panthessaliko stadium, which is used as the home ground of Niki Volou, a football club, and formerly by Olympiakos Volou, another football club. Other facilities in this group are the Ano Liosia Olympic Hall and the Peristeri Olympic Hall, which were converted into arts and entertainment facilities.

The Athens Olympic Complex (OAKA), managed by the legal entity "O.A.K.A. Spyros Louis", is another facility in this category. Many of the OAKA facilities, such as the Olympic stadium which is currently the home ground of AEK football club and formerly of Panathinaikos football club, as well as the Olympic Indoor Sports Centre, used by Panathinaikos Basketball Club and AEK Basketball Club, are in daily or weekly use. Similarly, the Aquatic centre and

Tennis centre are in use, whereas training and other facilities of the complex are available for rent either for athletic or cultural events.

However, OAKA did not become a tourist attraction. Currently, the lack of maintenance is evident in a significant part of the open spaces and facilities. Indeed, part of the Olympic complex looks abandoned. Furthermore, there is no museum for the 2004 Olympics in Athens (though it had been proposed to convert part of the International Broadcast Centre venue for that purpose), in contrast to other cities that have hosted the Olympics. [15] This is another example of Athens not making the most out of the Olympic legacy.

The third category includes facilities planned to be leased to private investors under long-term concessions. In June 2014, the Hellenic Republic Asset Development Fund issued concession tenders for the Olympic venues in Galatsi and Markopoulo. Three investment joint ventures submitted binding offers for the concession of the Olympic Equestrian Centre in Markopoulo. In contrast, no binding offers were submitted for the Galatsi Olympic Hall and the Hellenic Republic Asset Development Fund is re-examining the exploitation plans for this venue. Moreover, the concession procedure of the Schinias Olympic Rowing Centre is in progress.

The six venues of the Helliniko Olympic Complex are also in this category. Even though some of these facilities were used in the past (e.g. the Indoor Hall and the Baseball Centre, which was converted to a football pitch and was operating as the home ground of Ethnikos FC), the Helliniko Olympic Complex is a typical example of not making the most out of the Olympic legacy, as many venues (such as the Softball Centre, the Canoe Kayak Slalom Centre and the Hockey Centre) have been abandoned. In part, this is due to the prolonged consultations and lengthy bureaucratic procedures concerning the exploitation of the area of the former Athens international airport at Hellinikon. In 2014, Lamda Development S.A. was selected as the preferred investor for the acquisition of the shares of Hellinikon S.A. The development of the area of the former international airport at Hellinikon is arguably the biggest urban renewal project in Europe and among the biggest in the world, and would have substantial effects on the Greek economy.

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[15] The building housing the Historical Archives of the Athens 2004 Organising Committee operates as a museum in Ancient Olympia. The archives cover the period between the bid and the conclusion of the Games. The museum is housed on the premises of the International Olympic Academy in Ancient Olympia. It includes audiovisual and digitised content, as well as artefacts from the 2004 Olympic Games. The project was financed by IOC, the owner of the archives, while the implementation was carried out by a non-profit organisation, established for that purpose.

Finally, the fourth category of Olympic facilities according to their use includes underutilised facilities, for which no concession agreements are being prepared. A typical example is the Olympic Beach Volleyball Centre in the Faliro Olympic Complex. Nevertheless, the construction of the new opera house and cultural centre at Faliro, funded by the "Stavros Niarchos" Foundation, and other urban development works in the area, might contribute to better utilisation of the facilities in the Faliro Olympic Complex as well.

In conclusion, the substantial delays in the concessions and the abandonment of some of the venues gave rise to the perception that the Athens Olympics did not yield benefits for the country. The low level of use of the facilities and the fact that the Olympic venues did not boost participation in sporting activities in the city contribute to this perception. The fact that some Olympic venues have remained to a large extent unused after the Games reduced substantially the benefits from the 2004 Athens Olympic Games, as will be discussed in detail in Chapter 5 of the study.

Despite the fact that some Olympic facilities have been abandoned, there are many cases of successful utilisation (e.g. Badminton Theatre, Golden Hall, etc.). Meanwhile, steps have been taken, albeit with delays, to renovate areas with abandoned Olympic venues (such as Hellinikon). With efficient strategic planning and social consensus, Greece can achieve better results from the utilisation of the Olympic legacy, increasing the benefits for the Greek society and the economy.

Another issue of great importance, however, is the underutilisation of the experience and the know-how that the public administration gained during the preparations for the Games. The construction of a large number of facilities in a short period of time and adhering to strict IOC specifications required the coordination of many public sector agencies for the monitoring of the progress of works. In order to achieve that, many administrative procedures had to be accelerated and many bureaucratic obstacles had to be lifted.

A typical example for the improved operation of the public administration during the preparations for the Games is the acceleration of procedures of expropriation, the expulsion of trespassers from public property and the faster processing of appeals at the Hellenic Council of the State, the highest administrative court in Greece. The efficient operation of the public administration concerning projects of strategic importance for the Olympics was the model for the "fast track" procedures for strategic investments implemented after 2010. Additionally, substantial experience was gained from the staging of the Olympic Games in

the fields of preparation, marketing and TV coverage of multi-sport events. Moreover, during the Games many steps were taken to ensure the proper functioning of the city, in light of the large number of visitors (athletes, spectators etc.) and the extensive transportation needs. Typical examples are the new traffic management system for Athens, employing state-of the-art technology (Transport Monitoring and Control Centre) and the Main Operations Centre, used to monitor all the Olympic facilities.

However, the momentum gained during the preparations for the Games was not maintained, and did not eventually provide a new paradigm for the functioning of the public administration. Significant part of the modern equipment installed for the Games (e.g., the Transport Monitoring and Control Centre) and the experience gained in staging the event remained underutilised. In a sense, this valuable experience, which could have otherwise been used for the benefit of the people, the enterprises and the economy overall, was lost.

3.4   Expenditure and revenues from the 2004 Olympic Games

A substantial impediment for the exact determination of the costs and benefits of the Games relates to the fact that classifying a particular construction project as an "Olympic" project or not is open to dispute. Clearly, the sport facilities and the projects included in the Host City Contract as an obligation of Greece, along with auxiliary infrastructure projects that were performed exclusively in order to stage athletic events for the Games, should be classified as Olympic projects. However, other projects that also contributed to the successful hosting of the Games, yet served a broader purpose as well, are often not as easy to classify (Figure 3.8).

In this study, in assessing the economic impact of the Games, we focus on the projects characterised as "Olympic" in the Public Investment Programme (PIP). Some of these projects, however, may not be directly related to hosting the Games. Urban renewal works in some areas of Athens and of other cities, upgrade works in certain hospitals that were not used for the medical treatment of athletes or spectators, or works on parts of the road network that did not support the transportation activity of the Games, are examples of such projects.

In addition, the Olympic projects category included actions of the programme "Greece 2004". This programme aimed to spread the benefits from the Games to the entire country. It included projects for the renovation and reconstruction of facilities in areas of the country

that would not attract athletes or spectators. Possibly, some of the projects of the programme "Greece 2004" were completed after the Olympics.

Figure 3.8: Infrastructure projects in the preparations for the Olympic Games
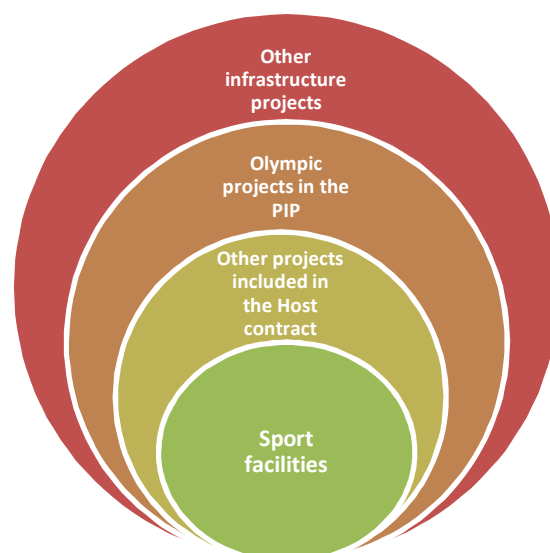
The preparations for the 2004 Olympic Games would have been successfully completed, and with lower cost, even if some of these projects had not been implemented. These projects were tied to the Olympic Games as a result of political decisions, aiming at accelerating the implementation of the projects. These projects clearly generated benefit to their users. Nevertheless, the expenditure for such projects raised the official cost of the Olympic Games.

On the other hand, the PIP Olympic projects do not include large infrastructure projects implemented in that period (e.g. the Attiki Odos motorway, the Athens International Airport "El. Venizelos", the Suburban Railway of Athens, Athens Tram, etc.). These investments contributed to the success of the Games – whereas the implementation of some of them was accelerated due to the preparations for the Games. However, these projects had been planned long before Athens was selected as a host city for the Olympics, and hence these projects would have been implemented regardless of whether Athens hosted the Games or not. Moreover, most of these projects were co-financed by the European Union. Still, some of these projects were related to the Games, in the following sense: when Athens applied for hosting the Olympics it stated that some of these projects would be completed by 2004, and could thus be used when the event would be staged. Therefore, the prospect that some of these projects would be completed by 2004 reinforced Athens' application for hosting the Olympics. A typical example in this case is the Athens Tram, connecting the Hellinikon

Olympic Complex and some of the facilities in the Faliro Olympic Complex with the urban rail transport network of Athens.

Moreover, the cost of the 2004 Olympics is often discussed without considering the respective benefits. . There are indeed arguments that could justify different cost estimates from the official data, depending on which particular projects are considered "Olympic". Nevertheless, the respective benefits should also be taken into account. In case the expenditure for a particular infrastructure project is included in the cost of the 2004 Olympics, then the respective benefits (for instance, positive effects on economic activity, tax revenues and everyday life, assuming the facilities are still in use) should be taken into account as well.

Besides, the positive multiplier effect increases as the definition of the Olympic projects is expanded to include projects, in addition to those in the core group of Figure 3.8 (sport facilities). For instance, including works such as the Attiki Odos motorway, the Tram and the Suburban Railway would increase the gross cost of the Games. Yet, at the same time, the wider usefulness of this infrastructure (compared with purely Olympic venues, such as the fencing venue) would probably increase the net benefit from the Olympic Games. Conversely, the exclusion of projects not directly related to the preparations for the Olympic Games would decrease the gross cost figure, yet this could also lead to a lower net benefit estimate. For these reasons, the cost-benefit estimates for the Athens Olympic Games in this study are based on the official categorisation, mainly using data from the Budget reports of the Ministry of Finance and the final report of the Organising Committee "Athens 2004".

Figure 3.9: Funding sources for the 2004 Olympic Games
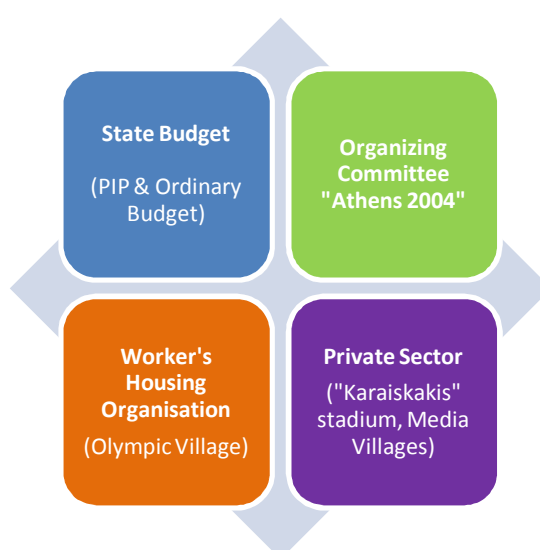
According to these data, the financing of the projects for the Athens Olympic Games was mainly covered by the State Budget (Public Investment Programme and Ordinary Budget) and by the revenues of the Organising Committee "Athens 2004" (Figure 3.9). The cost-benefit estimates for the Games in this study also take into account the construction of the Olympic Village, financed by the Worker's Housing Organisation (OEK). A fourth source of financing, which is however very small compared with the other sources, is the private sector, as some Olympic projects were self-financed. These projects are the renovation of the "Georgios Karaiskakis" stadium (€60 million expenditure)[16] with a concession contract and the two residential complexes (ILIDA Village and Pallini Village) used as Media villages during the Games.

3.4.1   State Budget Expenditure

According to the State Budget reports, the State financing for the projects classified as Olympic came exclusively from the domestic resources of the Public Investment Programme, without financing from EU funds (such as the 3rd Community Support Framework, the Cohesion Fund or other EU initiatives).

The list of projects financed by the PIP includes the construction of new (and the upgrade of existing) sport facilities for staging sport events, along with auxiliary equipment and infrastructure. The expenditure for the procurement of equipment for the Police and other government agencies to ensure security during the Games is also included here. The State financing also includes the construction cost of the transport network (technical studies, land expropriation, road infrastructure) necessary for connecting the sport and other facilities with the main road network of Athens. Public funds were also used to improve the access to historical and cultural sites.

In addition, this category includes the contribution of €282.5 million from the Greek State to the budget of Athens 2004, for the preparation and the staging of the Olympics and Paralympic Games, as per a decision by the inter-ministerial committee DESOP. The subsidy aimed to cover the gap in the budget of the Organising Committee from cancelling plans for an "Olympic lottery", which had stirred acute political controversy. Issuing an "Olympic" lottery and using part of its profits for the Games were included in the bid file Athens

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[16]http://el.wikipedia.org/wiki/%CE%A3%CF%84%CE%AC%CE%B4%CE%B9%CE%BF_%CE%93%CE%B5%CF%8E%CF%81%CE%B3%CE%B9%CE%BF%CF%82_%CE%9A%CE%B1%CF%81%CE%B1%CF%8A%CF%83%CE%BA%CE%AC%CE%BA%CE%B7%CF%82

submitted when applying to host the Games, forming a contractual obligation of the Greek state.

Additionally, on the occasion of the Athens Olympics the Greek State financed a substantial number of relatively low-scale projects, compared with the other categories, aiming to upgrade existing infrastructure (e.g., hospitals in Athens, public transportation, etc.) and perform repair and reconstruction works in many areas of Athens (e.g., creating pedestrian zones, repairing roads and avenues, performing works on public parks, planting trees and restoring buildings). The Greece 2004 programme is also included here, with regional projects (e.g. upgrade of sport facilities, cultural initiatives, etc. This programme to a large extent complemented the sectoral operation programmes of the 3rd Community Support Framework that were implemented at the time (Figure 3.10).

Figure 3.10: PIP projects related to the 2004 Olympic Games in Athens
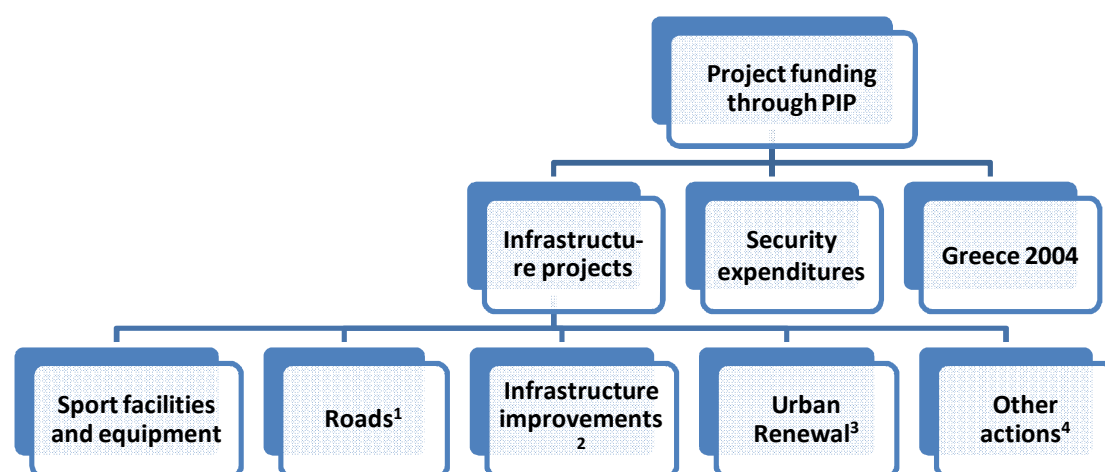
    (1)   Connection of sport facilities with main roads
    (2)   Hospitals, public transportation, tourism infrastructure, etc.
    (3)   Renovation of streets, avenues, parks, public lighting, planting of trees, restoration of buildings
    (4)   Cultural activities, information programmes, technology, procurement of equipment

Source: Ministry of Finance **Data processing:** IOBE

According to ex-post data from the State Budget reports, the expenditure (in nominal prices) for the PIP Olympic projects is estimated at €6 billion over the period 2000-2010, with most of it (€5.1 billion or 86% of the total) recorded between 2002 and 2004. The accumulation of the expenditure in the last three years of the preparation period is associated with the delays in the first few years following the award of the Games.

The need to accelerate the construction of the projects may have led to higher cost, compared to a hypothetical scenario, in which the allocation of the projects in the preparation period had been more even. The expenditure from 2005 onwards, which cumulatively reached €838 million, is mainly associated with repayment of projects and the Greece 2004 programme (Figure 3.11).[17]

The preparation for the 2004 Olympic Games resulted in a substantial increase of the Greek (i.e. non-EU) funds for the PIP, without, however, displacing the remaining expenditure of the PIP, which remained fairly stable throughout the period 1997-2008 (Figure 3.12).

Figure 3.11: Expenditure (in nominal prices) from national resources of the PIP for the 2004 Olympic Games in Athens
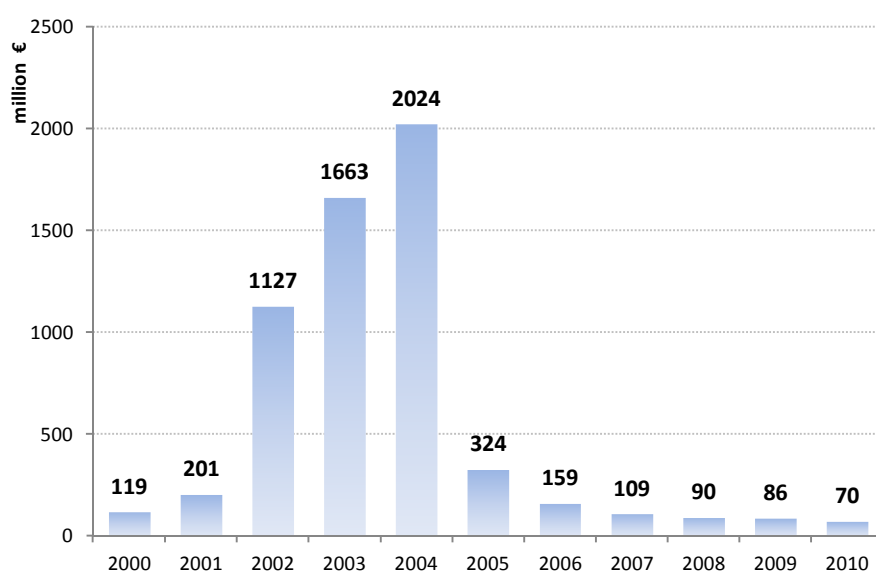
Source: Ministry of Finance **Data processing:** IOBE

Between 2002 and 2004 the expenditure for Olympic preparations was 2/5 of the Greek funds used in the PIP (€11.7 billion). In total, over the period 2000-2010 the cost of the Olympic projects accounted for 18% of the Greek funds used in the PIP (€33.2 billion in total). The share for the Olympic preparations over the entire PIP expenditure (i.e. Greek funds and EU funds) between 2002 and 2004, which reached €25 billion, was approximately 20%. The respective share over the PIP expenditure in the period 2000-2010 (€94.2 billion) was 6.3%.

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[17] In the annual State Budget reports, the Greece 2004 programme is presented in the Regional Public Investment Programme under the category "Olympic projects". Its budget over the period 2005-2010 is estimated at €335 million.

Over the period 2000-2006 the expenditure for Olympic projects as a share of both the Greek funds and the total funds (Greek and EU) used for the PIP was larger than the respective share for most other categories of expenditure (Figure 3.13).Regarding to the allocation of expenditure per Ministry, the cumulative share of the Ministry of Culture and of the former Ministry for the Environment, Physical Planning and Public Works (YPEHODE) reached almost 80% of the total expenditure. The expenditure for Olympic projects carried out by the former YPEHODE was about 42% of the total expenditure, while the expenditure for such projects carried out by the Ministry of Culture was approximately 38% of the total (Figure 3.14).

Figure 3.12: Expenditure allocation of the national PIP funds
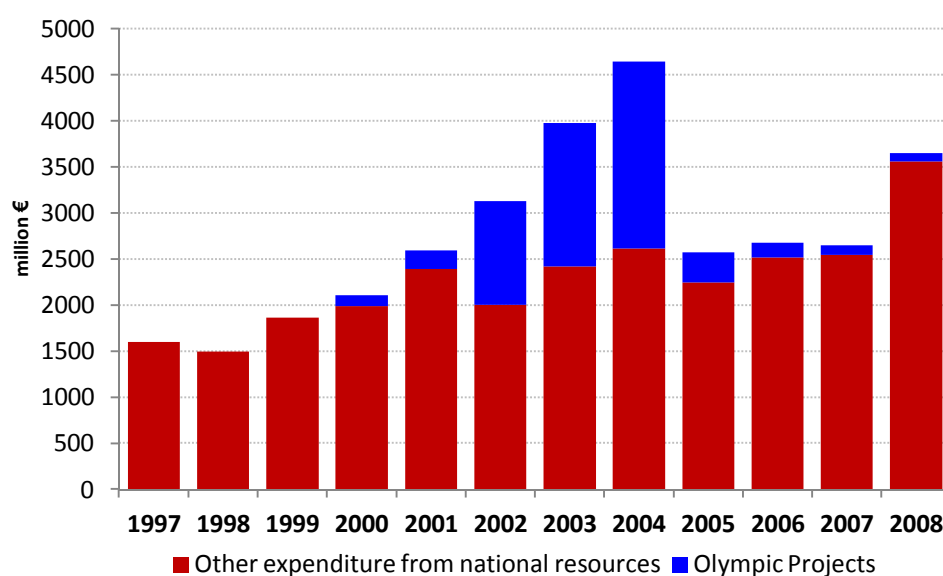
Source: Ministry of Finance

YPEHODE was also responsible for the implementation of the largest number of projects, compared with the other ministries involved in the preparations for the Games (141 projects). In particular, the former YPEHODE managed projects of €1.7 billion total worth, among which were the Schinias Olympic Rowing Centre, the Helliniko Olympic Complex, the Olympic Beach Volleyball Centre and the Olympic Modern Pentathlon Centre. The construction cost of these venues is estimated at approximately €817 million.

The budget of the Ministry of Culture was allocated mostly to construction and renewal of sport facilities. The Ministry of Culture managed the construction of Olympic venues (of €1.4 billion total worth) such as the Galatsi Olympic Hall, the Markopoulo Olympic Shooting Centre, the Panthessaliko / Pankretion / Panpelloponisiako stadiums, the Vouliagmeni

Olympic Centre, the Nikaia Olympic Weightlifting Hall, the Ano Liosia Olympic Hall, the Markopoulo Olympic Equestrian Centre and the OAKA area.

