Market impact of international sporting and cultural events

António Miguel Martins & Ana Paula Serra

Abstract We study market reaction to the announcements of the selected country hosting the Summer and Winter Olympic Games, the World Football Cup, the European Football Cup and World and Specialized Exhibitions. We generalize previous results analyzing a large number and different types of mega-events, evaluate the effects for winning and losing countries, investigate the determinants of the observed market reaction and control for the *ex ante* probability of a country being a successful bidder. Average abnormal returns measured at the announcement date and around the event are not significantly different from zero. Further, we find no evidence supporting that industries, that *a priori* were more likely to extract direct benefits from the event, observe positive significant effects. Yet, when we control for anticipation, the stock price reactions around the announcements are significant.

Keywords Market Efficiency · Event Studies · Mega-Events · Anticipation

1 Introduction

This paper investigates the impact of the announcement of large international sporting and cultural events on the stock markets of host countries. Such events, often known as mega-events, are one-time events that require very large expenditures, frequently funded by the host governments.

Why should we observe a market reaction to the announcement of such mega-events? Two main competing arguments predict that these events produce non-negative abnormal returns as of the announcement date.

The first argument predicts that stock market reaction reflects whether the event creates or destroys economic value for the listed firms in the host country. Under the null hypothesis of efficient markets, positive or negative abnormal returns would reflect the present value of the expected change in listed firms' cash flows the event will produce. Assuming managers maximize shareholders' value, only positive NPV projects would be undertaken, and market prices would adjust upwards the event-related news. Further, anticipation of (net) economy-wide benefits driven by event-related international exposure, public infrastructure improvements and multiplier effects of the initial revenues would result in a positive impact for the aggregate market. The market reaction on the day an event is announced may not accurately measure the true economic impact of the events if investors anticipate the event will occur (Malatesta and Thompson 1985). The magnitude of the effects observed is of smaller magnitude and, the greater the anticipation, the lower the price impact as of the announcement date. This is particularly true for the events we study because in most instances the outcome is at least partially anticipated by investors.

Market reaction to nomination news could reflect instead a national positive sentiment caused by pride, self-esteem or joy associated with the fact that the country was chosen to host and sometimes organize an international (most of the times) worldwide broadcasted and recognizably important event.

The above arguments predict that winning (losing) countries observe positive (negative) market returns. Rational arguments predict that the effect should be asymmetric for winners and losers and across events, because the perceived economic impact can vary widely across countries. In a different way, behavioral arguments maintain that, if prices are affected by investor sentiment, regardless of the objective probability of observing the event and of the economic impact of the investment, we should observe a market rise in selected countries and a market decline in excluded countries. Further, the fact that investors extract more pain from bad news than the joy they sense when a good outcome is revealed can motivate different market reactions for winning and losing countries, and the magnitude of the effect would therefore be greater for losers than for winners.

If the event was not anticipated at all, i.e. event-news were a complete surprise, and investors are rational, the impact should be felt only on the winning bidder's valuation. In reality this scenario is rather implausible: mega-events location decisions are complex ongoing processes that involve several rounds of negotiation and/or voting, and require active bidding and intense business plans preparation from the countries or cities that take part in the contest. Furthermore, when there is only one known candidacy, the announcement itself conveys no news.

Stock market impact is at most, an attenuated measure of overall net economic impact and we do not measure here the economy-wide benefits attributable to such events. Regardless of a positive or negative overall economic impact, individual stocks (and industry indices) may register positive abnormal returns. The same goes for the effects observed in aggregate market indices: even if investors are rational, an event yielding negative economy-wide effects does not necessarily have to have a similar correspondence in the stock market. Aggregate market returns are value-

weighted averages of its individual constituent stocks' returns and, while the event can be damaging for economic growth, some listed firms (and industries) that potentially extract direct benefits from the organization of the event, such as tourism and infrastructure-related industries, can observe positive market returns. Variation in abnormal returns across firms (or industries) would reflect the differential net benefit each firm (industry) extracts from the event.

It is difficult to establish *a priori* the overall economic impact of the event and relate it directly to predict the sign and magnitude of market returns. Yet one can outline hypotheses motivated by the competing theoretical arguments, and test them upon the observed zero/non-zero, positive/negative abnormal returns, symmetrical/ asymmetrical effects for winning and losing countries and the cross-sectional variation of returns across events.

In any case, whether selections to host mega-events are perceived or not as positive news to the firms more directly involved and to the economy of the host country is an interesting question. In fact, we observe that countries and cities strongly compete to host international sporting and cultural events, and provide public funding, on the basis of the positive effects on the country's economy brought about by these events. Organizers claim that there are not only immediate increases in spending (direct and induced) but also further future economic benefits related with the infrastructure investments and international exposure. Yet there is a lot of controversy about the wealth effects of hosting these events. Several authors suggest that the actual impact may be substantially lower than the one estimated in *ex ante* models. In fact, *ex post* studies highlight that not only are the direct benefits lower (because of improper measurement of benefits and costs), but also that there is lack of empirical evidence demonstrating that the international exposure and the publicity associated with the event have any impact in improving the country or region for tourism or business. As for the companies more directly involved, previous literature suggests that stock prices tend to respond favorably to announcements of similar large capital investments.