Figure 3.13: Allocation of PIP funds per category, on average over the period 2000-2006

National Funds

Category	
Prefecture projects	~25%
Olympic projects	~21%
Various projects	~9%
Education	~9%
Transportation	~7%
Manufacture	~6%
Specialised projects	~5%
Public administration	~3%
Regions	~2%
Environment	~2%
Railways	~2%
Health	~1%
Land improvement	~1%
Culture	~1%
Other projects	~2%

Total PIP

Category	
Transportation	~17%
Prefecture projects	~13%
Olympic projects	~9%
Regions	~8%
Education	~7%
Specialised projects	~6%
Manufacture	~5%
Various projects	~4%
Railways	~4%
Training	~3%
Energy	~3%
Agriculture	~3%
Public administration	~2%
Culture	~2%
Other projects	~9%

Source: Ministry of Finance

The expenditure for the construction of new sport facilities and for the renewal of existing ones (€2.8 billion) was almost half of the total expenditure for the Olympic projects from the State Budget (without including the participation of the State in the expenditure of the Organising Committee and overlays), followed by the expenditure for roads (14%) and urban renewal (13.9%). The cost of planning and implementing the security plan of the Games is estimated at 7.6% of the total expenditure, while the cost of infrastructure upgrades in hospitals, public transport, etc. was approximately 5.1% of the expenditure for the Olympic projects (Figure 3.15).

Apart from the PIP, some expenditures during the preparations and the staging of the Games were also covered from the Ordinary Budget. These are mainly operational expenditures and payments to public sector personnel (for instance, in the Security forces) employed during the preparations, and mainly for the duration of the Olympic and Paralympic Games. The expenditure through the Ordinary Budget was approximately €570 million between 2001 and 2004, with the greatest part recorded in 2004 (€390 million or 1.1% of the total primary expenditure for that year).

Therefore, according to the official data, the total disbursement for the preparation and the staging of the Athens Olympic Games from the State Budget (sum of the Public Investment Programme and the Ordinary Budget) was approximately €6.5 billion. This is approximately 1% of the State expenditure (€644.6 billion) over the period 2000-2010.

Figure 3.14: Expenditure for the preparation of the 2004 Olympic Games per Ministry
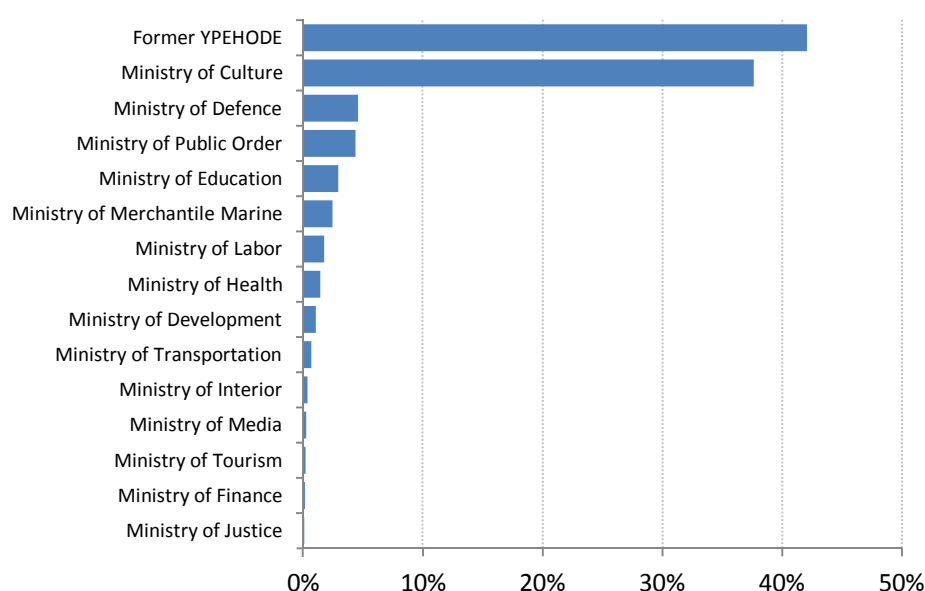
Source: Ministry of Finance

The above gross cost is not necessarily a good measure of the actual burden of the Games on the State Budget, considering that a substantial number of the projects financed by the State were not actually directly related to the preparation and the staging of the Games. The examination of the relevance of each of the projects to the 2004 Olympic Games is beyond the scope of this study.[18] However, an indicative measure of the expenditure for projects not directly related to the 2004 Olympic Games could be derived from the expenditure for the "Infrastructure improvements", "Urban Renovation" and "Other actions" categories.

In particular, the cost of the projects in these categories is estimated at approximately €1.6 billion. Additionally, the expenditure in the "Roads network" category (€0.8 billion) could be, at least partially, considered as less relevant to the Olympic Games, since this infrastructure is used by the residents of Athens and its suburbs on a daily basis. Therefore, the public

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[18] Cartalis (in press) provides estimates for the cost of the projects classified as Olympic without having a direct relationship to the hosting of the Games.

expenditure related purely to the hosting of the 2004 Olympic Games – construction and renovation of sport facilities and the cost of security – is estimated at €4.1 billion.

Figure 3.15: Allocation of Olympic expenditure from the State Budget
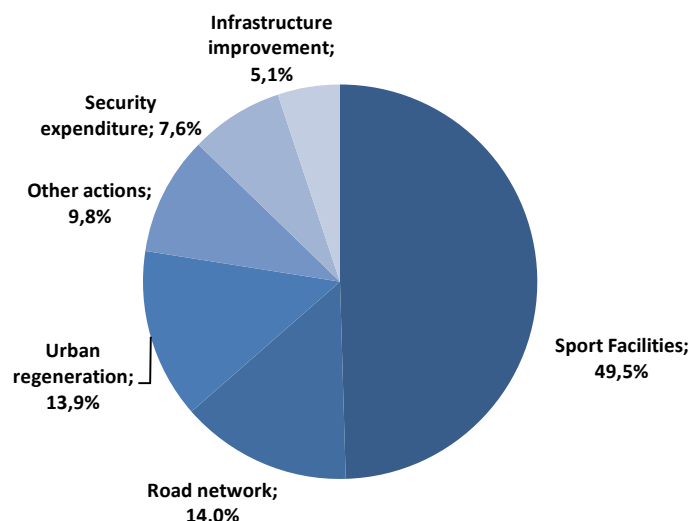
Source: Ministry of Finance **Data processing:** IOBE

3.4.2   Expenditure and revenues of the ATHENS 2004 Organising Committee

The Athens 2004 Organising Committee of the Olympic Games (ATHOC), according to the Host City contract, had the responsibility for planning, organising and coordinating the preparations and the staging of the 2004 Olympic and Paralympic Games. More than 14,000 staff was employed in the 52 divisions of the Committee, of which 68.5% were recruited for the period between June and August of 2004 (the majority of them as trainees).

While the State Budget financed the public-owned Olympic projects and the security cost of the Games, the expenditure for the staging of the Games was covered by the budget of ATHOC. The operating expenses of ATHOC reached €1,968 million during the company's lifetime, while an additional €304 million was spent by ATHOC on behalf of the Greek State.

The largest share of ATHOC expenses was for technological equipment and services (IT, telecommunications and energy - €339 million or 17.2%). These were followed by operational expenses during the Games (e.g. transportation, accreditations, operation of facilities - €310 million or 15.7%) and outlays for supporting activities of the Games, regarding volunteering and hospitality (€298 million or 15.1% - Figure 3.16). The administrative cost reached €101 million or 5.2% of the total expenditure.

On the other hand, according to the committee's report, the revenues accounted to €2,098 million. The largest share came from broadcasting rights (27% or €579 million – Figure 3.17), mainly from the IOC, which was responsible of the negotiations with the international television networks.

Figure 3.16: ATHOC expenditure allocation
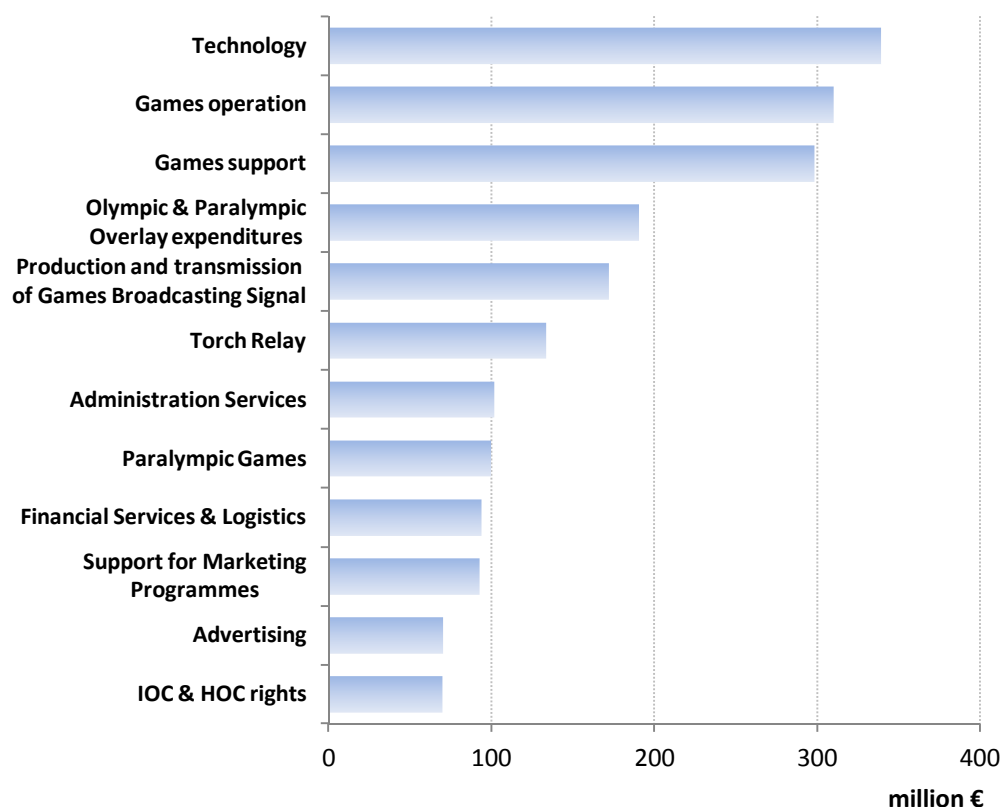
Source: ATHOC

The sponsorship revenues were at a similar level (€537 million or 26% of the total receipts). ATHOC met its target for sponsorship revenue two years before the Games, while the revenue from the torch relay sponsorship in Greece and abroad was 50% higher than initially anticipated. As a result, more than half of the revenues (53%) of ATHOC came from television rights and sponsorships.

The revenues also include the participation of the Greek State (€283 million), corresponding to the forecasted revenue from the Olympic lottery that was eventually covered by the State Budget. Taking also into account the surplus of €131 million from the operation of the Organising Committee, the participation of the Greek State in the committee's budget reached 7.2% of the revenues.

Figure 3.17: ATHOC revenue allocation
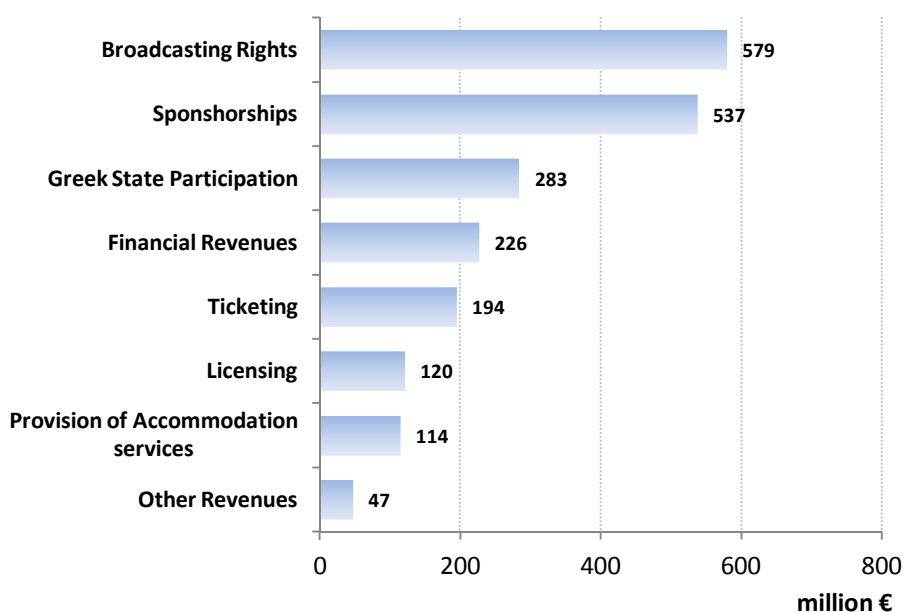
Source: ATHOC

Respectively, the ticket revenues reached €194 million, which corresponds to 9.2% of the total revenues, substantially lower compared with other Olympic Games in the past. For instance, tickets represented 1/5 of the total revenues of the Sydney 2000 Organising Committee and 31% of the London 2012 Organising Committee (Figure 3.18). This development can be attributed in part to the fact that the population of Greece is small, as well as to the uncertainty with regard to the safety of air transport, as a result of the terrorist attacks in the United States in September 2001.

Figure 3.18: Ticket revenues as percentage of the total revenues of Olympic Games organising committees
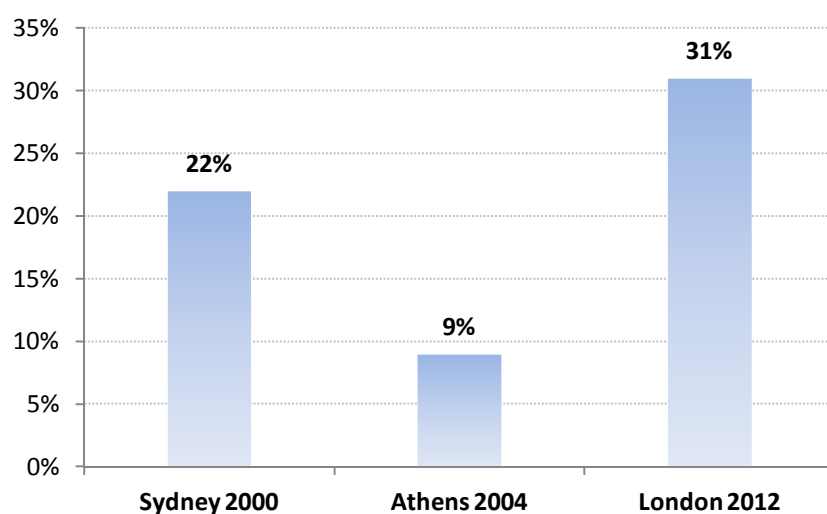
Source: IOC

Overall, the Committee's operation accrued a €131 million surplus. The operating revenues exceeded expenses by 6.6%, a performance which is better, according to available data, than London and Barcelona and worse compared only with the Sydney 2000 organising committee (19.5%, Figure 3.19). The surplus of ATHOC could have been higher, in case the average attendance was similar to other Olympic Games.

Figure 3.19: Surplus of Organising Committees in recent Olympic Games
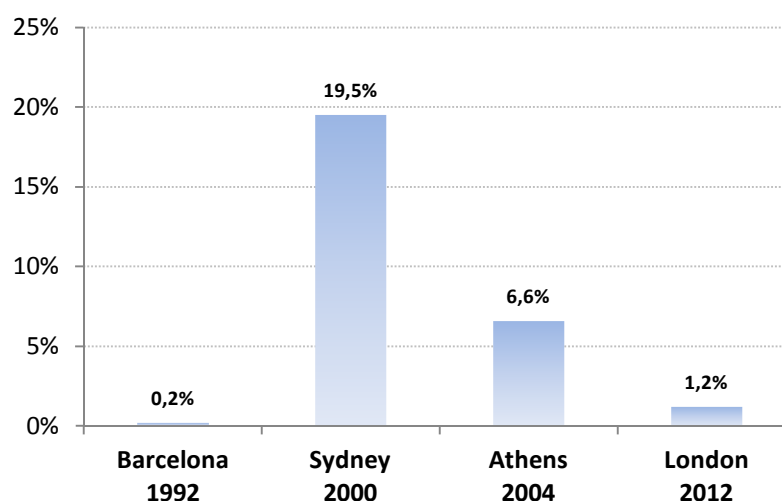
Source: Centre d' Estudis Olimpics, Sydney Olympic Co-ordination Authority, ATHO 2004, UK Dept. for Culture Media & Sport, Eurostat **Data processing:** IOBE

Additionally, the inter-ministerial committee DESOP authorised ATHOC to hold auctions for services and products related to the Olympics (sports equipment, furniture, facilities' equipment) and take other necessary actions (e.g. land expropriation expenses) for the preparations for the Games. This arrangement aimed to avoid time consuming procedures, by taking advantage of ATHOC's enhanced operational flexibility and efficiency, compared with the public administration.

The cost of these actions was €304 million, of which €180 million were covered from the Greek State with subsidies to ATHOC, while the remaining (€124 million) was covered by the operating surplus of the Committee's budget. As a result, the total expenses of ATHOC are estimated at €2.3 billion, whereas the final net surplus of the committee is estimated at €7.0 million (Figure 3.20).

Figure 3.20: ATHOC's operating surplus
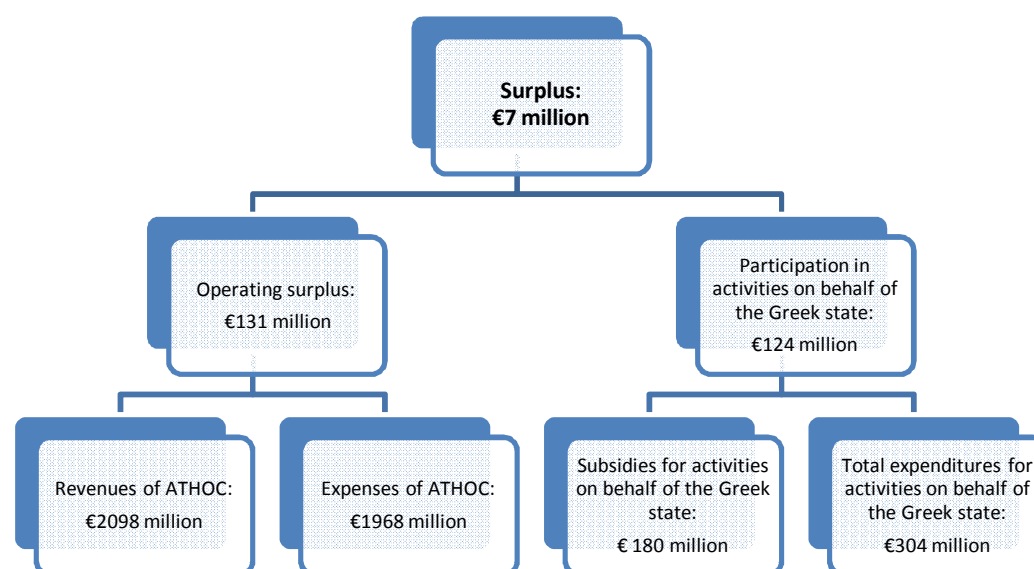
3.4.3 Expenditure for self-financed projects

The construction of a few of the facilities used for the Athens Olympics was financed by private investors, or by other organisations (not the Greek government, or ATHOC). The construction of the Olympic village (2,292 flats in 366 blocks on an area of 1.2 million m^2 in Thrakomakedones) belongs to this category. The total cost of the project, financed by the Worker's Housing Organisation (OEK), was €280 million.[19] After the end of the Games, the flats were given to OEK beneficiaries (low-income families), randomly selected from 17,500 eligible applicants. Additionally, the cost for the reconstruction of the "Karaiskakis" stadium and the construction of the Media villages in Marousi and Pallini, an estimated total of €100 million, was covered from private funds.[20]

3.4.4 Fiscal revenues from the 2004 Olympic Games

Part of the expenditure for the Olympic projects corresponds to the purchase of goods and services on which Value-Added Tax (VAT) was imposed. In addition, some of the expenditure for the Games was allocated to pay income taxes and social security contributions for the employees who worked during the period of the preparations and the staging of the Games.

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[19] The impact from hosting the Olympic Games in Beijing, Athens, Sydney, Barcelona – Utilization of Olympic Venues and Infrastructures (TEE, 7-8 May 2009, Athens) / Building the Olympic Villages, Th. Asimakopoulos, former President of the Worker's Housing Organisation.

[20] The cost of the Media Villages (ILIDA residences of Lamda Development S.A. and Lofos Edison of AKTOR S.A.), which were converted to residence complexes after the Games, is estimated at €40 million, assuming construction cost equal to 233 €/m^2 over the total surface of the complexes.

Finally, additional revenues for the State came from increased economic activity due to the preparations for the Games.

A detailed estimation of the direct fiscal revenues from the Games is outside the scope of this study, due to the lack of sufficiently detailed data and the difficulties in identifying all the economic transactions related to the 2004 Olympic Games. However, we could make an estimate of the largest part of the VAT revenues and the income tax associated with the Games, using the data on public and private investment, together with the ATHOC expenditure.

The estimation of the fiscal gain from VAT revenues during the preparation period of the Games is based on an average rate ranging between 15% and 18%, taking into account the taxation rates over the period 2000 and 2004 and based on the assumption that construction absorbed the largest part of these investments (VAT 18%). Using rates lower than 18% is justified by the possibility that a small part of the expenditure was spent on goods and services taxed at reduced VAT rates.

The above VAT rates were normalised[21] and were applied to the PIP funds spent for the construction of the Olympic projects (€6,0 billion), the expenses of "Athens 2004" Organising committee (estimated at €2.1 billion, excluding the administrative expenses) and the privately funded investments, such as the construction of the Olympic village and the "Karaiskakis" stadium (€380 million). This resulted in the estimate that the VAT revenues from the Olympic projects ranged between €1.1 and €1.3 billion (Figure 3.21).

Next, we estimated the income tax on wages paid out of the Ordinary Budget and the administrative expenses of ATHOC 2004. For the estimation of the mean income tax rate, we used data on income and collected tax from the General Secretariat for Information Systems (GSIS).[22] The mean income tax rate over the period 2006-2008, which correspond to the earliest available data, was approximately 15.4%.

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[21] The 18% rate on the pre-VAT value is equivalent to a 15.3% rate (0.18/1.18) on the final value of the taxed product or service.
[22] Statistical Bulletin, GSIS

Figure 3.21: VAT estimates
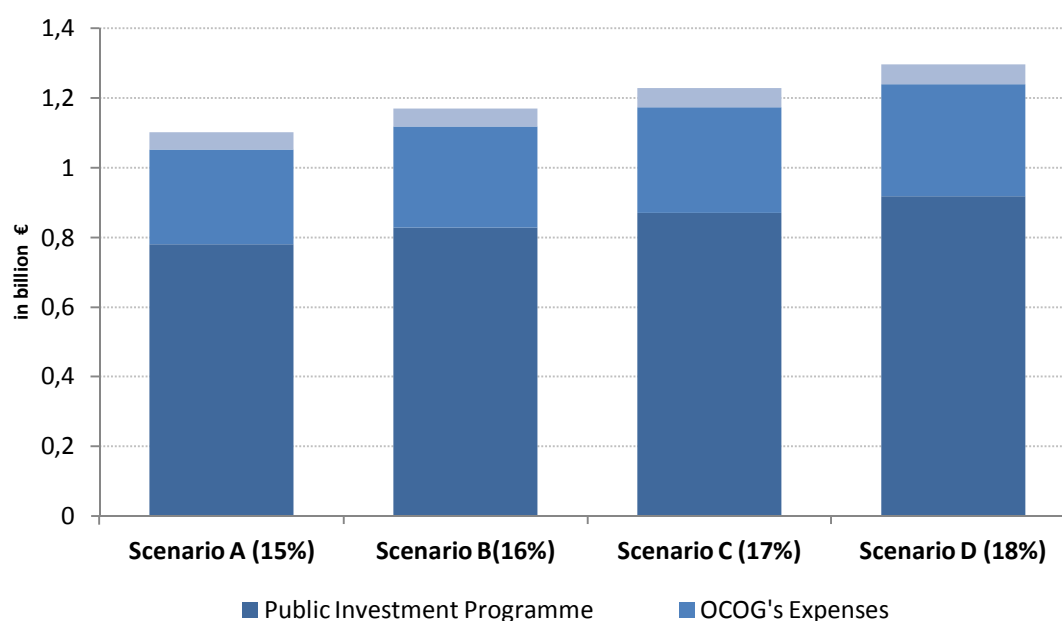
Source: IOBE estimates

By applying this rate on the expenditure of the Ordinary Budget, which is mainly related to wages and other remuneration for the staging of the Games (€570 million), along with the expenses of the ATHOC 2004 regarding remuneration (administrative expenses – €101 million), the total income tax is estimated at €104 million. Respectively, the social contributions related to the above labour income are estimated at €80 million. Overall, the fiscal revenues during the preparation period of the Games are estimated between €1.3 and €1.5 billion.

It should be stressed, however, that the preceding methodology does not incorporate the multiplier effect of the Constructions sector. Based on a study currently conducted by IOBE, each euro invested in Constructions generates €0.38 of direct and indirect tax revenues.[23] Therefore, considering the multiplier effect from the interaction of Constructions with other sectors of economic activity in Greece, the estimated fiscal revenues during the preparation and the conduct of the 2004 Olympic Games (direct and indirect) exceeded €2.4 billion. If in addition we also take into account the VAT on ATHOC expenses, the income tax on ATHOC wages and the income tax on the Ordinary Budget expenses (mainly salaries and overtime payments) the estimate on the fiscal revenues exceeds €2.9 billion.

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[23] IOBE (2014). The role of economic growth, the impediments and the perspectives of the Constructions sector (in process).

Additionally, the upgrade of the country's infrastructure and image might have resulted in positive catalytic effects on the Greek economy (higher productivity, tourism, exports), with corresponding positive effects on the Greek public revenues.[24] According to a statement of the then Finance Minister, Yannis Stournaras, at the Greek parliament in early 2013, the final outcome of the 2004 Olympic Games, taking into account the above sources of revenue, is positive even in fiscal terms.[25]

Figure 3.22: The contribution of Olympic expenditure to tax revenues (direct and indirect taxes)
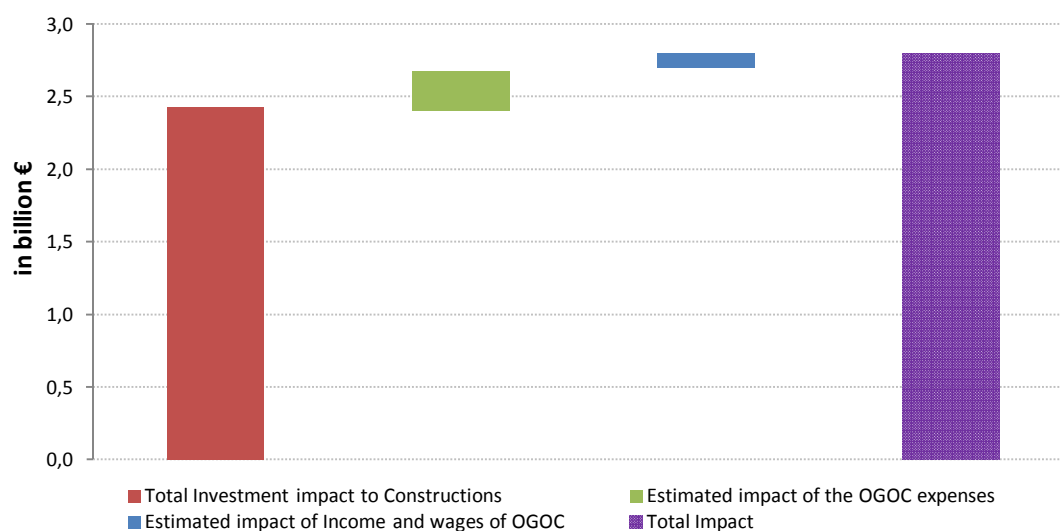
Source: IOBE estimates

3.5   Conclusions

Despite the challenges and the uncertainties in the preparations period, staging the 2004 Olympic Games was recognised as a great success. During the Olympic and Paralympic Games, Athens hosted 17,600 athletes and team officials. This required the coordination of a large number of services (to provide food, cleaning, etc.), which was successfully implemented.

The preparations for the Games led to a significant upgrade of the infrastructure of Athens and other cities in Greece. Athletic venues and other facilities were built as a result of the Games, along with an entire suburb (the Olympic village) and a road network to connect these facilities with the main roads of Athens. During that period, a substantial number of

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[24] The assessment of these effects is presented in the following two chapters of the study.
[25] Greek Parliament, Plenary minutes, XV Period, Session A, Vol., page 6717

other infrastructure projects were implemented as well (e.g. Tram, suburban railway, renovation of ISAP stations, renewal of the public transportation fleet, modernisation of the equipment of the police and of the public broadcaster, improvement of the infrastructure and of the medical equipment of healthcare institutions, etc.), which contributed to the modernisation of Athens and improved significantly the city transportation system.

Table 3.3: Cost and benefits for stakeholders in the preparations for the Olympic Games

Entity	Cost	Benefit
Greek government (State Budget)	- PIP expenditure (€6.0 billion) - Ordinary Budget expenditure (€571 million)	- Revenues from the final surplus of ATHOC 2004, after the expenditure on behalf of the Greek State (€7 million) - Estimated direct and indirect fiscal revenue (taxation and social security contributions) from investment spending (€2.4 billion) - Estimated fiscal revenue from current spending (Ordinary Budget & ATHOC 2004 - €0.5 billion) - Fiscal revenues from additional economic activity, due to better infrastructure, increase in tourist arrivals and improved image of Greece abroad
ATHOC	- Operating expenditure (€1968 million) - Expenditure on behalf of the Greek State (€304 million)	- Operating revenues (€2098 million) - Subsidies for activities on behalf of the Greek State (€180 million)
Private sector (self-financed projects)	- OEK expenditure for the construction of the Olympic village (€280 million) - Renovation of "Karaiskakis" stadium (€60 million) - Media villages in Marousi and Pallini (€40 million)	- Supply of 2292 flats to OEK beneficiaries - Revenues from the commercial use of "Karaiskakis" stadium - Revenues from the sale and rent of luxury residences

Source: State Budget reports 2000-2010, Official report ATHOC 2004, IOBE estimations

As regards the Olympic legacy, some of the venues have been successfully utilised either for commercial use or for hosting cultural events. However, in many cases they have remained idle. Some facilities have been abandoned and are currently substantially damaged, due to lack of maintenance. Despite the significant delays in the utilisation of many venues, the forthcoming urban renewal projects in the areas of Hellinikon and Palaio Faliro prompt optimism for better utilisation of the Olympic legacy.

The construction of the necessary infrastructure was mainly financed from the State Budget. The estimation of the cost and benefit from the Olympic projects depends on which projects are classified as Olympic. Based on data from the PIP and the Ordinary Budget, the gross expenditure of the State Budget on Olympic projects reached €6.5 billion. However, this is not necessarily the most appropriate measure of the actual cost, given that the Greek State financed many projects which were labelled "Olympic", even though they were not directly related to the staging of the Olympic Games.

Additionally, the gross expenditure for the Olympic Games should not be seen as a measure of the net burden on public finances. Apart from the gross expenditure, covered from the State Budget, one should also take into consideration the tax revenues, the social security contributions and other public revenues from the staging of the Olympic Games and from the additional economic activity during the preparation period (estimated at approximately €2.9 billion) and during the post-Olympic period (Table 3.3).

Regarding ATHOC, the final financial outcome is positive, even when we take into account the expenditures the committee made on behalf of the Greek State. Additionally, the construction of some facilities used for the Games was financed by entities and enterprises that in return received the exclusive rights to use the facilities they financed.

The quantification of the costs and the benefits for the entities involved directly in the organisation of the Olympic Games is only a small part of the overall assessment of the contribution of the 2004 Olympic Games to the Greek economy. The overall assessment also involves estimating the impact of staging the Games on many other aspects of the economy (such as the impact on GDP, jobs created). A detailed estimation of the broader economic impact of the Games is presented in the following two chapters.

4   IMPACT ON TOURISM AND ON OTHER SECTORS

In this chapter we attempt to quantify the impact of the 2004 Olympic Games on the Greek economy. Using appropriate econometric tools, we estimate, on the one hand, the impact of the Games on the Greek economy and, on the other, the duration of the positive shock on the economic sectors that were affected by the Games.

As a general finding from the empirical investigation, we could state that there is strong evidence of a short-term positive effect from hosting the Olympic Games, reflected in several important economic indicators. The impact of the Games, however, seems to have faded away after the start of the economic crisis.

This chapter is structured as follows. The next section presents a detailed description of the available data. Most of the variables in the dataset had an active role in the quantitative analysis, however only the statistically significant results are presented in this study. The presentation of the empirical methodology, results and interpretations follows after that. The chapter concludes with the findings from the econometric analysis. The appendix presents summary tables with descriptive statistical measures and the results of the econometric estimations.

4.1   Data and descriptive analysis

Most available time series cover a period from the early 1990s up to 2013. We used annual series in the econometric models. The number of observations per variable, and hence per model, varies from twelve observations, for an incomplete sample (observations from 2000 onwards), to 24 observations, for a complete sample.

In the analysis that follows we use four reference points for most time series. In particular, for each variable the first reference point is the first year for which we have an observation for the variable. As a second reference point we use the year 2001, when the attack on the World Trade Centre in New York took place. This event had a serious exogenous impact on air travel and tourism on a global scale. As a third reference point we use 2004, the year of the Olympic Games in Athens. The fourth and final reference point is 2008, the start of the economic recession. The scope of this strategy is to present the trends of the variables, taking into account events that may have caused exogenous disruptions.

4.1.1   Tourist arrivals

The first variable used in the analysis measures the international arrivals at the Athens International Airport "Eleftherios Venizelos" from 1998 until 2013. We constructed one series per continent of origin of the travellers arriving in Athens and a global series that presents overall arrivals, regardless of their origin.

Figure 4.1 presents the tourist arrivals in Greece per continent of origin and total arrivals over time. The top chart presents all series together. In the other two charts, we separately present the series for North America and Asia and for Africa, Oceania and South America, due to scale differences.

Figure 4.1: Tourist arrivals per continent
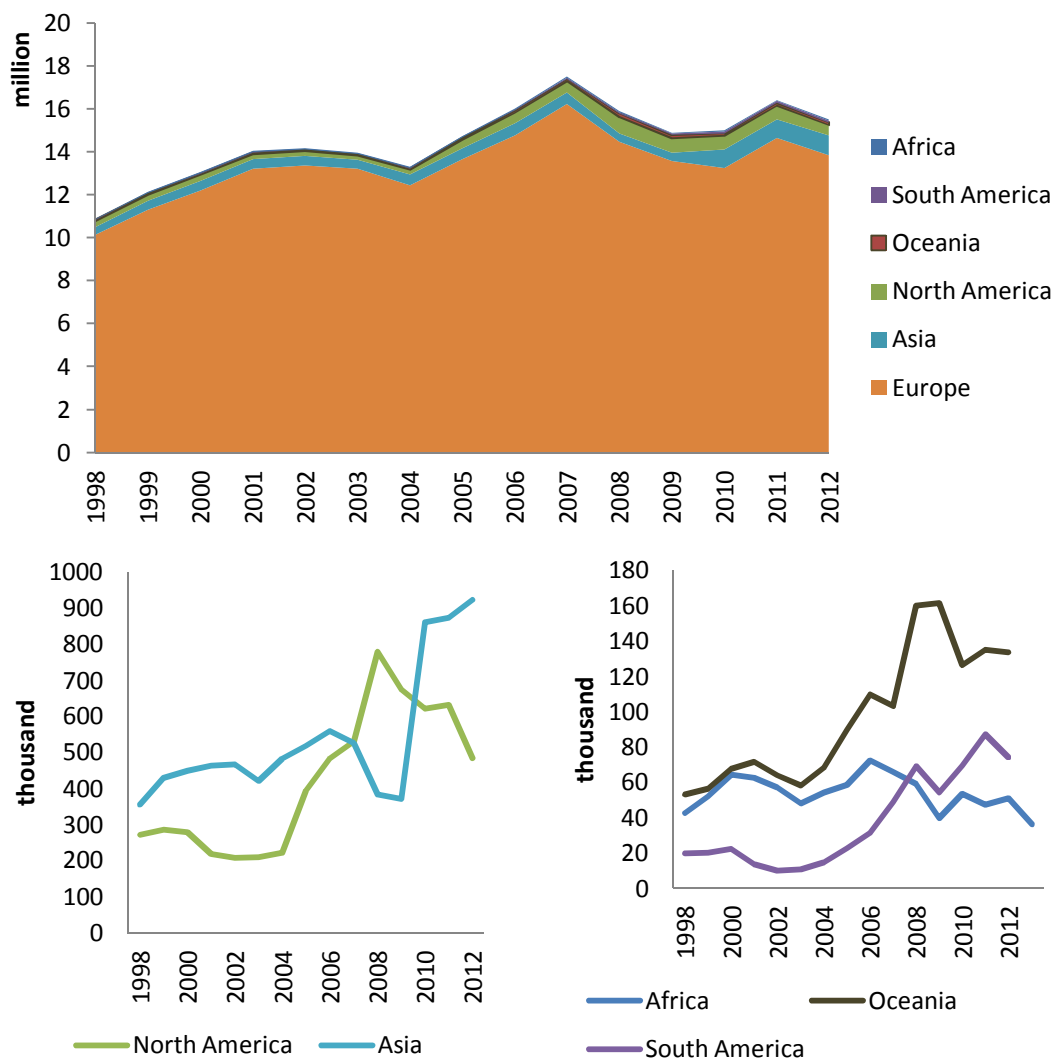
Source: EL.STAT. **Data processing:** IOBE

We observe an increase of arrivals up to 2001, a reduction from 2002 to 2004 and a significant increase from the year when the Athens Olympic Games took place and up to 2008, when the upward trend was interrupted due to the unfavourable conditions in the global economy. The course of the total arrivals is driven mainly from the arrivals from Europe, as Europe is by far the largest market for Greek tourism.

Figure 4.2: Rate of change of arrivals per continent
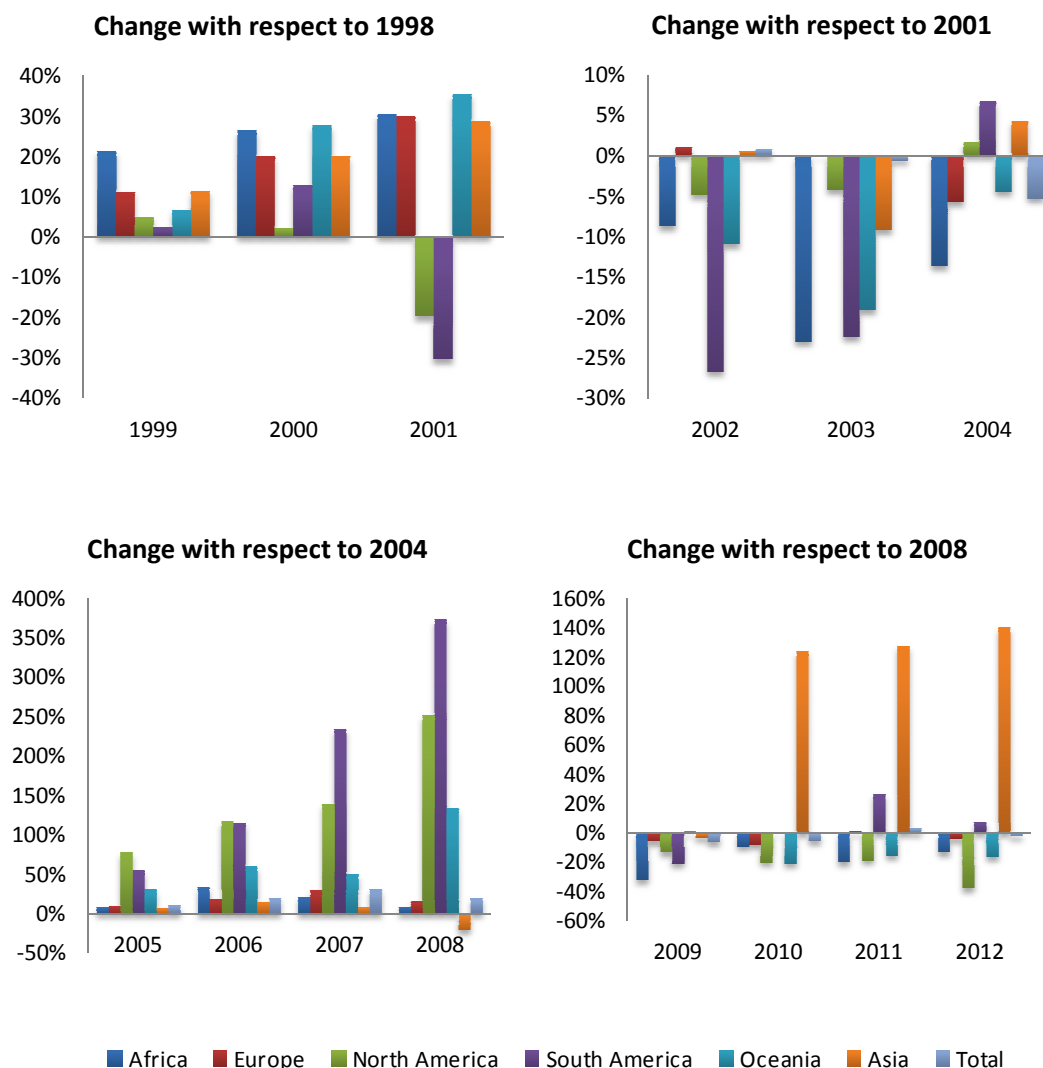
Source: EL.STAT **Data processing:** IOBE

Nevertheless, it is also worth to observe the path of the other markets for Greek tourism. The share of arrivals from other continents over total arrivals is rising. Indeed, the share of arrivals from Europe on total arrivals fell from 95% in 2004 to 89% in 2012. In addition, some of the other markets have different trends than Europe, both over time and in relation with the impact of the Olympic Games. For example, the impact of the Games on arrivals from

Asia seems to weaken faster (with a significant drop in 2007), increasing strongly, however, later on, during the recession.

The momentum of the arrivals is illustrated in Figure 4.2, which presents the rate of change of arrivals per continent with respect to the corresponding reference points. In the upper left chart we observe that arrivals increased from all continents from 1998 to 2001, except for 2001 when there was a significant drop of arrivals from North and South America. From 2001 onwards, the impact of the terrorist acts and the economic slowdown, recorded in some regions at the time, on tourism was reflected in the arrivals from the other continents as well.

In 2004, tourist arrivals from Asia, North America and South America increased. On the other hand, the arrivals from the remaining continents declined, which is most likely due to a crowding-out effect.[26] The crowding-out effect refers to the situation when a large share of the tourists planning to visit a city that hosts an event tend to postpone their visit, because they expect that prices will be higher due to the event, or that there will be difficulties with transportation due to congestions, or difficulties in finding accommodation, or that there will be other nuisances, related to security measures and the service time in transport hubs (e.g. airports), etc. Notably, scientific studies published in the past decade have shed new light on the significance of crowding-out effects on tourism, as a result of staging athletic events.

According to a view that was very popular until a few years ago, hosting major events (sport events, cultural events etc.) had a very large positive impact on tourism in the host country through the publicity provided by the mass media. However, recent studies have found that while there is indeed a positive impact on tourism in the host country, the impact is not as large as previously believed. Furthermore, recent studies (Fourie & Santana-Gallego, 2011, and the citations therein) reveal the short-lived nature of this impact.

In most cases, the tourist flows, both in terms of international arrivals and tourist expenditure, stay high for a period of four to ten years after the Olympics. The case of Greece thus follows the international trend, as increased tourist activity is observed in the four-year period from 2005 to 2008. This can be clearly observed in the lower left chart in Figure 4.2. In the four years after the Games, the international arrivals grew at very high

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[26] See Fourie, Siebrits & Sponk, 2010, Matheson, 2002 and Solberg & Preuss, 2006

annual rates. From 2009 onwards, the tourist flows started to decline sharply due to the global economic crisis and the uncertainty that prevailed during that period.

Figure 4.3: Arrivals in Attica
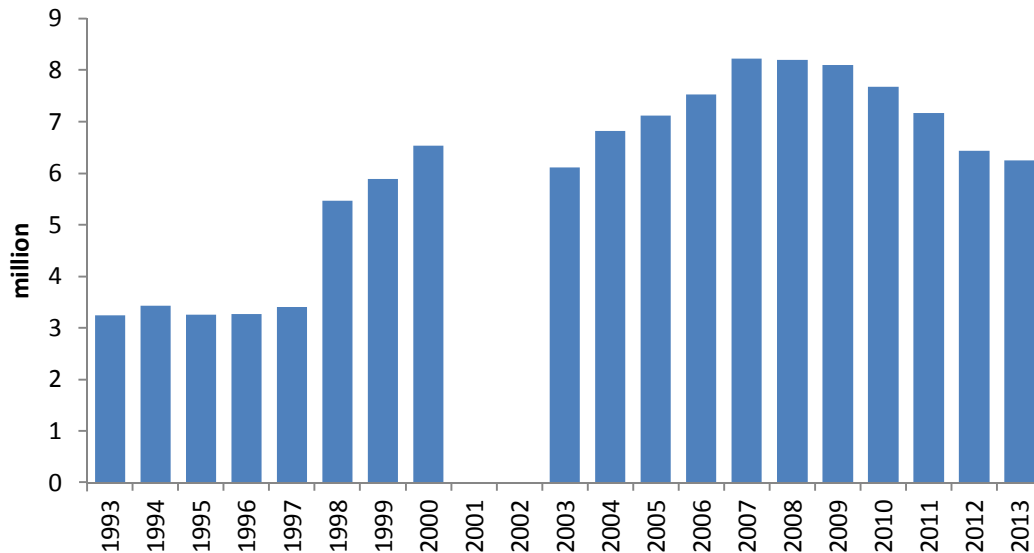
Note: No data is available for 2001 and 2002 in the data source
Source: Eurostat **Data processing:** IOBE

Figure 4.4: Arrivals in Attica, annual percentage change

Source: ELSTAT **Data processing:** IOBE

Figure 4.3 shows the number of arrivals in the wider area of Athens, the host city of the 2004 Olympic Games. The trend of the arrivals in Attica follows closely the course of international arrivals in the previous charts. Growth was observed already from 2004 with the Games, as

the number of arrivals increased from 6.1 million in 2003 to 8.2 million in 2007. Once more, with the start of the economic crisis the tourist flows declined sharply.

Indeed, focusing on the percentage changes of arrivals in Attica in Figure 4.4, we notice that for 3 years after the 2004 Olympic Games, the visits to Attica were increasing every year by 4%-9% (20% throughout the period 2004-2007).

This "golden" era, together with the positive effects from the extensive publicity of Athens in the international press and electronic media, seems to have come to an end in 2008 with the start of the economic recession.

4.1.2   Exports

The positive publicity that the country received with the Olympic Games could have had potentially an impact on other variables apart from tourism, such as the exports of goods. In particular, Figure 4.5 shows the exports of Greek goods having an upward trend over time, with a temporary surge after 1997, which coincides with the announcement of Athens winning the bid to host the Olympic Games.

In 2001-2003 the exports of goods fell, however they returned to even faster growth rates between 2004 and 2007 (8.5%-11.6% annually). With the start of the economic crisis in 2008, the exports of goods initially stabilised, falling sharply in the following year (2009). Afterwards, the exports of goods returned to growth.

Figure 4.5: Exports of Greek goods, constant 2010 prices
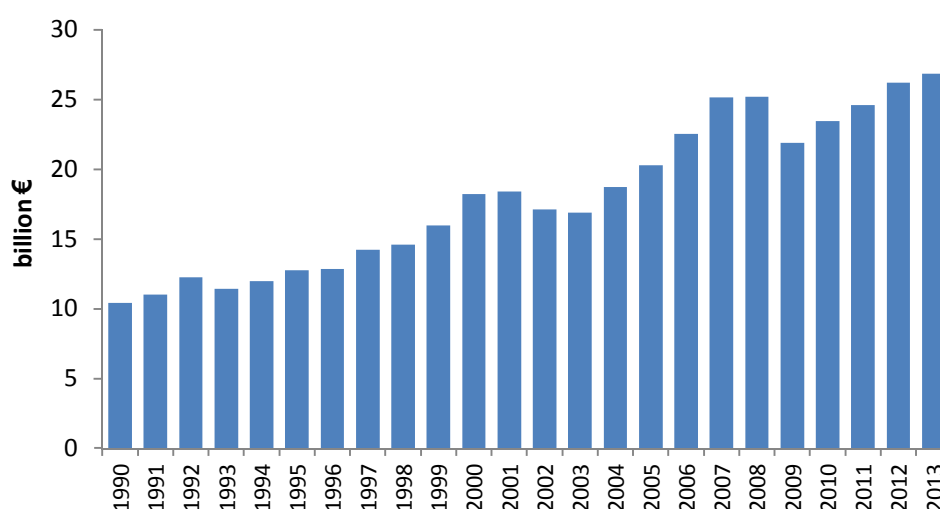
Source: AMECO **Data processing:** IOBE

Regarding the geographic destination, Greek exports to most continents grew after the end of the Games (Figure 4.6). Initially, the growth was particularly strong in the Asian markets; however these markets also experienced earlier a slowdown (already from 2007). In contrast, in North America and Oceania, the growth of exports was sustained. This may be related to the fact that the Athens Olympics received greater publicity in these parts of the world.

Figure 4.6: Percentage change of exports with respect to 2004
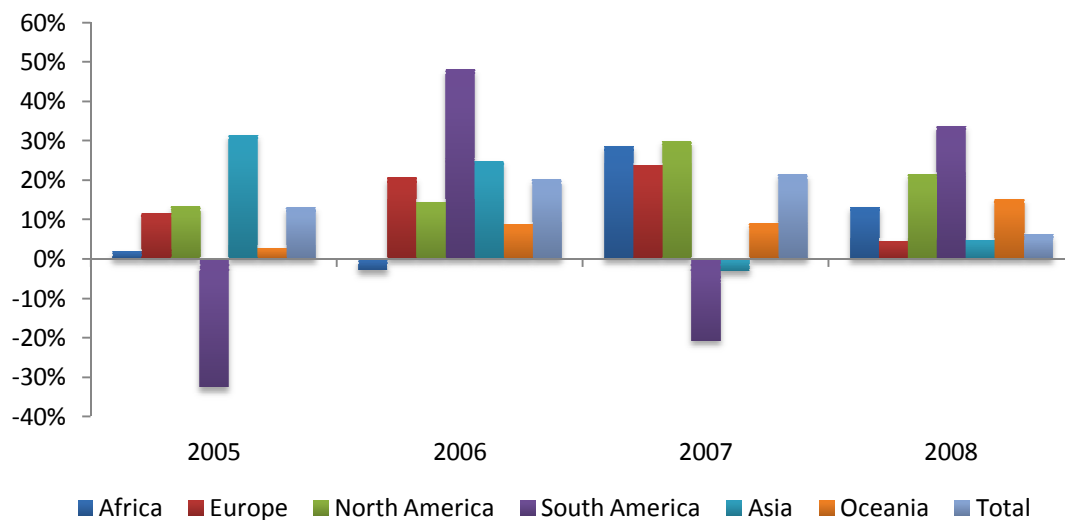
Source: The World Bank **Data processing:** IOBE

4.1.3   Unemployment

Next, we examine two time series on unemployment. The first series tracks the unemployment rate in Greece, while the second tracks the average unemployment in the 15 countries, that were the members of the European Union in the period 1995-2004, as a standard for comparison.

The unemployment rate during the construction of the infrastructure projects followed a downward trend, interrupting a long period of rising unemployment (1990-1999). The likely positive impact of the preparation for the Olympic Games is more notable in 2002 and 2003, when the construction of the projects accelerated. During that two-year period, the unemployment rate in Greece continued to fall, in contrast with unemployment in the EU-15 overall.

After a temporary hike in unemployment in 2004, perhaps due to the completion of the projects for the Games, the unemployment rate returned to a path of decline in the four post-Olympic years. With the onset of the crisis in 2008, a period of very high unemployment and overall economic distress began.

Figure 4.7: Unemployment rate in Greece and EU-15 (%)
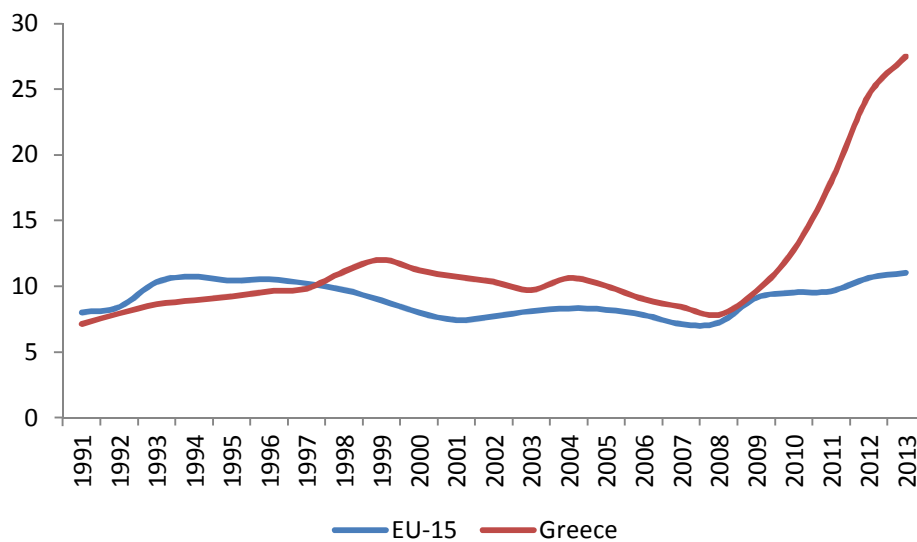
Source: AMECO **Data processing:** IOBE

Figure 4.8: Rate of change of unemployment
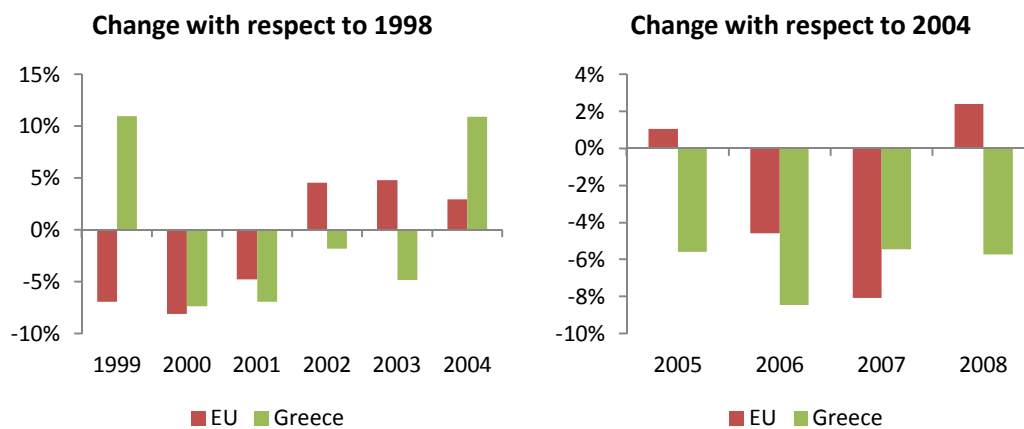
Source: AMECO **Data processing:** IOBE

4.1.4   Inflation

Figure 4.9 shows the course of inflation in Greece and EU-15 over a time span of about 25 years. Inflation here is defined as the rate of change of the respective Harmonised Index of

Consumer Prices. This index is used to measure the changes of the overall price level of goods and services that make up the "household basket".

We observe that inflation in Greece was higher than the EU-15 average throughout the period at hand, up to 2012. The difference shrinks with the effort to achieve the Maastricht criteria for the entry of Greece in the European Monetary Union between 1995 and 1999. From 1999 onwards, the difference between the inflation rates in Greece and in the EU-15 was slightly larger between 2001 and 2003 (+1.5 to +1.8 percentage points) and in 2005 (+1.4 p.p.).

Figure 4.9: Inflation rate, based on the Harmonised Index
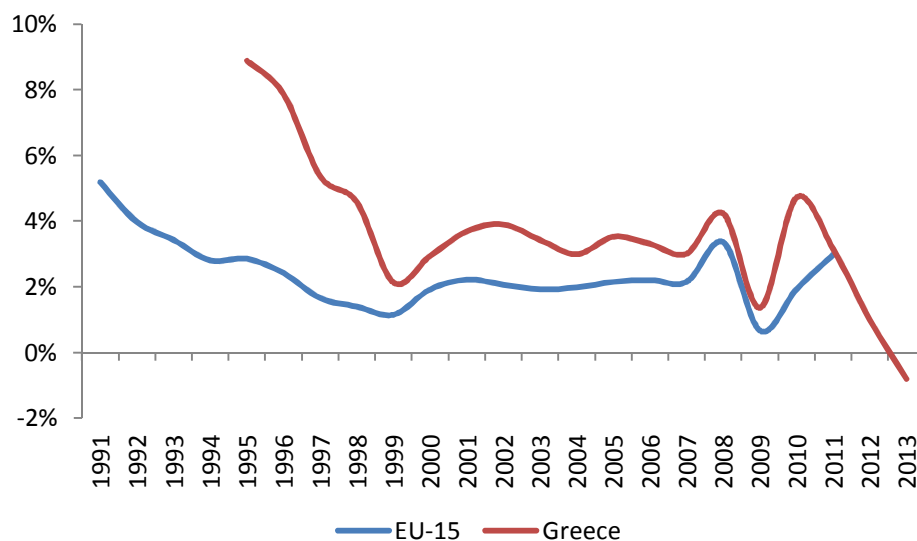
Source: Ameco **Data processing:** IOBE

This difference, in part, could be interpreted as a result of excess demand for Greek products and services, for the duration of the construction period and immediately after the Games, taking into account the production capacity constraints in infrastructure and in the provision of services, particularly in tourism. In other words, the strong construction activity and the publicity the country attracted at a global level could have pushed up the aggregate demand for Greek products. This increase could have generated temporarily a relative difficulty of serving the excess demand due to constraints in the availability of existing production resources. As a result, inflationary pressures arose.

4.1.5   Productivity

The total factor productivity is a variable that reflects changes on the total output of an economy that do not come from changes in the quantities of key production factors (labour and capital), but from exogenous developments (supply shocks). Hence, an increase in the output that is not accompanied with a corresponding increase in the production factors is interpreted as an increase in the productivity of these factors. If the positive effects of all factors are taken into account, then the change in the total factor productivity could be interpreted as a long-term technological progress of the economy.

Figure 4.10: Rate of change of Total Factor Productivity

Annual change

Change with respect to 1998

Change with respect to 2004
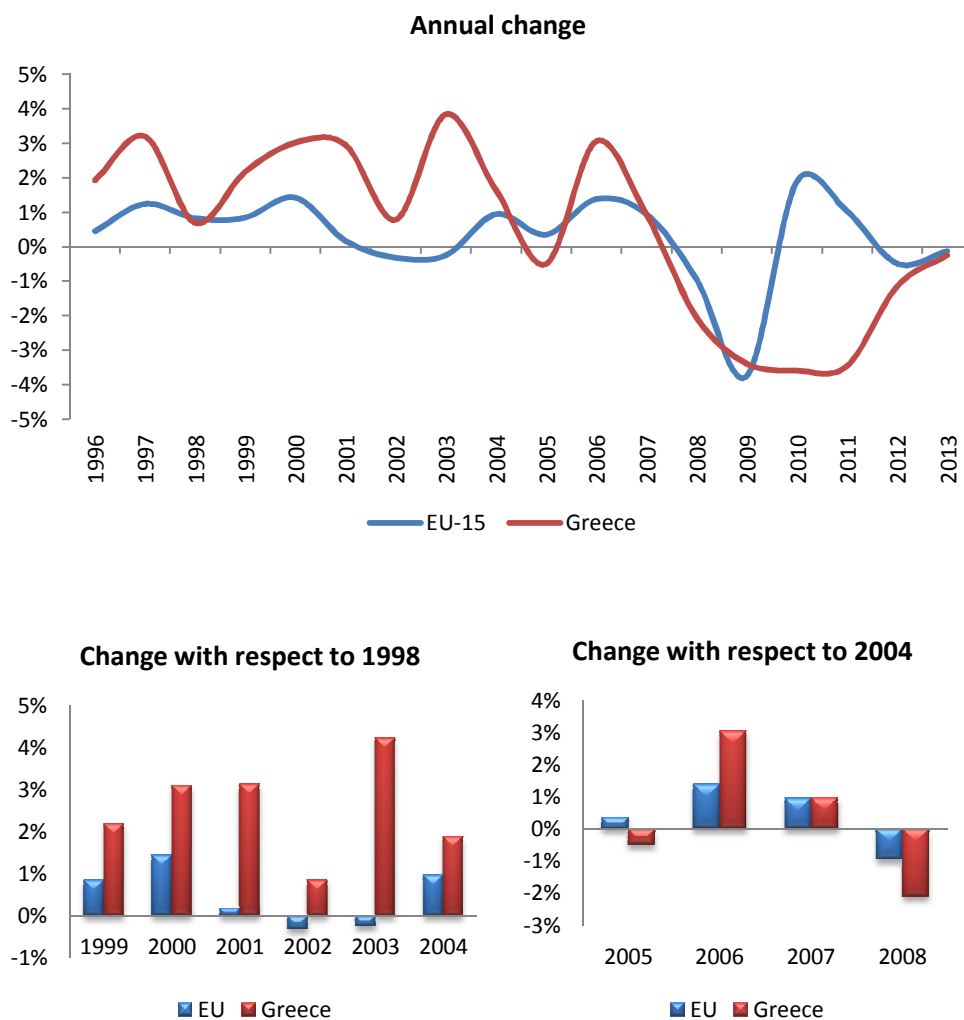
Source: AMECO **Data processing:** IOBE

We can observe in Figure 4.10 that there was a positive shock in the rate of change of total factor productivity in Greece both during the preparations for the Olympic Games and in the

years that followed. The difference in the productivity change between Greece and the EU is particularly high in 2003 (+4.1 p.p.). Unfortunately, the gains in terms of higher productivity seem to disappear during the crisis and particularly in 2010 and 2011.

4.2   Econometric analysis

The description of the path of various key economic variables over time is useful for the understanding of the impact of the Olympic Games, but it suffers from serious shortfalls. The key weakness comes from the fact that these variables are influenced by a number of other factors, beyond the hosting of the Olympic Games. The econometric analysis comes to meet, partly at least, this weakness.

The econometric techniques are used mainly for the empirical investigation of causal relationships. Furthermore, they are used to identify potential causality between two and more variables. The usual assumption that all the other factors affecting the examined relationship remain unchanged (the *ceteris paribus* condition) is made in the interpretation of the results.

The results from the econometric investigations should be interpreted as indications and not as proof of causality. One should keep this in mind in what follows, in order to interpret correctly the findings of our research.

4.2.1   Findings from previous econometric studies

The empirical investigation of the impact of major sporting events on the economy of the host country is a subject that the international academic community has studied extensively. Many studies on this matter have been published in prestigious academic journals. These studies vary both in terms of the econometric models that they used and in terms of the type, size and quality of datasets used by each scholar.

The main findings up until the early 2000s supported the conclusion that hosting major events had a positive impact on certain variables of the real economy (Hall, 1987, Kang, 1988, French & Disher, 1997, Robin, 1988, Walle, 1996). As expected, hosting such events has an impact on key economic variables related to tourism and international trade. These variables include the international arrivals to the city hosting the event, tourist expenditure, number of stays, imports and exports.

In the recent literature regarding the economic impact of hosting major events, some new empirical findings have come to light. Using more advanced econometric models, the researchers were able to reveal some phenomena which had previously passed unnoticed. In particular, the latest studies suggest that the correlation of hosting major events with some real economic variables is weaker than initially believed, mainly due to crowding-out effects.

The crowding-out effect in this case refers to potential visitors postponing a planned or intended visit to the host country, because the country is staging the event. This could happen mainly for the following reasons: Potential visitors of a country that has taken up the hosting of a major event might postpone their visit for security reasons. They might also like to avoid congestion in the means of transportation and accommodation, catering and entertainment venues. In addition, they might try to avoid potentially higher prices. As a result of the above factors, they tend to visit the country shortly after the hosting of a major event.

The extensive publicity a country attracts from hosting a major event brings more tourists in the period that follows the event. Nevertheless, the latest studies suggest that there are crowding out effects both for the duration of the Games and with regard to the potential positive economic impact one or two years after the end of the event (Preuss, 2007, Fourie & Santana-Gallego, 2011, Song, 2010).

Some studies suggest that the identification of positive results from the hosting of major events is an exceptionally difficult task and that in many cases no reliable conclusions can be drawn. In addition, the latest studies stress that the size of the impact depends on the type of the event (Winter Olympic Games, Summer Olympic Games, FIFA competitions, etc.), the level of economic development of a country and the timing of the event (during peak or off-peak tourist seasons).

4.2.2   Methodological approach

Obtaining reliable statistical data in Greece is not always possible. Hence, the use of advanced econometric methods of analysis with richer models was not feasible. Nevertheless, we used modern econometric tools, which helped us draw useful conclusions regarding the economic impact of the Athens Olympics. In particular, in this part of the analysis we use a relatively new methodology of model estimation, developed by Bai and Perron (2003).

This methodology is a modified least squares estimation that reveals the existence or not of structural breaks (breakpoints) in the time series of the variables. The advantage of this methodology is that it identifies endogenously potential structural breaks and checks their statistical significance. In the case of the 2004 Olympic Games, this is perhaps the most appropriate tool for the investigation of the presence of such a break in 2004 or at some point close to 2004. Such a finding would be in line with the international literature and the findings from the latest empirical studies.

4.2.3   Results

Applying the aforementioned method of Bai and Perron, we establish the existence of a structural break in 2005-2006. The international arrivals and the tourist expenditure shifted up from 2005 to 2007. This is fully in line with the findings in the international literature.

This positive result was interrupted with the outbreak of the economic crisis in 2008-2009. The correct identification of the turning point of the economic activity in Greece is an additional indication that strengthens the theoretical and scientific backing of our findings.

Tourist expenditure

Initially, we used as a dependent variable the tourist expenditure for the period from 2000 to 2013. This variable is a measure of the total amount of money spent in the country by visitors from abroad. We can see in Figure 4.11 that the tourist expenditure had a positive shift from 2006 to 2009. This result is revealed, once we deduct the autonomous part of the tourist expenditure. In other words, we deducted from the series the part that could be considered as repeating every year, irrespectively of the remaining drivers of tourist expenditure. The rest of the tourist expenditure had an upward shift.

The figures presented in this section of the analysis come from the estimation of alternative models. In the graphs, the observed values depict the actual data for each variable, while the estimated values come each time from the estimation of the particular model. The difference between the two is the residual that reflects the unexplained, non-systematic variability of the dependent variable, i.e. the part that cannot be explained from the available data.

This methodology initially identifies possible break points, tests their statistical significance and fits a linear step function, both through these points and through the actual data, such that it explains as much as possible from the variability of the dependent variable. As a

result, the line of the estimated values in all charts consists of successive linear segments, situated at different levels (segmented trend). The difference in the levels of two consecutive segments determines the time and direction of the structural change. A positive change in the linear segments signifies that at that point of time there was a positive and statistically significant impact on the examined dependent variable. A negative difference between two segments can be interpreted in a similar way.

Figure 4.11: Tourist expenditure, observed values and segmented trend
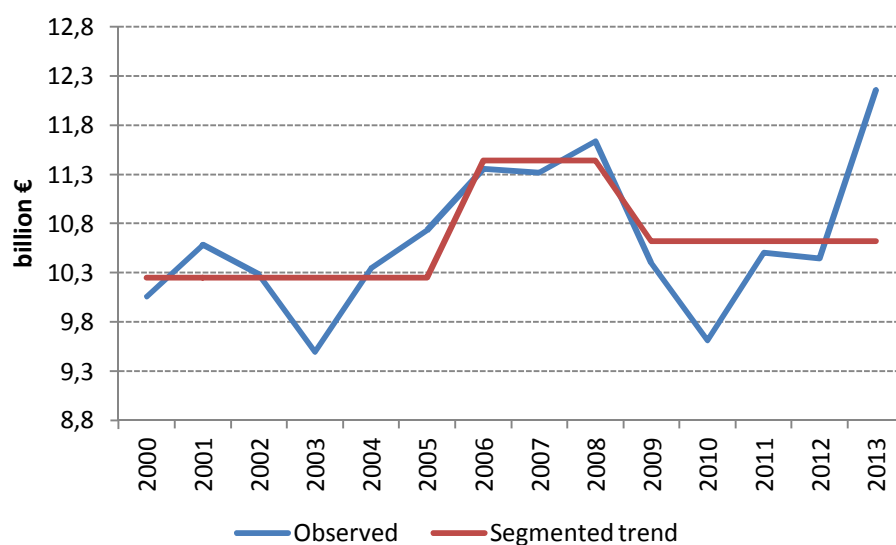
Figure 4.12 and Figure 4.13 illustrate the results of applying this method for the number of international arrivals in Greece. In case that we do not use another variable to explain the variability of international arrivals, there are two breaking points, 2000 and 2006. The second point can be explained with a positive influence from the Olympic Games due to the far-reaching publicity of Greece in the international mass media.

In Figure 4.13 we added an explanatory variable. The variable GDP38 is the weighted sum of the Gross Domestic Product of 38 countries, for which data were available. The variable is expressed in US dollars at current prices. It serves as a proxy of the global economic activity from 1998 until 2013.

Given that the tourist data on Greece confirm that the country attracts visitors from all continents, the above variable explains in part the variability of the international arrivals in economic terms. As the global income increases, we expect a positive impact on tourist visits in Greece, given that more people can thus afford to make the visit.

Figure 4.12: Total international arrivals, observed values and segmented trend
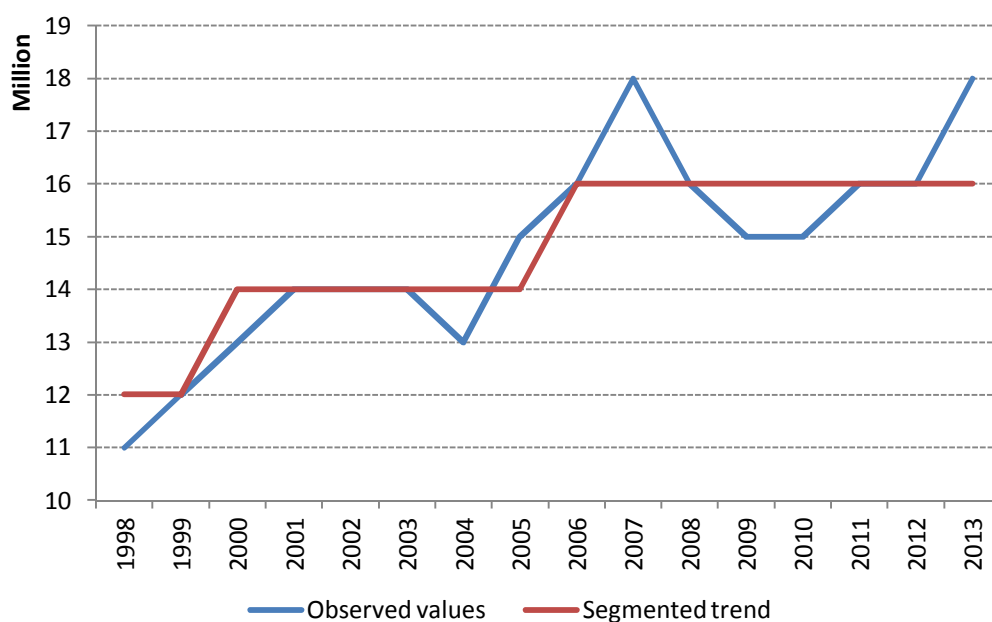
Figure 4.13: Total international arrivals with segmented trend, taking into account the impact from global GDP
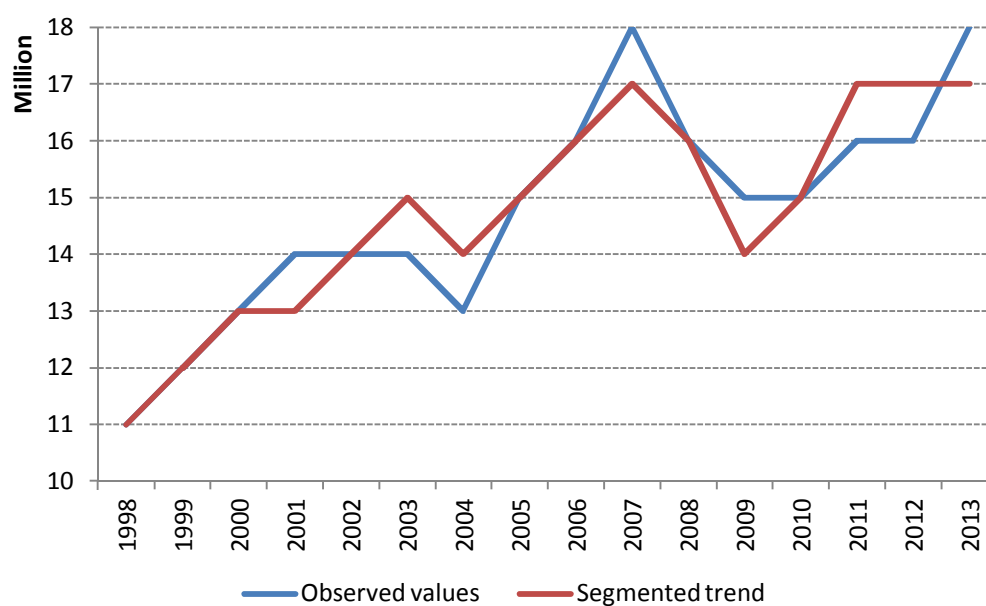
Naturally, the size of the impact depends on the elasticity of such a causal relationship. In contrast with the previous chart, there are three breaking points. The first breaking point remains in 2000, the second breaking point can be found in 2004, which coincides with the Olympic Games and lastly the third breaking point is in 2008. The last point indicates a

downward shift of tourist arrivals due to the global economic recession and the uncertainty regarding Greece.[27]

Exports

Figure 4.14 illustrates the positive impact of the Olympic Games on Greek exports. The segmented trend reveals the presence of a positive impact from the Olympic Games from 2003 onwards. In particular, the breaking points refer to 2003, 2006 and 2011. The two breaking points closer to the Games reveal a positive and statistically significant result. The analysis shows that the impact on exports was more gradual, yet more sustained.

Figure 4.14: Total exports, segmented trend

Observed values   Segmented trend
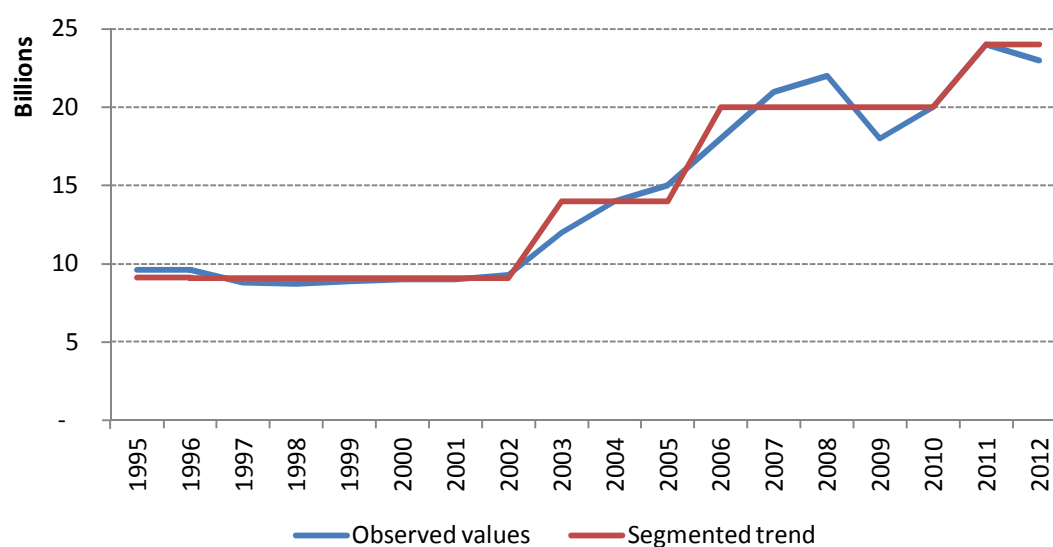
4.3   Conclusions

This part of the analysis examined aspects of the impact of the Athens 2004 Olympic Games on the Greek economy. The aim was to investigate the presence of wider economic effects.

As evident from the empirical analysis, the Olympic Games of Athens have a positive and statistically significant correlation with the number of international arrivals, the level of tourist expenditure and the level of exports of Greek products. The relationship type, however, differs across these variables. In the case of arrivals and tourist expenditure, the positive impact is relatively immediate and short-lived. In contrast, the positive impact on exports is more gradual and long-term.

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[27] The shift is more evident in the table with the estimation results.

The key positive impact of the Olympic Games on the Greek economy on the demand side comes mainly from the positive signalling, sent by the country with the successful hosting of the Olympic Games. The signalling is reflected in the changes of variables, such as tourist arrivals and exports. However the effects of this positive signalling are intangible. For that reason, the econometric analysis does not extend to the quantification of the impact of the Games on variables, such as employment and GDP and is focused on the confirmation of the presence of positive results on tourist expenditure and exports. The quantification of the wider effects through macroeconomic models is the subject of the next chapter of the study.

4.4 Appendix

Table 4.1: Tourist expenditure, breaking points

Dependent Variable: TOURSPEND
Method: Least Squares with Breaks
Date: 11/22/14   Time: 17:01
Sample (adjusted): 2000 2013
Included observations: 14 after adjustments
Break type: Bai-Perron tests of 1 to M globally determined breaks
Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
    5, Sig. level 0.05
Breaks: 2006, 2009
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth)
Allow heterogeneous error distributions across breaks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
2000 - 2005 -- 6 obs				
C	10249.73	119.8918	85.49155	0.0000
2006 - 2008 -- 3 obs				
C	11437.27	80.60670	141.8898	0.0000
2009 - 2013 -- 5 obs				
C	10622.20	427.8554	24.82661	0.0000
R-squared	0.386871	Mean dependent var		10637.23
Adjusted R-squared	0.275393	S.D. dependent var		749.1026
S.E. of regression	637.6650	Akaike info criterion		15.94091
Sum squared resid	4472783.	Schwarz criterion		16.07785
Log likelihood	-108.5864	Hannan-Quinn criter.		15.92824
F-statistic	3.470379	Durbin-Watson stat		1.518507
Prob(F-statistic)	0.067848			

Table 4.2: Total international arrivals, breaking points

Dependent Variable: GRARR38
Method: Least Squares with Breaks
Date: 11/22/14   Time: 17:02
Sample (adjusted): 1998 2013
Included observations: 16 after adjustments
Break type: Bai-Perron tests of 1 to M globally determined breaks
Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
    5, Sig. level 0.05
Breaks: 2000, 2006
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth)
Allow heterogeneous error distributions across breaks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	1998 - 1999 -- 2 obs			
C	11540067	346144.6	33.33886	0.0000
	2000 - 2005 -- 6 obs			
C	13896727	167507.6	82.96175	0.0000
	2006 - 2013 -- 8 obs			
C	16157352	381525.3	42.34936	0.0000
R-squared	0.787269	Mean dependent var		14732457
Adjusted R-squared	0.754541	S.D. dependent var		1859122.
S.E. of regression	921079.3	Akaike info criterion		30.47184
Sum squared resid	1.10E+13	Schwarz criterion		30.61670
Log likelihood	-240.7747	Hannan-Quinn criter.		30.47926
F-statistic	24.05505	Durbin-Watson stat		2.038101
Prob(F-statistic)	0.000043			

Table 4.2: Total international arrivals, breaking points

Table 4.3: Total international arrivals, breaking points, taking into account the impact of global GDP

Dependent Variable: GRARR38
Method: Least Squares with Breaks
Date: 11/22/14   Time: 17:03
Sample (adjusted): 1998 2013
Included observations: 16 after adjustments
Break type: Bai-Perron tests of 1 to M globally determined breaks
Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
    5, Sig. level 0.05
Breaks: 2000, 2004, 2008
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	1998 - 1999 -- 2 obs			
C	2603356.	1566344.	1.662059	0.1247
	2000 - 2003 -- 4 obs			
C	4182277.	1740412.	2.403038	0.0350
	2004 - 2007 -- 4 obs			
C	2195465.	2267989.	0.968023	0.3538
	2008 - 2013 -- 6 obs			
C	-471662.3	2690476.	-0.175308	0.8640
	Non-Breaking Variables			
GDP8	3.36E-07	5.78E-08	5.812527	0.0001

R-squared	0.875682	Mean dependent var	14732457
Adjusted R-squared	0.830475	S.D. dependent var	1859122.
S.E. of regression	765463.4	Akaike info criterion	30.18466
Sum squared resid	6.45E+12	Schwarz criterion	30.42609
Log likelihood	-236.4773	Hannan-Quinn criter.	30.19702
F-statistic	19.37067	Durbin-Watson stat	1.928552
Prob(F-statistic)	0.000061		

Table 4.4: Total exports, breaking points

Dependent Variable: GREXP38
Method: Least Squares with Breaks
Date: 11/22/14   Time: 17:04
Sample (adjusted): 1995 2012
Included observations: 18 after adjustments
Break type: Bai-Perron tests of 1 to M globally determined breaks
Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
    5, Sig. level 0.05
Breaks: 1997, 1999, 2004, 2009, 2011
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	1995 - 1996 -- 2 obs			
C	-8.46E+09	1.40E+09	-6.022850	0.0001
	1997 - 1998 -- 2 obs			
C	-9.37E+09	1.41E+09	-6.659760	0.0000
	1999 - 2003 -- 5 obs			
C	-1.01E+10	1.56E+09	-6.495902	0.0000
	2004 - 2008 -- 5 obs			
C	-1.05E+10	2.23E+09	-4.732130	0.0006
	2009 - 2010 -- 2 obs			
C	-1.32E+10	2.48E+09	-5.316463	0.0002
	2011 - 2012 -- 2 obs			
C	-1.21E+10	2.77E+09	-4.364190	0.0011
	Non-Breaking Variables			
GDP8	0.000695	5.40E-05	12.87330	0.0000

R-squared	0.995930	Mean dependent var	1.44E+10
Adjusted R-squared	0.993709	S.D. dependent var	5.70E+09
S.E. of regression	4.52E+08	Akaike info criterion	42.98080
Sum squared resid	2.25E+18	Schwarz criterion	43.32705
Log likelihood	-379.8272	Hannan-Quinn criter.	43.02854
F-statistic	448.5721	Durbin-Watson stat	2.091515
Prob(F-statistic)	0.000000		

Table 4.4: Total exports, breaking points

5 IMPACT ASSESSMENT: A MACROECONOMIC APPROACH

This chapter presents an assessment of the overall macroeconomic effects from hosting the Olympic Games in Athens. This chapter draws on and summarises some of the results and findings of the previous chapters, from a macroeconomic standpoint.

The hosting of major sporting events, such as the Olympic Games, the FIFA World Cup and the UEFA Euro finals, is a complex endeavour that has a multidimensional impact on the host cities and countries. These short-term and long-term effects are not limited to the economy, as they also have a very strong contribution to the overall improvement and cultural promotion of the country on the global scene. The quantification of the more general effects is exceptionally complicated, yet the economic impact can be assessed fairly accurately. The evaluations and the estimates presented in this chapter refer to and focus mainly on the impact of the 2004 Olympic Games on the economy of Greece and the Attica region in particular.

The macroeconomic assessment will run along two dimensions. The first dimension refers to the impact of the Games on economic activity and the boost on the medium-term potential growth rate of the economy that the Games caused.[28] The analysis is performed initially over the short term, evaluating the effects on economic activity caused by expenditures, of various sorts, for the Olympics and examining their links to demand factors. Afterwards, a medium-term supply-side analysis assesses the effects on the potential productive capacity of the economy that come from the upgrade of the production processes and the organisational structures as a result of hosting the Games. The supply factors, in contrast with the demand factors, have longer-lasting effects that do not fade away with the end of the construction activity and the staging of the Games.

The second dimension is with regard to the impact of the Olympic public spending on the public finances of the country, and in particular on the fiscal deficit and the public debt, in the medium-term. Subsequently, as part of the fiscal impact analysis, we examine the opportunity cost of certain fiscal expenditures for the construction of sport facilities with questionable post-Olympic value and contribution to the overall Greek economic

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[28] The medium-term potential growth rate of output is defined as the GDP growth rate that a country can sustain over the medium term, without changes in the inflation rate in the economy. It corresponds to the equilibrium point of demand and supply in the economy, where there is neither excess capacity, nor inflationary pressures due to excess demand.

development. In other words, taking into account that many facilities after the end of the Games remained underutilised and were to a large extent damaged due to poor maintenance, the corresponding expenditure, at the level of the national economy, should be thought of as consumption, rather than as investment. This raises the question about the cost, in GDP terms, from the de facto redirection of public spending from investment to consumption, as a result of the inadequate use of the Olympic facilities.

This chapter is structured as follows: The next section outlines the methodology used for the analysis. It presents how the simulations were designed and provides information on the key features of the econometric models used. In the third section we assess the impact on key macroeconomic indicators from demand and supply-side factors, estimating the overall impact on the economy. In the fourth section we focus on fiscal issues and in particular on the impact of the Olympic public expenditure on the fiscal deficit and debt. In the fifth section we examine and assess the opportunity cost of the Olympic spending on projects that remained idle after the end of the Games, discussing whether some of the funds used for the Olympics could have been otherwise used, yielding greater benefit for the national economy. We conclude with a summary of the findings in the sixth section.

5.1   Methodology

The methodology for the assessment of the impact of hosting the Olympics on economic activity and public finances, in the context of the aforementioned bi-dimensional approach, is based on the comparative evaluation of alternative macroeconomic scenaria, built using econometric models. This methodology consists of constructing a baseline scenario, with which alternative scenaria, based on different assumptions, are then compared.

In particular, with regard to the first dimension of the analysis, the main question is how the Greek economy would have developed had the Games not taken place in Athens. This question can be answered comparing the results of a counterfactual scenario without hosting the Games, with the actual historical data for the period from 2000 to 2013 acting in this case as the baseline scenario. The difference between the two scenaria constitutes a measure of the impact of the Games on the Greek economy.

For this purpose, we perform simulations that depict the likely course of the Greek economy if we make the working hypothesis that Athens had not been the host city of the 2004

Olympic Games and of course that the construction and other projects connected with the Games had not taken place as well.[29] The scenaria cover the period of the preparations for the Games, with the construction of sporting, tourist and other support infrastructure (2000-2004), the period for the duration of the Games, and the period after the end of the Games to capture the expected post-Olympic effects on the economy.

The alternative scenaria are implemented by deducting expenditure linked directly with the Olympic projects on the demand side (e.g. public investment) and revenues, such as the income from the operation of the Organising Committee. The scenaria are carried out with the use of a macroeconomic model of the Greek economy, maintained at IOBE, which includes all the key macroeconomic variables of the Greek economy on a national accounts basis: GDP, demand components, employment, wages, prices, external balance etc. A brief description of the macroeconomic model of IOBE is presented in the Appendix.

The deviations between the results contained in the new scenaria and the historical data, expressed in percentage deviation of their levels, constitute a measure of the impact of the Olympic Games on the Greek economy at macroeconomic level. The results are presented both in tabular and chart format.

The second scenario estimates the impact of supply factors, imposing an exogenous shock on the variable of the model expressing total factor productivity[30] that limits the medium-term potential growth rate of the Greek economy. The size of the shock and the time profile of the impact are based on empirical studies that analyse and quantify the course of total factor productivity and potential output of the Greek economy over the medium term from 2000 to 2010. This scenario attempts to quantify the impact of technology transfers and the wider organisational improvements in the production process, leading in the end to a boost of productivity and efficiency coming from hosting the Games in Athens.

The medium-term impact of the Olympic Games on the public finances of the country is assessed and quantified through simulations, conducted with the general equilibrium model GIMF, which is considered most appropriate for this task. GIMF is a multi-region, multi-sector general equilibrium model, developed by the IMF and used for policy analysis in various member-states of the Fund. This study uses a version of the GIMF, calibrated at IOBE

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[29] This includes all expenditure, characterised as Olympic (see Chapter 3), including the modernisation projects in the security, health, tourism and culture sectors.
[30] The definition of total factor productivity is provided in section 4.1.5.

for three regions: Greece, the Euro area and the rest of the world. A brief description of the GIMF model and its calibration is provided in the Appendix.

Essentially, we attempt to assess the extent to which the public expenditure connected with the preparation for the Games, together with the additional public revenue, generated with the hosting of the Games, has had an impact on the long-term equilibrium debt-to-GDP ratio as well as the transition path of the debt-to-GDP and fiscal deficit to the new equilibrium.

5.2　The impact of the Games on economic activity

The empirical analysis presented in this chapter is mainly based on the system of national accounts of the Greek economy, developed by ELSTAT. All the key indicators that are presented and analysed in this chapter and the simulations performed here refer mainly to macroeconomic aggregates from the national accounts.

ELSTAT recently released the new annual national accounts statistics, covering the period from 1995 to 2013, for which ELSTAT followed the new European System of Accounts (ESA 2010). However, the data based on the new system cannot be used for this study, as the analysis and estimations performed here largely focus on fiscal data for the period from 2000 to 2004. In the new system, based on ESA 2010, the revision of the fiscal data only covers the period from 2006 to 2013. Hence, there would have been a break in the time series if we used the new series, while the data for the period of particular interest for this study in any case would have been based on the previous system. Therefore, in order to have consistency between the fiscal data and the activity indicators for the whole period from 2000 to 2013, we had to use the statistics compiled with the old system of national accounts. This does not limit the credibility of the results, nor does it affect the validity of the comments and the evaluations performed, given that the results are presented in terms of deviations and not levels.

The evaluation of the impact on the economic activity from hosting the 2004 Games, as already mentioned, is performed both on the demand and the supply side. The next section analyses the impact on the demand side.

5.2.1　Impact of demand-side factors

This section presents the first alternative scenario, which concerns the evaluation of the impact from demand-side factors. The economic effects on the demand side vary depending on the nature of the expenditures, the activities to which they are directed, the specific

demand components that receive the boost and the pursued objectives of the expenditures. In particular, the macroeconomic effects from the demand side of the economy that are evaluated here come from expenditures related to:

- Construction of sporting facilities, construction of other new infrastructure, renovation of existing infrastructure, procurement of equipment and the construction of the Olympic Village to host the athletes.
- Expenditure related to the operation of the organising committee (investment and current expenditure, together with income generation).
- Additional tourism receipts from the excess tourist flow that resulted from hosting the 2004 Games.

For the implementation of this scenario, the following interventions were made in the model:

A. The part of the investment that can be directly attributed to the construction of Olympic installations and other facilities related to the Games was deducted from the historical data series on investment (public and private) of that period. The expenditure linked to the Ordinary Budget (mainly expenditure for additional labour in the public sector) was deducted from public consumption. The current spending of the organising committee was deducted from private consumption.

B. The part of tourism receipts that is considered to come from the hosting of the Olympic Games was deducted from the normal tourism receipts, determined over the medium-term by the level of demand for tourist services at an international level. This impact is expected to be observed during the year the Games took place, and even stronger after the end of the Games, due to the increased publicity of the country abroad.

C. Income linked directly to the preparation and hosting of the Games is deducted from the income account of the private sector. This includes, for example, income generated from the award of engineering studies and other support services during the preparation phase and for the duration of the Games (e.g. security services). This income exceeds the income generated endogenously from the normal operation of the economy and should be attributed to the preparation and the hosting of the Games.

For the first and third interventions, the required statistical data fed into the model in order to perform simulations are observed statistical measures, the processing of which can be immediately performed. Besides, some of these measures have already been discussed in other chapters of this study. However, the part of the tourism receipts that is considered to exceed the normal collection from ordinary course of events in tourism, is not an observable magnitude and should therefore be estimated. This estimation is performed using statistical methods.[31]

In particular, the time series of travel receipts, in current prices, for the period 1999-2013, compiled as part of the statistical current account data by the Bank of Greece, are deflated using the consumer price index. The result is a series of tourism receipts at constant prices with 2000 as a reference year. The descriptive examination of this series shows a gradual increase of tourism receipts from 2004, growing stronger during the post-Olympic period (2005-2008). Then, the tourism receipts decline with the outbreak of the global economic crisis, before recovering anew mainly in 2013 with the relative improvement of the global economic environment.

Figure 5.1: Tourism receipts and fitted values, at constant prices
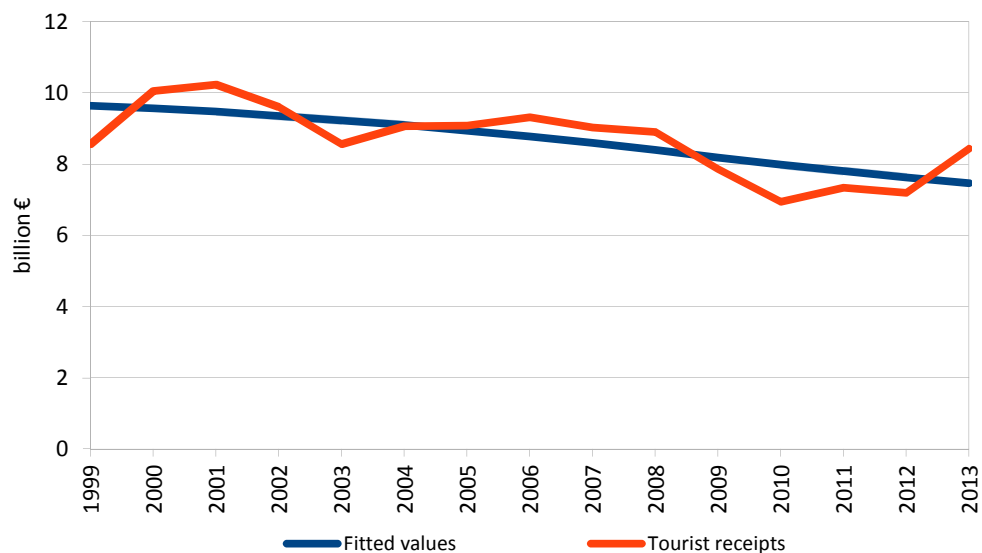
In order for these descriptive findings to gain a stronger empirical base and a clear quantitative nature, we implemented a more formal econometric procedure. We regressed the tourism receipts for the period 1999-2013 on the EU average private disposable income

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[31] Detailed analysis of the impact on tourism is presented in Chapter 4.

per capita at constant prices. This variable is a suitable proxy for the economic activity and conditions at European and global level and it is closely linked with the tourism receipts of the member-states and of course of Greece. The fitted values of this regression show the level of tourism receipts that is justified by the global economic conditions. It can be observed (Figure 5.1) that the actual receipts for 2004 are about the same as the fitted values, however during the post-Olympic period 2005-2008 and before the outbreak of the global economic turmoil, the actual receipts were exceeding the corresponding fitted values.[32] The excess of these receipts over the level justified by the global economic activity and personal real income can reasonably be attributed to the hosting of the 2004 Games, which had a positive impact on the publicity of the country abroad.

To confirm that the hosting of the Games contributed to a boost of the tourism receipts, we turn now to the issue of quantifying the additional tourism flow so that it can be evaluated in the broader framework of the macroeconomic impact on the demand side. For this purpose, we deduct the trend from the time series on tourist expenditure, using various statistical techniques.

Figure 5.2: Tourism receipts and non-linear trend
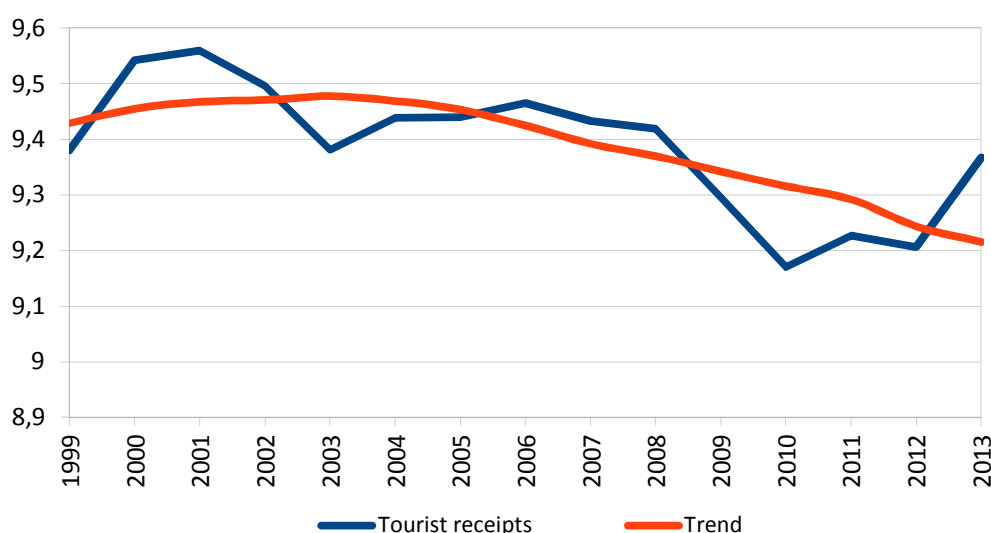
In particular, we tried a linear trend, a linear trend with blip points and level shifts, as well as non-linear techniques. In the end, we selected a trend that is extracted using the non-linear

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[32] It should be noted that the shift in the tourist receipts during the post-Olympic period is confirmed with the introduction of dummy variables that change the constant term of the corresponding regression.

filter of Hodrick and Prescott. Figure 5.2 presents the time series of the receipts and the trend extracted with the non-linear filter. The values of the trend express 'normal receipts', while the positive deviation observed between the actual receipts and the trend during the period from 2006 to 2008 is a measure of the excess receipts due to the Games. The amounts in constant 2000 prices are presented in Table 5.1. These amounts are deducted from exports of services in the simulation for the evaluation of the impact from demand-side factors.

Table 5.1: Excess tourism receipts 2005-2008, million euro at constant prices

Year	2005	2006	2007	2008
Tourism receipts	131.3	531.7	425.5	508.7

We turn now to the statistically observable direct expenditure. The key component of the demand boosting spending is the expenditure for the Olympic projects, contained in the Public Investment Programme (PIP). The PIP expenditure related to the Olympic projects cover the period from 2000 to 2010 and amount to €6.0 billion in total. Out of this amount, €838 million or 14% of the total refer to payments that were disbursed in 2005-2010. Nevertheless, even though these payments took place after the end of the Games, in our view they had an impact on activity that took place during the period 2000-2004. Based on this consideration, we considered more realistic to distribute the 2005-2010 payments in the period 2000-2004, with a stronger boost of the expenditure distribution in 2003 and 2004.[33] This expenditure is classified as public investment in national accounting terms. It was first deflated using an appropriate price index and then deducted from the corresponding time series of public investment (on a national account basis).

Subsequently, the annual expenditures of the ordinary budget, related to the Games, a total of €571 million for the period 2000-2004, were deducted from the public consumption series for that period, as expressed in national accounting terms. The expenditures for the construction of the Olympic village (€280 million, together with the expropriation cost) and the Karaiskakis stadium (€60 million) that correspond to the period 2002-2004 were deducted from the respective time series of investment in dwellings and construction,

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[33] The results from the estimation without distributing the post-Olympic expenditure in the years before the Olympics are presented in the Appendix (Table 5.4). These results do not differ substantially from the results of the estimation assuming the post-Olympic expenditure is distributed in the years before 2004.

following their transformation at constant prices. Then, we estimated the breakdown of the expenditure of the Organising Committee (OC) in national account terms.

The total expenditure of the OC amounts to €1,967.8 million throughout the period of preparation and hosting of the Games. The OC expenditure is initially broken down to three national account categories: private consumption, private investment besides dwellings and compensation of employees. Out of this expenditure, about 60% represents private consumption, followed by private investment and compensation of employees. The consumption and investment expenditure were deflated in constant prices of the year 2000. The compensation of employees was kept at nominal terms, as recorded in the private income appropriation account.

The analysis performed in the previous paragraphs was aimed at mapping the various expenditure categories of the Olympic projects to their corresponding national account aggregates, in order to incorporate them in the model and to conduct the simulations. To assess the impact, initially the model was simulated for the period from 2000 to 2013 to reproduce identically the historical values of all variables for that period. Subsequently, the above derived Olympic-specific expenditure estimates were deducted from the corresponding variables of the model. After this intervention, the model was simulated again over the same period 2000-2013 and the resulting new scenario was compared with the historical data, as derived from the first simulation. The percentage deviation of the values of the specific variables contained in the two scenaria can be considered as a measure of the impact of the demand-side factors on the national economy from hosting the Olympic Games. In other words, the alternative scenario resulting from the deduction of the expenditure describes the course of the Greek economy in case that the Games had not been hosted in Greece and the demand factors had not manifested themselves.

Table 5.2 shows the results for key macroeconomic aggregates as percentage deviations from the corresponding baseline values for the period from 2001 to 2010. Figure 5.3 to Figure 5.5 present the graphs of the corresponding results for the period from 2000 to 2013. It should be noted that when the values are expressed in terms of percentage of nominal GDP (e.g. current account), then the deviations are expressed in absolute levels and not percentage terms.

It is evident from the examination of the table and the charts that the expenditure for hosting the Games had a strong impact on economic activity during that period. The impact

was direct and gradually growing until 2004, the year when the Games took place in Athens. Public investment, which gradually stimulated the other demand components (private investment and consumption) was the key growth driver. The imports path, in principle, is in line with final demand, however the large growth of investment and consumption brought a stronger than expected growth of imports. Exports increased, however as mentioned previously, their growth strengthened mainly in the post-Olympic period.

Table 5.2: Macroeconomic impact of the demand factors, percentage deviation from the historical data

Year	2001	2002	2003	2004	2005	2006	2010
GDP	-0,13	-0.76	-1,22	-1,87	-0,93	-0,78	-0,12
Private consumption	-0,06	-0,39	-0,69	-1,37	-1,04	-0,79	-0,12
Investment	-0,75	-4,50	-6,38	-8,18	-2,13	-1,36	-0,76
Exports	0,0	0,05	0,10	0,19	-0,20	-1,29	-0,03
Imports	-0,25	-1,70	-2,46	-3,38	-0,97	-1,15	-0,36
Employment	-0,13	-0,41	-0,67	-0,93	-0,79	-0,79	-0,45
Real wage	0,0	-0,19	-0,41	-0,74	-0,43	-0,17	0,25
Current account/GDP (Diff)	0,08	0,49	0,64	0,91	0,12	-0,05	0,07

In 2004, the year of the Games, the demand factors had the largest impact on activity. If the Games had not taken place, the Greek GDP would have been lower by 1.87% from the level in the reference scenario. Employment also followed an upward trend from the start of the period, peaking in 2004. If the Games had not taken place, employment in 2004 would have been lower by 0.95% compared with the actually recorded employment. This rate corresponds to about 43,000 new jobs that were created due to the Games.

Figure 5.3: Economic activity, percentage deviations from base
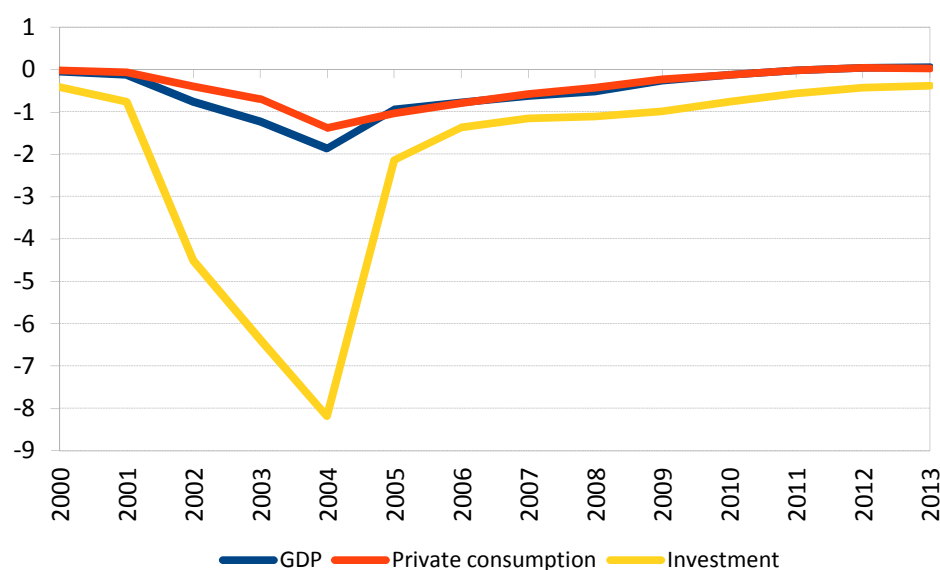
Figure 5.4: Employment, percentage deviations from base
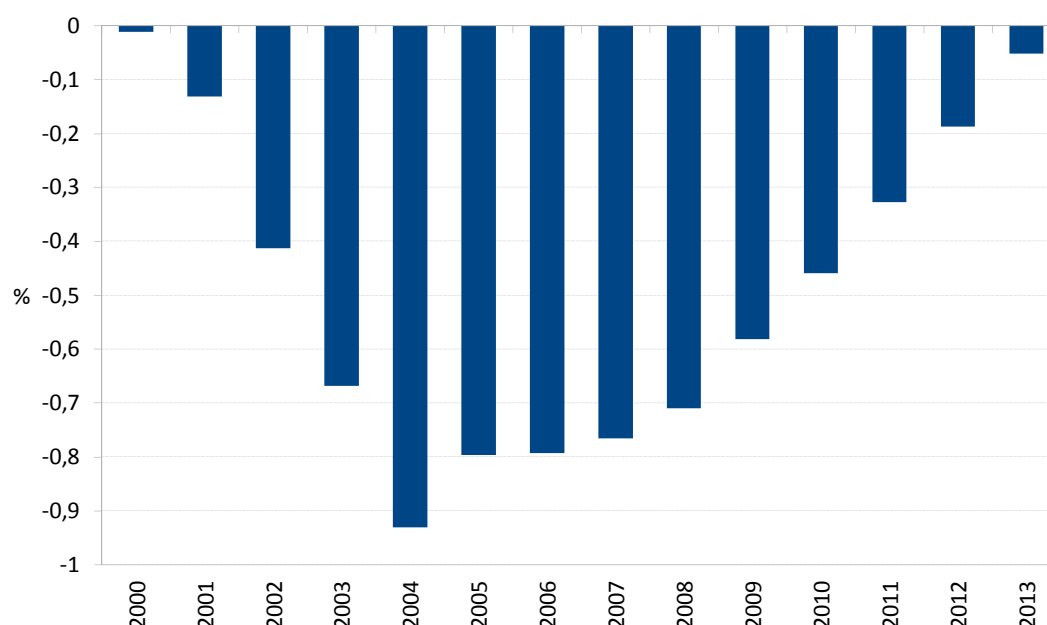
The results contained in Table 5.2 refer to the total impact on the economy from a simultaneous implementation of all the interventions on the demand side. However, we also obtained results for each intervention separately, which are not presented here to save space.[34] From the examination of the particular simulations conducted for each expenditure component, it was revealed that the largest impact on activity (GDP), marginally above half of the total impact, came from the Olympic expenditure of the Public Investment Programme, followed by private consumption and private investment. The expenditure on salaries of the administrative services of the OCOG and the expenditure for the construction of the Olympic village have a limited impact. Similar findings for the impact of the various expenditure components hold for employment as well. In contrast with the previous interventions, on the demand side, that mainly had an impact during the preparation stage and in 2004, the impact of the tourism receipts manifested itself after the end of the Games. This impact was strongest in 2008 - its magnitude was comparable with that of private consumption during the preparation stage.

The demand-side effects presented above had a short-term nature and lasted mainly for the duration of the preparation stage and the Games themselves. After the Games, the impact gradually weakened. This is also evident from the performed simulations, where by the end

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[34] The detailed results are available upon request.

of the simulation period all key indicators gradually returned to their baseline, historical values.

Figure 5.5: International trade, percentage deviations from base
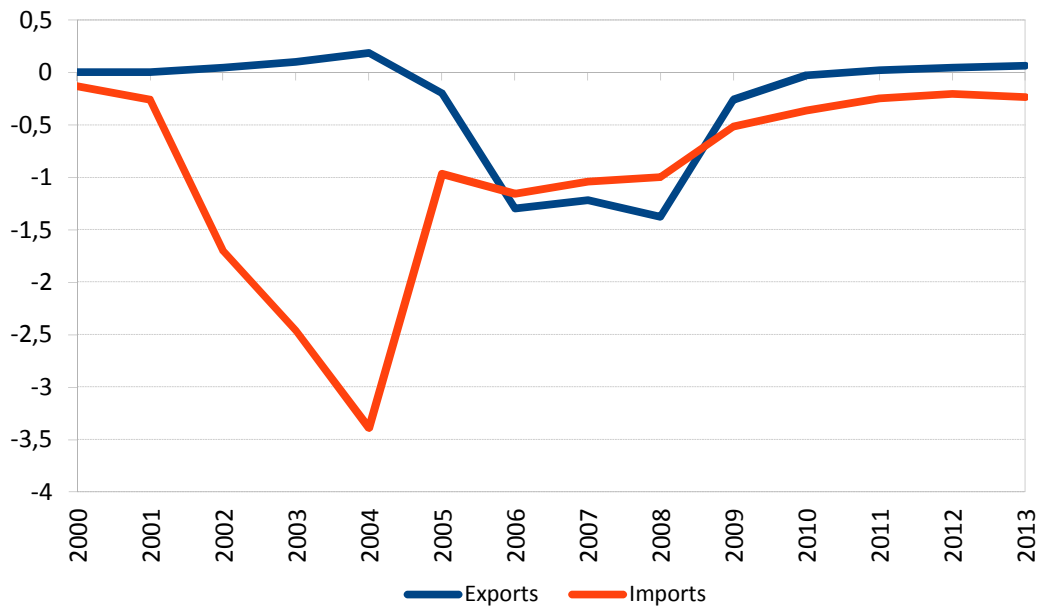
Nevertheless, the Games did not only have short-term effects, connected with boosting demand. The hosting of the Games was a complex endeavour that required high standards of organisation to implement the projects, while the existing techniques and production processes had to be modernised as well. The Games contributed to a significant transfer of know-how, organisational standards and skills to the Greek economy. These factors stimulated the economy on the supply side, having a permanent long-term impact. The next section examines and quantifies the impact of the supply-side factors.

5.2.2   Impact of supply-side factors

The supply-side factors enhanced total factor productivity in the economy. The macroeconomic scenario, constructed in this section, evaluates the impact on the Greek economy from the increase of total factor productivity, resulting from adopting more efficient production and organisation procedures during the preparation phase and during the Games themselves.

The evaluation of the supply factors is based on the same approach as that of the demand factors. A macroeconomic scenario is constructed with the use of the econometric model of

IOBE, assuming that the Games had not taken place and hence the supply-side effects had not materialised.

According to certain estimates (Albani et al. 2009, Zonzilos and Pavlou 2009), the long-term growth rate of the total factor productivity of the Greek economy accelerated notably from 2001, with the level of productivity growing until 2008, when the global economic turmoil started to have an impact on the Greek economy. The Games, due to the advanced nature of the projects and the organisation processes, were one of the factors that, with the implementation of innovative practices, had a significant contribution to the enhancement of the productivity and in the end the efficiency of the Greek economy. The studies mentioned above estimated that the growth rate of total factor productivity increased by about 0.6 percentage points, with a corresponding impact on the potential growth rate of the economy. Based on this result, and in order to construct the scenario that evaluates the impact of the supply-side factors we have assumed that out of the 0.6 points of the estimated productivity growth, the boost that came from the Games equalled 0.4 percentage points.

Figure 5.6: Impact on potential output and GDP
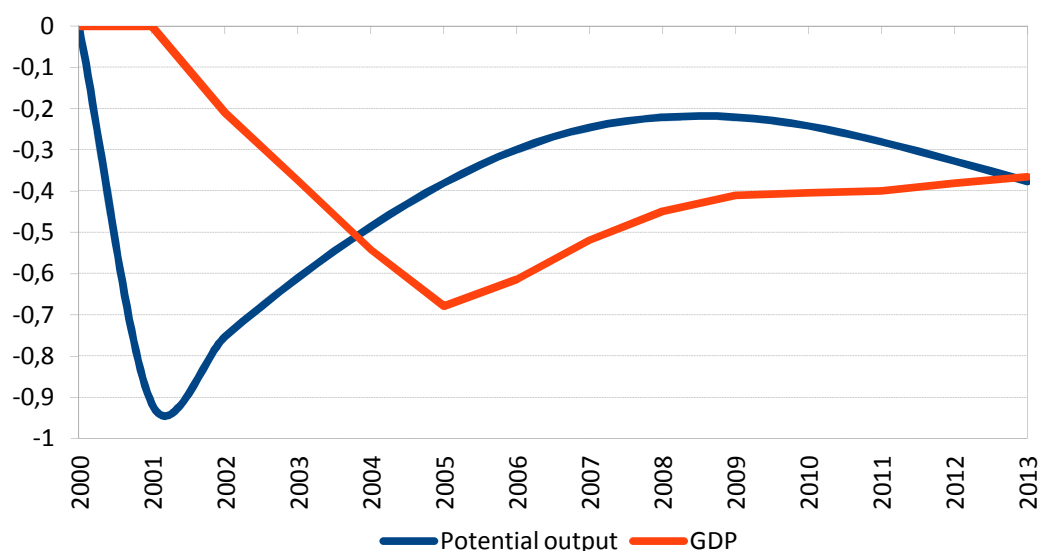
In order to construct the scenario, we introduced an additional equation in the model that made total factor productivity endogenous, making a direct intervention possible and enabling the manifestation of dynamic effects for the whole duration of the simulation. Then, we introduced a productivity shock, reducing productivity only for 2001 by 0.4 percentage points and ran the model under the new setup. The outcome of the new

scenario is compared with the baseline scenario that coincides with the historical data for the period from 2000 to 2013. Even though the shock is only for one year, the persistence incorporated in the transmission mechanism provides medium-term effects.[35] The results, expressed as percentage deviations of levels for the potential GDP and the actual (observed) GDP over the period from 2000 to 2013, are presented in Figure 5.6.

The reduction of productivity has a direct and rather strong impact on the potential output of the Greek economy, dragging down with some delay real GDP as well. The fall gradually weakens over the simulation period. Nevertheless, in contrast with the previous simulation of the demand-side factors, the impact on activity now has a permanent nature. At the end of the simulation period, actual and potential GDP are 0.4% below their historical baseline values. In other words, the results show that the Games, besides the short-term effects connected with the construction of the Olympic installations, generated medium-term benefits as well, boosting the potential growth rate and the overall efficiency of the economy. The supply-side factors had a limited impact on employment.

Figure 5.7: Total impact of demand and supply factors on GDP, percentage deviations from base
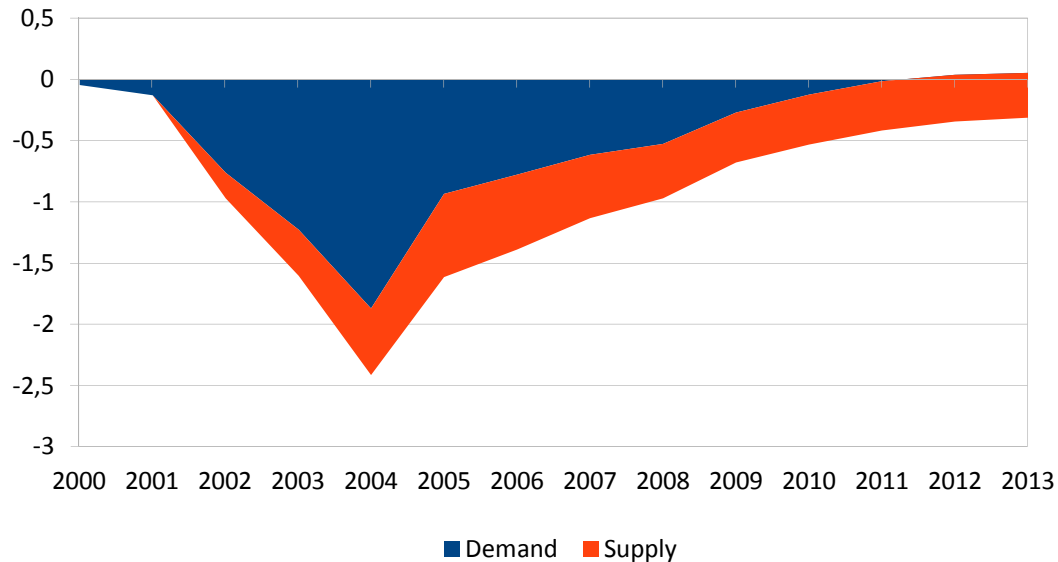
At this point we can assess the total outcome of the demand-side and supply-side factors on economic activity. Figure 5.7 depicts the course of GDP during the period 2000-2013, formed

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[35] The change takes place with the addition in the model of an autoregressive process with a parameter of 0.95 that describes the course of productivity. This scheme allows for an exceptionally slow amortisation of the exogenous shock.

by the combined effect of the supply and demand factors. If the 2004 Games were not hosted in Athens, then the level of Greek GDP in 2004 would have been lower by about 2.5% in 2004 and by about 0.4% in 2013. These results refer to the Greek economy as a whole, however if we take into account that Attica produces about 50% of the Greek GDP, then the impact of the Games on the regional GDP of Attica would be significantly larger.

5.3   Fiscal impact

This section examines the impact of the Olympic projects related public expenditure on the evolution of Greek public debt in the medium term. This expenditure refers to expenses of the public investment programme, which in national account terms are classified as public investment. It should, however, be stressed that a change in investment, expressed as percentage of GDP (reduction in our case) for a particular time period, results in an equal and same-direction change in the steady-state debt-to-GDP ratio as well. The Ordinary Budget expenditure linked with the Olympic projects is rather small to have a substantial impact on public debt and its impact on economic activity is very weak.

The methodology of the alternative scenaria used for the evaluation of the impact of the Games on economic activity is followed in the examination of the fiscal effects as well. However, we use a different model. The simulations are conducted with the use of a three-region version (Greece, Euro area and the rest of the world) of the general equilibrium model GIMF, which is more appropriate for the examination of fiscal issues. Some of the features of GIMF are outlined in the Appendix, along with a discussion regarding the calibration of the model.

Having calibrated the model for one year, based on the mean values of key national account variables (including public finances variables) for the 2000-2010 period, alongside other assumptions regarding specific critical parameters of the economy, we set up a macroeconomic scenario for a large number of periods (control solution). This scenario will act as a reference (baseline) scenario against which the alternative scenaria will be compared.

For the construction of the alternative scenario, as done previously, we assume that the Games did not take place, the preparation projects were not executed and the Olympic expenditure of the Public Investment Programme was not disbursed. The PIP expenditure on Olympic projects covered the period from 2000 to 2010, amounting in total to €6.0 billion. Here as well, as in the previous simulations on economic activity, the funds disbursed in

2005-2010 for project outlays (amounting to €838 million in total) were redistributed in the period 2000-2004, with larger amounts corresponding to the years 2003 and 2004.

The practice of the expenditure breakdown is similar with the case of the demand-factor evaluation. In particular, the PIP Olympic expenditure, expressed in terms of percentage of GDP are as follows: 0.09% in 2000, 0.15% in 2001, 0.81% in 2002, 1.1% in 2003 and 1.3% in 2004. These figures are entered in the model, reducing accordingly the public investment to GDP ratio over the period 2000 to 2004.

Meanwhile, the intervention in the model's investment series is accompanied by an equivalent change in the level of the desired fiscal deficit target as percentage of GDP. The cumulative debt reduction in 2000-2005 due to lower investment is 3.43 percentage points of GDP.

To maintain the debt reduction over the long term (beyond 2004), the consistent, with the debt reduction, change in the fiscal surplus target is 0.15 percentage points of GDP.[36] In other words, the lower level of steady-state debt by 3.43 points requires maintaining lower deficit by 0.15 points over time.

Consequently, one more intervention is required from 2005 until the end of the simulation period that would reduce the ratio of the deficit over GDP by 0.15 points annually. This intervention ensures the long-term consistency between the reduction of the debt and the deficit.

Table 5.3: Macroeconomic and fiscal effects from the reduction of the public investment programme (percentage deviation of levels from the reference scenario)

Year	2000	2001	2002	2003	2004	2005	2013
GDP (% change)	-0,30	-0,39	-0,81	-0,94	-1,0	-0,11	-0,91
Deficit target / GDP (Diff)	0,09	0,15	0,81	1,1	1,3	0,15	0,15
Public investment/GDP (Diff)	-0,08	-0,15	-0,81	-1,1	-1,3	0,0	0,0
Steady-state debt/GDP (Diff)	-1,83	-3,43	-18,55	-25,19	-29,77	-3,43	-3,43
Debt/GDP (Diff)	0,60	0,81	0,93	0,13	-1,17	-3,34	-3,25

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[36] The fiscal deficit target shows the level of the deficit that is consistent with a new steady-state debt level after the change in investment. In the steady-state equilibrium, debt and deficit as percentage of GDP are connected with the expression Debt = $(\pi^*g/(\pi^*g-1))^*$Deficit, which is derived from the budget constraint of the public sector, where π is the inflation rate and g the growth rate of the economy (growth rate of population and productivity). According to our calibration π=1.02 και g=1.025, hence by substitution the change of deficit equals 0.15.

Figure 5.8: Impact on GDP and employment from the change in public investment, percentage deviation of levels
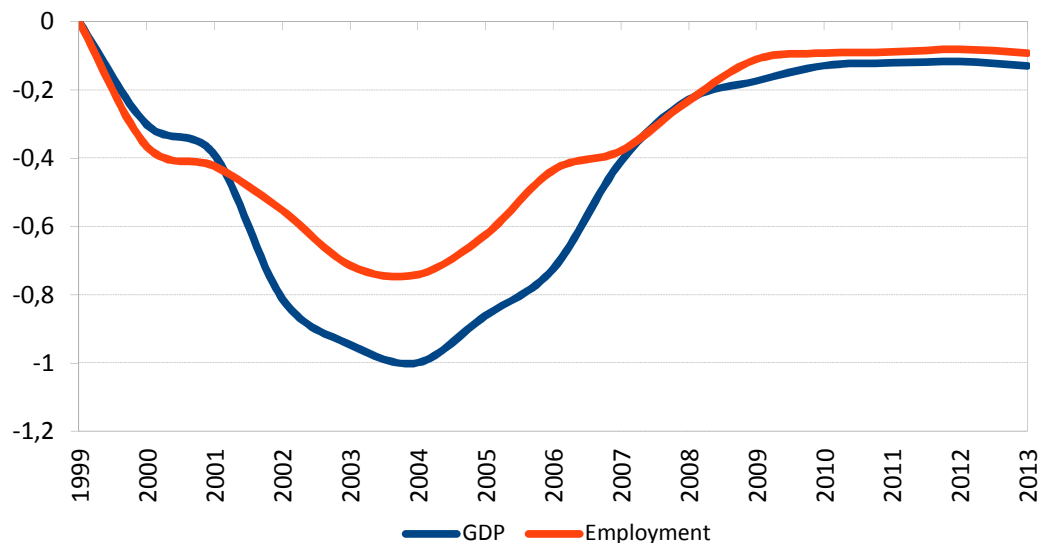
This simulation is equivalent to a scenario of fiscal consolidation, aimed at a permanent reduction of the debt, as a share of GDP, by 3.45 percentage points, though public investment as a policy lever. The consolidation lasts for five years and investment returns to its initial level by the end of the intervention. The change of the steady-state debt, however, is permanent.

Figure 5.9: Public finance indicators as percentages of GDP, deviation of levels from the reference scenario
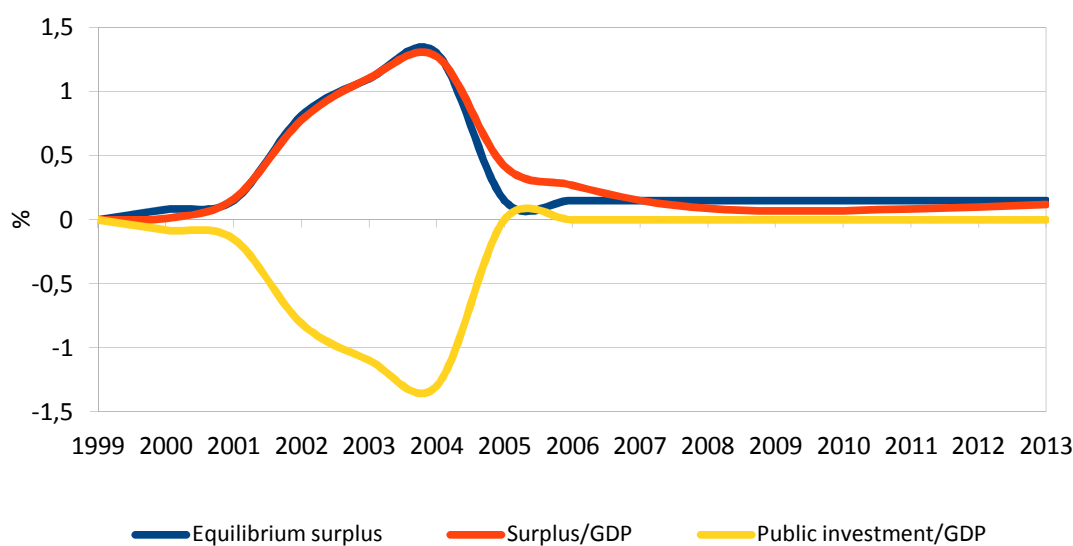
After implementing these interventions, the model is simulated again. Table 5.3 shows the numerical results of this simulation, expressed as percentage deviations of levels from the reference scenario. The path of fiscal variables and GDP are depicted in Figure 5.8 - Figure 5.10. These results show that if the public investment related to the Games had not taken place, then the Greek GDP and employment in 2004 would have been lower by 1% and 0.72% respectively. The results for the economic activity almost coincide with the outcome of the simulation of the impact of public investment alone, performed with the econometric IOBE model in the examination of the impact of the demand factors. The similarity of the results derived from both models add to the credibility of the estimation.

The examination of the fiscal variables shows that if the Games had not taken place then the long-term steady-state debt would have been lower by 3.43 GDP points. The observed debt-to-GDP ratio would have initially moved in the opposite direction, as the reduced public investment would have been accompanied with reduced economic activity and less tax revenue, however afterwards the debt would have converged quite quickly to its long-term equilibrium level. The annual deficit target as percentage of GDP would have been marginally better.

Figure 5.10: Public debt as percent of GDP, percent points deviation
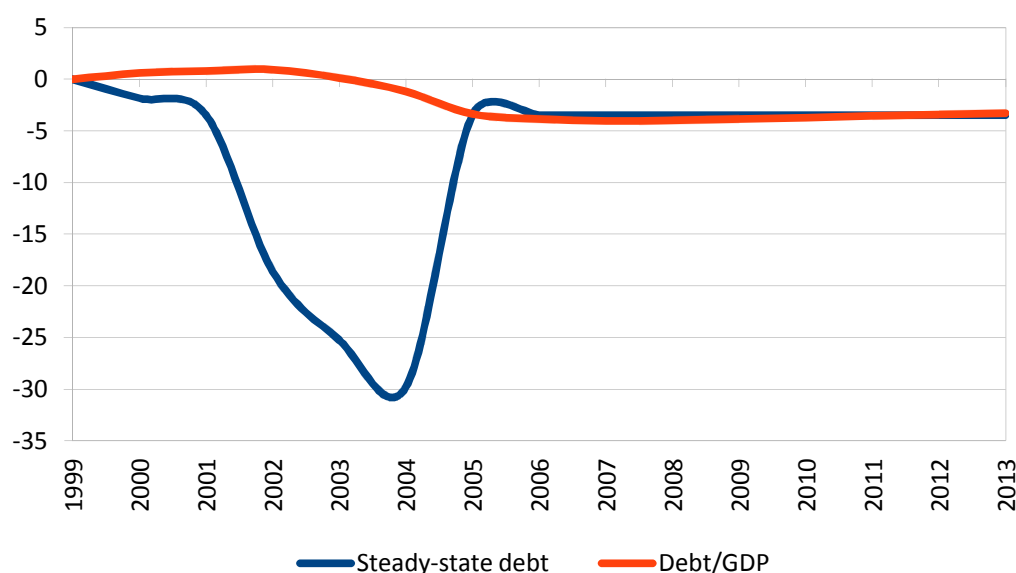
It should be stressed that this simulation focuses exclusively on the impact of public investment on debt. Therefore, the tax revenues that are raised and have an impact on its short-term path to the new equilibrium come exclusively from the impact on economic activity from the change in public investment. Clearly, the economic activity induced by the

Games, resulting in higher private investment, private consumption, etc., brought additional tax revenue. Taking into account that public investment contributed to the shift in GDP by 1%, compared with 2.5% for the total of Olympic interventions, it should be clear that the additional taxes from the additional GDP balance almost fully the debt generated from the additional public expenditure.

5.4   Opportunity cost of the Olympic projects

As mentioned in Chapter 3 of this study, many of the Olympic facilities remained underutilised after the end of the Games. As a result, public capital that was created for hosting the Games was dilapidated. The question that reasonably arises concerns the consequences of the capital destruction on productivity and eventually on economic activity and the medium-term growth rate of the economy.

Public investment differs from public consumption by the fact that the former contributes to the accumulation of public capital, which strengthens the productivity of the economy and thus contributes to both the short-term and the medium-term growth of GDP. In contrast, the impact of public consumption is limited to the time when expenditure takes place, without leaving its imprint on the economy. Public consumption does not strengthen the production capacity of the economy. In addition, public capital has a slower amortisation rate than private capital and as a result the beneficial impact of public investment has a longer duration.

In this part of the study, we attempt to provide a quantitative answer to these issues. The GIMF model can be used to study these issues, since it allows the activation of different transmission channels between investment and consumption. According to the estimates presented in Chapter 3, the inactive facilities represent about 20% of the Olympic expenditure of the Public Investment Programme. Given this piece of information, we design the following simulations:

Initially, we simulate the model, having previously deducted all the expenditure for the Olympic projects of the Public Investment Programme, expressed as percentage of GDP, from the variable in the model that captures public investment. The resulting scenario (similar with the one described in section 5.3) will serve as a reference scenario, with which to compare the results from two alternative simulations. The first alternative scenario deducts 80% of the total expenditure on Olympic projects from public investment in the period 2000-2004. The second scenario considers that the remaining 20% of the investment

expenditure, corresponding to spending directed to projects which remained idle after the end of the Games and did not contribute to the formation of public capital, is not investment but public consumption. Essentially, the role of this investment spending in the economy is similar with public consumption and therefore the corresponding amounts for the period 2000-2004 were deducted from the model variable that expresses public consumption. From a fiscal standpoint, the initial reference and the two alternative scenaria are equivalent.

Having created the reference scenario with a reduction of the PIP expenditure, we then implement first the scenario based on the hypothesis of a fall of investment by 80% and subsequently the scenario of public consumption reduction by the remaining 20% of the expenditure. The cumulative result of the two alternative scenaria is compared with the reference scenario.

Figure 5.11 compares the deviation of GDP between the cumulative result of the two alternative scenaria and the reference scenario. The key finding from the examination of the results is that in the reference scenario GDP is higher throughout the simulation period, however between 2000 and 2004 the scenaria are almost equivalent. In the post-Olympic period, when the demand-side effects fade away and the supply-side effects dominate, the switch from investment to consumption leads to about 0.17 percentage points lower GDP. This loss in GDP terms comes from the abandonment of the sporting installations and the corresponding destruction of public capital.

Figure 5.11: Impact on GDP from abandoning certain installations in the post-Olympic period (deviation of levels from the baseline scenario)
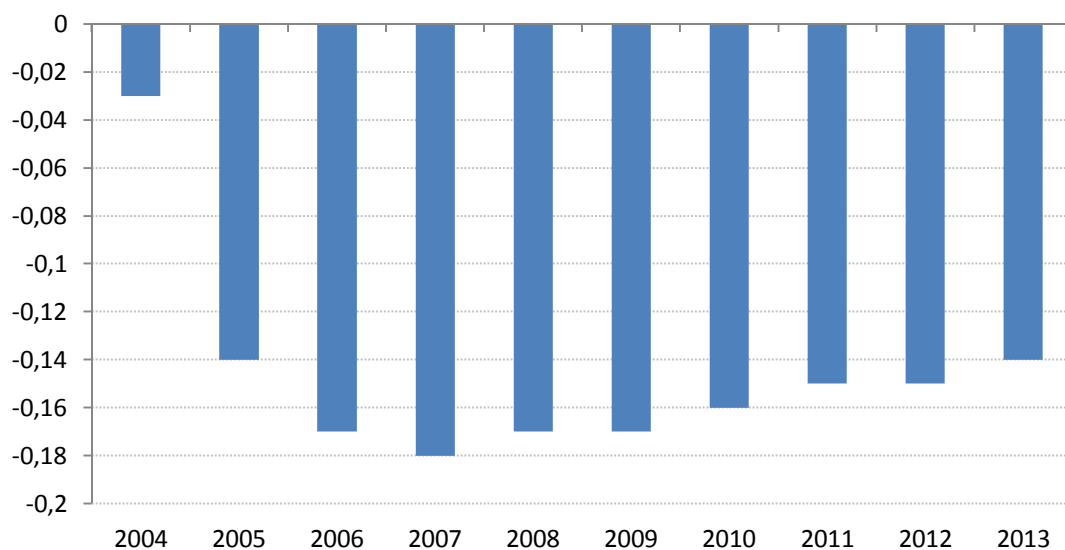
5.5   Summary-Conclusions

This chapter dealt with the assessment of the macroeconomic impact of the 2004 Games on the Greek economy. The assessment was performed with the use of two econometric models maintained in IOBE. An attempt was made in the study to provide quantitative answers to three specific questions:

First, what would have been the course of the Greek economy over the period from 2000 to 2013 and the evolution of its key macroeconomic indicators, if the Games and the corresponding preparation and support projects had not taken place?

Second, what was the impact of the public expenditure connected with the Games on the course of fiscal deficit and public debt? Were the Games among the causes of the Greek fiscal derailment?

Third, what was the opportunity cost of the Games, in the sense of the loss in GDP terms, from not utilising a significant number of sporting facilities after the end of the Games?

The answer to the first question is clear: the Games had a significant impact on economic activity, creating new jobs throughout the period of analysis (2000-2013). The combined impact of the demand and supply factors on activity was immediate, gradually growing between 2000 and 2004. If the Games had not taken place, the level of GDP in 2004 would have been lower by 2.5%, compared with the historical level recorded in 2004 with the hosting of the Games. In addition, employment would have been lower by about 44,000 jobs. After the end of the Games, the impact of the demand factors declined, however the complexity and the diversity of the endeavour and the high level of technical standards of the construction projects contributed to the boost of productivity by the supply factors, leaving their mark on the economy over the medium term. Taking into account that about 50% of the Greek GDP is generated in the region of Attica, the impact in the wider Athens metropolitan area should be notably stronger, in regional GDP terms at least.

To answer the second question, we ran simulations with the multi-region general equilibrium model GIMF. The key conclusion from the analysis of the public Olympic expenditure and the corresponding simulations is that the hosting of the Games in Athens in 2004 did not have a substantial impact on the country's public finances. Public debt did not derail because of the Olympic Games, a conclusion confirmed also in other recent studies (Mourmouris, 2014). The fiscal burden of the public expenditure on Olympic projects was

marginal. In addition, if policy had shifted in the following years in a more restrictive direction, then the additional debt related to the Olympics would have been eliminated and the Greek economy could have benefited from the medium-term positive impact of the supply factors.

Regarding the third question, two scenaria were carried out, incorporating the assumption that the part of investment spending that funded installations abandoned after the end of the Games did not have an impact on the economy as investment expenditure, but as consumption spending. The combined impact of the two scenaria (consumption and investment) on activity was then compared with a scenario where all investment spending had been fully utilised, contributing to the increase of public capital and productivity. The results show that after 2004 at least, when the impact of the demand factors weakened gradually and eventually faded away, the abandonment of the installations reduced GDP by about 0.2%, compared with what would have been the case, if the installations had not been abandoned. This is our estimate of the cost of abandonment of Olympic installations in GDP terms.

5.6   Appendix

5.6.1   The IOBE econometric model of the Greek economy. Some of its key features

The IOBE model is a standard, medium-sized, aggregate demand and supply, structural econometric model, describing the main macro linkages of the Greek economy. The model is aligned with the "neoclassical synthesis" and takes into account the long-run supply side of the economy. The main use of the model is in forecasting. Moreover, the model is designed to simulate the economy in terms of big aggregates and to produce quantitative information for a variety of macroeconomic policy issues. The model is dynamic, using extensively error-correction formulation and co-integration techniques in the specification and estimation of the behavioural equations. One critical feature of the model is that the long-run intermediate target relations, describing the supply side of the economy and the wages-price nexus, initially are calibrated at their sample mean and then estimated using additional context-dependent dummies and trends. This practice significantly improves the in-sample fit of the equations.

On the supply side, output is given by a constant-returns-to-scale Cobb-Douglas production technology in labour and capital. Output prices (value-added deflator) and factor demands are derived from the cost minimisation problem of a representative firm, which operates in

an imperfectly competitive market. The coefficients of the long-run equations are calibrated according to the average sample share of labour income in value added. Potential output is derived by inserting in the calibrated function the actual capital stock, the trend in total factor productivity, and by replacing actual employment with its full employment level (derived from the exogenous labour force and the calculated NAWRU).

For the determination of prices, the GDP deflator at factor cost is considered to be the general inflation indicator. Assuming a degree of monopoly power, the representative firm sets prices in the market for its diversified product with a constant mark-up on marginal cost. In this set-up, the price level is determined by the unit labour cost and the mark-up, subject to the demand function faced by firms and the production function. All other prices, except import prices, are related to this indicator with additional specific adjustments. Import prices are linked to foreign prices via the exchange rate. Wages are modelled via a Phillips curve. In the long run, real product wages are determined by average productivity and the exogenously determined NAWRU. Moreover, in the short run nominal wages respond to the deviation of actual unemployment from the NAWRU level and to the changes of productivity.

Aggregate demand is determined by individual equations for each expenditure component of demand such as consumption, fixed investment, housing investment, inventory investment, exports, imports and government expenditure. Inventories, public consumption and public investment are exogenous in real terms.

Private consumer expenditure is modelled in an aggregative manner, including both durables and non-durables. In addition, two types of households are considered, those which have perfect access to financial markets and those which are liquidity constrained. The first have a forward looking behaviour, while the second spent all their current income, since they cannot save for the next period. In the long run, the consumption of forward looking consumers is determined by a linear combination of their disposable income, the stock of human capital and the stock of financial wealth. The stock of human capital is calculated as the present value of the future stream of labour incomes.

Exports of goods and services are determined in the long-run by world demand, which, enters the equation with unit elasticity and relative prices. The unit elasticity restriction is accepted by the data. In the short run, real exports' growth is affected by growth in relative

prices, the growth in foreign demand and the lagged long-run relationship, which enters as an error correction term and thus ensures adjustment to the equilibrium.

Imports of goods and services are determined in the long run by total final expenditure and relative prices. A unit elasticity is imposed on the demand variable and a logistic trend is also included in the long-run specification. The dynamic adjustment of real imports of goods and services towards long-run equilibrium is given by a standard ECM, in which the growth of domestic demand and relative prices influence imports' growth.

5.6.2   The GIMF Dynamic Stochastic General Equilibrium model. Key features and calibration

The Global Integrated Monetary and Fiscal model GIMF is a multi-country, dynamic, stochastic, general-equilibrium model developed by the IMF. The model is in wide use at the IMF for a variety of purposes, including policy analysis, as well as the assessment of the macro implications of structural reform programs and fiscal consolidation interventions. The simulations carried out in this study use an annual three-region version of GIMF, calibrated for Greece, the euro area (excluding Greece) and the rest of the world. The calibration of the model is done at IOBE. The GIMF model with its sound theoretical structure and its strong policy orientation is particularly well-suited for the type of quantitative analysis conducted in this study. A complete description of the theoretical structure of the model and its basic properties can be found in Kumhof et al. (2010) and Anderson et al. (2013).

The model is micro founded with optimising behaviour by households and firms. GIMF is characterised by Keynesian features, which are derived from a number of nominal and real frictions and adjustment costs, ensuring smooth and realistic short-term responses to the exogenous interventions and shocks under examination.

On the production side, the model has two types of firms: intermediate goods producers (manufacturers) and final goods producers (distributors). All firms operate in monopolistic competition in their output market, so they are able to charge a mark-up over their marginal cost. Imperfect competition is introduced in the model through imperfect substitutability between product varieties. In the input market, firms operate in perfect competition and factor prices reflect marginal productivities.

Manufacturers produce two types of intermediate goods: tradables and non-tradables by combining capital and labour. Tradable intermediate goods are combined with imported

tradable intermediate goods to produce final goods (consumption, both private and public, investment and exports).

There are two types of households in GIMF, those which have perfect access to financial markets and those which are liquidity constrained. Both types of households consume goods, supply labour and pay taxes. The presence of the liquidity constrained households has two important implications for the properties of the model. First, it is a source of non-Ricardian behaviour in the model and, second, it improves the transition dynamics leading to a better capture of the short-run cyclicality observed in the data. The liquidity constrained households have no access to credit and cannot save. Therefore they consume all their wage income every period, as well as any transfers they receive from the government. Their consumption decisions are immediately adjusted to the changes in their disposable income, and this is reflected in output fluctuations.

The non-liquidity constrained households follow an overlapping generation model and maximise a utility function over a finite horizon, subject to their intertemporal budget constraint. The main characteristic of this type of households is that they can perform consumption smoothing, alleviating the impact of shocks to the economy on their consumption behaviour.

The model has a rich fiscal policy setup and this is a significant advantage of GIMF over other policy oriented general equilibrium models. Fiscal policy is conducted using a variety of fiscal instruments related to spending and taxation. There are seven separate fiscal instruments. Four instruments on the expenditure side: government spending, government investment (infrastructure spending), general lump-sum transfers and lump-sum transfers targeted to liquidity-constrained households. And three instruments on the revenue side: consumption tax, corporate income tax and labour income tax. Government consumption spending is unproductive, while government investment spending augments the stock of public capital and enhances productivity. The unproductive nature of public consumption is important for the design of some simulations carried out in this work.

The following paragraphs provide information related to the calibration of the model.

The standard calibration of GIMF as in Anderson et al. (2012) is maintained for the euro area and the rest of the world. For Greece, the calibration of the key steady-state ratios of the model is based on the official national account statistics and broadly matches their empirical counterparts over the period 2001-2008. For example, the share of private consumption and

private investment is set to 65 percent and 19 percent respectively of nominal GDP, while the export and import shares are set to 27 percent each, ensuring balanced trade in the long run. The share of capital in the intermediate sector production technology is set to 40 percent and that of labour to 60 percent, slightly adjusting for the number of self-employed. The production function is of the CES type, but for manufacturers it is calibrated to the Cobb-Douglas case. The values for the adjustment costs on the nominal side reflect the fact that in the non-tradable sector prices adjust more sluggishly than in the tradable sector. The value of the parameter reflecting the wage growth adjustment cost is higher in Greece, compared to the respective value for the euro area.

The annual inflation rate is set equal to 2% in the steady state, consistent with the ECB's quantitative definition of price stability. The liquidity constrained households make up 35 percent of all households, against 25 percent in the euro area. The calibration of the rest of the parameters of the Greek block, such as the households' parameters, is based on information from previous studies, while some standard values of the literature are used as well. The price mark-up of the non-tradable sector is set to 1.35, against 1.12 in the euro area. The numerical values for the mark-ups in our calibration are taken from the IMF Working Paper Anderson et al. (2012), documenting the GIMF model, moreover, additional helpful information was gathered by previous OECD studies examining the competitive conditions prevailing in the member states of the organisation. In general, various studies conducted at the OECD suggest that the services sector in Greece is substantially restricted in comparison with other countries of the euro area.

5.6.3   *Macroeconomic impact of the demand factors, without redistribution of the post-Olympic outlays*

Table 5.4: Macroeconomic impact of the demand factors, without redistribution of the post-Olympic payments (percentage deviation of levels from the historical data)

Year	2001	2002	2003	2004	2005	2006	2010
GDP	-0.11	-0.70	-1.13	-1.71	-1.0	-0.83	-0.14
Priv. Consumption	-0.05	-0.37	-0.67	-1.32	-1.03	-0.78	-0.11
Investment	-0.65	-4.01	-5.74	-7.08	-2.80	-1.71	-0.92
Exports	0.0	0.04	0.09	0.16	-0.20	-1.29	-0.03
Imports	-0.23	-1.55	-2.24	-3.01	-1.20	-1.23	-0.37
Employment	-0.13	-0.39	-0.64	-0.89	-0.81	-0.80	-0.48

6   CONCLUSIONS

The hosting of the 2004 Olympic and Paralympic Games in Athens was a particularly important event for Greece, with multiple economic and social effects. The success of the Games promoted Greece as a developed country that can carry out difficult undertakings, such as the preparation and the execution of the largest sporting competition worldwide. With the hosting of the Olympic and Paralympic Games, Athens and Greece remained at the spotlight of the global interest in August and September 2004, through the international press, the electronic mass media and the internet.

The successful hosting of the multitude of sporting events, however, does not translate automatically to a significant positive economic impact. Besides, as the experience from recent such events shows, the cost and the benefit from hosting the Olympics depend on a range of parameters, during both the preparation phase and the period after the Games. Therefore, achieving a significant positive economic impact is a rather complex endeavour.

On the expenditure side, the gross cost depends on the degree of readiness of the host city's infrastructure, the share of the private sector in the investment spending and the choice of the authorities between permanent and temporary facilities, a choice that stems from their intentions in regard to upgrading the infrastructure of the host city. For example, the 1996 Olympic Games in Atlanta were characterised by a relatively small gross cost of preparation and use, as the infrastructure was largely in place prior to the Games. In contrast, in the London 2012 Games quite a few infrastructure projects were implemented that upgraded significantly the East London area, while at the same time many temporary sport installations were put in place, which reduced significantly the net cost of use after the end of the Games. Lastly, both in Barcelona 1992 and in Sydney 2000, significant investment was made in permanent infrastructure and installations, in order to achieve more permanent benefits for the residents and the visitors of these cities.

Accordingly, the benefits from hosting the Games depend strongly on the size of the investment for Olympic preparation (however, large investment is not a sufficient condition for large benefits), the potential for further publicity and tourist development of the host area and the success in the utilisation of the Olympic heritage. Hence, hosting the Games can have low fiscal cost and low economic benefit (e.g. Atlanta), high cost and high benefit (Barcelona), but also high cost and uncertain economic benefit (Beijing).

In this regard, the Athens 2004 Games moved more in the direction of Barcelona 1992, than Atlanta 1996 or London 2012. The infrastructure of the city was upgraded significantly both with the Olympic projects and with other infrastructure projects that were completed during the same period (e.g. the new Athens International Airport, the Attiki Odos motorway, the Suburban Railway of Athens, the Athens Tramway etc.), perhaps also as a result of the pressure from the need for them to be ready during the Games. In most cases, the planners opted for permanent installations, so that the city can host major sporting events in the future and in order to promote mass sport in the city.

The exact estimation of the costs and the corresponding benefits of the Games to the economy is influenced by the fact that there can be different views on which projects should be classified as "Olympic". That said, based on the data for expenses recorded as "Olympic" in the Public Investment Programme and the Ordinary Budget, the total financing from the State Budget is estimated at €6.5 billion for the whole period for which such expenses were recorded (2000-2010). The gross burden on the State Budget thus corresponds to only 1% of the State expenditure during that period and to less than 2% of the gross debt of the General Government at the end of 2013.

On the side of fiscal receipts, about €2.9 billion are estimated to have returned in the State coffers as tax revenues and social security contributions during the preparation and the staging of the Games. We should add to this the State revenues stemming from increased economic activity during the post-Olympic period. From the macroeconomic simulations conducted to evaluate the impact on fiscal deficit, public debt and economic activity, it is evident that hosting the Games did not substantially burden the fiscal position of the country.

Regarding the Organising Committee "Athens 2004", the net financial result has a positive sign. Without taking into account the expenses of the committee for projects executed on behalf of the public administration, the Olympic Games Organising Committee "Athens 2004" recorded an operating surplus of €131 million. Even when the above expenses are taken into account, the net result of the Organising Committee remains positive, amounting to €7 million.

Apart from the results for the State, for the Organising Committee and for other institutions and enterprises that financed projects for the Games with their own funds, the Olympics had a wider impact on the economy as well. From the econometric analysis, we found that there

was a positive and statistically significant correlation of the competition with the number of international arrivals, the size of tourist expenditure and the value of exports. The impact on tourism was immediate, yet it did not last beyond 2008. Perhaps, the short duration of the impact stemmed from the negative effects of the crisis on the image of the country and the city of Athens abroad.

The analysis with the use of macroeconomic general equilibrium models showed that the Games had a notably positive impact on economic activity and employment throughout the examined period (2000-2013). If the Games had not taken place, the level of GDP in 2004 would have been lower by 2.5% and employment would have been lower by about 44,000 jobs. After 2004, the impact of the demand factors gradually declined, however the supply factors (reflected in higher productivity) extended the positive economic impact over the medium term. Nevertheless, the abandonment of quite a few facilities after the end of the Games (the cost for the construction of which is estimated at 20% of the investment expenditure) has lowered the GDP of the country by about 0.2 percentage points, according to our estimations. In essence, the benefit from the use of the Olympic heritage was smaller than it could have been because of the fact that a significant part of the installations was abandoned and dilapidated, while the boost that the Games gave to the country's image abroad was relatively quickly overshadowed by the negative publicity that Greece attracted since the end of 2009.

Despite the significant delay in the utilisation of many facilities, the forthcoming development in the Hellinikon area and the urban renewal at the Paleo Faliro area give rise to hopes for better use of the infrastructure built for the Games. To the extent that the construction of the Olympic facilities was the first major step for the development of these areas (through settling land-use issues, expropriating private land, securing licences and performing other similar significant tasks), the possibility of their development will have a positive effect on the assessment of the benefits from the Games over a longer time span.

The experience from hosting the Athens 2004 Olympic Games showed that with a determination to achieve a particular goal and with a satisfactory degree of consensus across the society, Greece can be impressively successful. Given the difficulties that the country is facing today and the need for speedier exit from the deep economic crisis, the lessons from the Olympic Games are more relevant than ever before.

7 BIBLIOGRAPHY

Albani M., Zonzilos N. and Z. Bragoudakis (2010), Εκτιμήσεις του δυνητικού προϊόντος της ελληνικής οικονομίας με τη μέθοδο της συνάρτησης παραγωγής (βραχυχρόνιες, μεσοπρόθεσμες και μακροπρόθεσμες εκτιμήσεις). Κεφάλαιο 4.3 στο Ισοζύγιο Τρεχουσών Συναλλαγών της Ελλάδος: Αιτίες Ανισορροπίας και Προτάσεις Πολιτικής. Bank of Greece, Athens.

Alpha Bank. (2004). *Οικονομικό Δελτίο* . Athens: Alpha Bank.

Anderson, D., H Hunt, M. Kortelainen, M. Kumhof, D.Laxton, D.Muir, S. Mursula, and S. Snudden (2013), "Getting to Know GIMF: The Simulation Properties of the Global Integrated Monetary and Fiscal Model" IMF Working Paper Series, WP/13/55.

ATHOC (2004), *Official Report of the XXVIII Olympiad*, Athens: Liberis Publications Group

Baade, R., & Matheson, V. (2003). *Bidding for the Olympics: Fool's Gold.* London: Edward Elgar Publishing.

Bai & Perron, (2003), *Computation and Analysis Of Multiple Structural Change Models, Journal Of Applied Econometrics, Vol.6, Pp.72–78.*

Bakouris K. (2014), Ο ακήρυχτος πόλεμος, Αθήνα 2004, Papadopoulos Publishing, Athens.

Brunet, F. (1995). *An economic analysis of the Barcelona '92 Olympic Games: resources, financing and impacts.* Barcelona: Universitat Autonoma de Barcelona.

Brunnet, F., & Xinwen, Z. (2008). *The Economy of the Beijing Olympic Games: An analysis of first impacts and prospects.* Barcelona: Centre d' Estudis Olimpics.

Carlsen, J., & Williams, P. (July 1997). Events tourism and destination image in Western Australia. *International Conference: The impact of mega events*.

Cartalis, C., 'Sport Mega-Events as Catalysts for Sustainable Urban Development: The Case of Athens 2004' in Mega-event Cities: Urban Legacies of Global Sports Events, editors: Gavin Poynter and Valerie Viehoff, in press.

Culture, in *Hosting the Olympics: the Long-term Impact*, Conference Report, East Asian Architecture and Planning Program, MIT and Graduate School of Environmental Studies, Seoul National University: Seoul, pp. 245-264.

ELSTAT (2014) Annual National Accounts November 2014, Athens.

Essex, S. and Chankley, B. (2004), Urban transformation from hosting the Olympic Games, University of Plymouth.

European Institute for Construction Labour Research. (2011). *Olympic sites: a celebration of Olympic values.* CLR.

European Tour Operators Association. (2009). *Beijing Olympic Update.* London: European Tour Operators Association.

Flyvbjerg, B., & Stewart, A. (2012). *Olympic Proportions: Cost and Cost Overrun at the Olympics 1960-2012.* University of Oxford.

Fourie J., Santana-Gallego M., (2011), The Impact Of Mega-Sport Events On Tourist Arrivals, Tourism Management, Vol. 32, pp. 1364-1370.

Fourie J., Siebrits K., & Spronk K., (2010), Tourism Displacement In A Natural Experiment. Mimeo. Stellenbosch: Stellenbosch University.

French, S.P., & M.E. Disher (1997), Atlanta and the Olympics: A One-Year Retrospective, *Journal of the American Planning Association, Vol.* 63(3), pp. 379-392.

Hall, C.M. (1987), The Effects of Hallmark Events on Cities, *Journal of Travel Research*, Vol. 26(2), pp. 44-45.

Hughes, D. (2012). *The long-term legacy for the UK from the Olympic and Paralympic Games.* London: House of Lords Library.

Humphreys, B. R. (August 2008). Rings of Gold. *Foreign Policy*.

Kang, H.B. (1988), Accelerating the Future-State: Urban Impact of Hosting the 1988 Seoul Olympic Games, in *Hosting the Olympics: the Long-Term Impact*, Conference Report, East Asian Architecture and Planning Program, MIT and Graduate School of Environmental Studies, Seoul National University: Seoul, pp. 17-32.

Kumhof, M., D. Laxton, D. Muir and S. Mursula (2010), "The Global Integrated Monetary Fiscal Model (GIMF) - Theoretical Structure", IMF Working Paper Series, WP/10/34.

Levy, B., & Berger, P. D. (2013). On the financial advantage of hosting the Olympics. *International Journal of Humanities and Social Science*, Vol.3, No.1.

Madden, J. R. (2002). The Economic Consequences of the Sydney Olympics: The CREA/Arthur Andersen Study. *Current Issue in Tourism*, 7-21.

Malfas, M., Theodoraki, E., & Houlihan, B. (2004, June). Impacts of the Olympic Games as Mega events. 209-220. Municipal Engineer 157.

Martin, M. F. (2008). *China's Economy and the Beijing Olympics.* CRS Report for Congress.

Matheson V. A., (2002), Upon Further Review: An Examination Of Sporting Event Economic Impact Studies, The Sport Journal, Vol. 5, pp. 1-4.

Matheson, V., & Baade, R. (2004). Mega sporting events in developing nations: playing the way to prosperity. *South African Journal of Economics*, 1084-1095.

Minnaert, L. (2012). An Olympic legacy for all? The non-infrastructural outcomes of the Olympic Games for socially excluded groups (Atlanta 1996 - Beijing 2008). *Tourism Management*, 361-370.

Mourmouris, I. K. (2014), "Οι συνέπειες των Ολυμπιακών Αγώνων στην οικονομία και στην ανάπτυξη". Κεφάλαιο 2.2 στον τόμο *Η Ελληνική Πολιτική Οικονομία 2000-2010,* S.A. Roukanas and P. G. Sklias (eds), Livani Publising, Athens.

OKE (2003), *Ολυμπιακοί Αγώνες 2004,* Economic and Social Council of Greece, Athens.

Owen, J. G. (2005). Estimating the Cost and Benefit of Hosting Olympic Games: What can Beijing Expect from its 2008 Games? *The Industrial Geographer*, Vol.3, pp.1-18.

Oxford Economics (2012). *The economic impact of London 2012 Olympic & Paralympic games.* London: Oxford Economics.

Poynter, G. (2006). *From Beijing to Bow Bells: Measuring the Olympics Effect.* London: University of East London.

Preuss, H. (2004). *The Economics of Staging the Olympics.* Massachussets: Edward Elgar Publishing Inc.

Preuss, H. (2007) The Conceptualization And Measurement Of Mega Sport Event Legacies', *Journal Of Sport & Tourism, Vol.* 12(3), pp.207-228.

Preuss, H. (2010). *The Economic Dimension of the Olympic Games.* Barcelona: CEO.

Robin, D. (1988), Hosting the Olympic Games: Long-term Benefits to Sport and

Rose A. K., & Spiegel M. M., (2011), 'The Olympic Effects', *The Economic Journal, Vol. 121(553), pp.652–677.*

Rose, A. K., & Spiegel, M. M. (2009). *The Olympic Effect.* Cambridge: National Bureau of Economic Research.

Solberg H. A., & Preuss H., (2006), *Major Sport Events And Long-Term Tourism Impacts, Journal of Sport Management, Vol. 21, pp. 215-236.*

Song W., (2010), *Impacts Of Olympics Ion Exports And Tourism, Journal Of Economic Development, Vol. 35(4), pp. 93-110.*

Song, H., Kim, J. H., & Yang, S., (2010), Confidence Intervals for Tourism Demand Elasticity, *Annals of Tourism Research*, Vol. *37*(2), pp. 377-396.

Telloglou T. (2004), *Η πόλη των Αγώνων*, Hestia, Athens.

Urban and Spatial Planning Research Unit (1997), *Χωρικές επιπτώσεις των Ολυμπιακών Αγώνων και σύνδεσή τους με το προγραμματικό πλαίσιο*, University of Thessaly.

Walle, A.H. (1996), Festivals and Mega-Events: Varying Roles and Responsibilities, *Festival Management and Event Tourism*, Vol. 3(3), pp. 115-120.

Woodward, A. (2001). *Olympic Games Tourism Strategy.* Sydney: Australian Tourist Commission .

Zonzilos N. and G. Pavlou (2010), "Ο δυνητικός ρυθμός ανόδου της ελληνικής οικονομίας μεσοπρόθεσμες και μακροπρόθεσμες εκτιμήσεις και ο ρόλος των διαρθρωτικών μεταρρυθμίσεων". Κεφάλαιο 4.4 στο Ισοζύγιο Τρεχουσών Συναλλαγών της Ελλάδος: Αιτίες Ανισορροπίας και Προτάσεις Πολιτικής. Bank of Greece, Athens.