We study stock price reaction around the announcement of the selected country to host the Summer and Winter Olympic Games, the World Football Cup, the European Football Cup and World and Specialized Exhibitions. We also measure the market effects of the announcement of the nomination of the European Cultural City.

First, we evaluate the abnormal returns of winning bidders on (and around) the announcement date using an event study approach. We study the impact at market and industry-levels. Second, we analyze the determinants of the variation in abnormal returns across events and industries on the basis of a set of variables found important by previous studies and control for the prior probability of observing the event. Third, on the basis of a simple model of partial anticipation, we reexamine the abnormal returns observed for winning and losing countries and perform a series of tests to disentangle the different theoretical arguments that could account for the observed stock market behavior.

Using a cross-section of 81 winning countries, we find that, on average there is no significant stock price reaction upon the announcements. We also measure stock price reaction over several other event-windows and again results are inconclusive. Further, the stock price reaction for losers is not statistically significant. Furthermore, we find no evidence supporting that industries likely to benefit from the selection

observe stronger effects. Overall, non parametric tests seem to be more powerful but results are mixed. The results of the cross-sectional analysis confirm some of the relations we predict. In particular, we report that abnormal returns are lower (in absolute terms) for winners and losers when the outcome is predictable. Overall we interpret our findings as supportive of rational valuation and partial anticipation. The results suggest further that non-trivial benefits exist but these are specific to particular events and countries. Thus, no general statement can be made regarding the economic merit of hosting a mega-event.

This study is related with several strands of the finance and economic literature. We focus on the literature of information and market efficiency. Another strand of literature directly related to this paper is the impact of sentiment on asset prices that we indirectly address. Our results are also of interest to other empirical economic research areas such as economic impact studies of large capital investments and public investment in infrastructures, and sports, recreation and tourism studies.

Our main contribution is to perform rigorous study of market reaction to the announcement of mega-events. Previous studies focus on one particular event and consequently do not have the opportunity to explore the cross-sectional variation in abnormal returns. Because we analyze a large number of events, we improve statistical significance and are able to explore the determinants of cross-sectional variation across events. In addition we study different types of events that can be grouped in two major classes, sporting and cultural events. On top of that, unlike most of the previous studies, we control for partial anticipation and evaluate the effects for winning and losing countries. Our study generalizes previous results, investigates the determinants of the observed market impact and controls for the ex ante probability of a country being a successful bidder.

While we do not address directly the overall economic benefits of these events, it is possible to draw some policy implications regarding the merit of (funding) these events. Given the limitations of traditional economic impact ex ante studies (and because the implementation of more comprehensive and rigorous techniques may be, in most cases, impracticable), event-studies can inform policy makers about the wealth effects of the organization of mega events.

The remainder of paper is organized as follows. Section 2 reviews the relevant related literature. Section 3 presents the testable hypotheses. Section 4 presents the data and tests. In Section 5 we present and discuss our main findings. Section 6 concludes.

2 Background and previous findings

2.1 Overall economic impact of mega-events

Dwyer et al. (2005) refer to mega-events as one-time or recurring events of limited duration. Mega-event projects entail large construction projects (infrastructural, productive or not) and operational costs.[1] Economic impact studies (or economic

[1] For example, Germany spent over 1,4 billion euros building or rehabilitating 12 stadiums for the 2006 Soccer World Cup of which 35% were funded by taxes and Greece spent over 1 billion euros in the 2004 Olympic Summer Games on security (cited by Matheson 2006).

impact assessments), most of the times sponsored by promoters, claim these mega projects are very positive NPV projects and there seems to be a lot of interest in hosting these events. Yet several studies suggest that not only are the input estimates optimistic but the typical methodology to assess *ex ante* event-related economic returns, input-output models, fail to correctly account for the revenues that are attributable to the event.[2] To properly assess how much growth is attributable to the event, one has to a) control for "substitution" and "crowding-out" effects; b) incorporate multipliers that reflect eventual "leakages to other countries"[3]; and c) account for the impact in taxation or government borrowing.[4] More refined models propose using a series of relevant variables, proxy factors for local growth determinants, to project the level of economic activity in the absence of the event. Comparing this estimate with the actual level of activity will tell us *ex post* what the effective contribution of the event was. In other words, deviations from average national (or local) growth or historical growth, that are not explained by deviations in costs of production or demand side variables, should be attributed to the event.

There is some controversy regarding the economy-wide impact of mega-events in the host countries. The impact is measured frequently by changes in personal income, *per capita* personal income, employment or sale taxes collections. Academic studies that analyze the *ex post* effects of these mega-events confirm that *ex ante* estimates are overly optimistic. For example, Baade and Matheson (2004) present an *ex post* analysis of the 1994 World Cup in the U.S. and find that several cities did in fact experience significant losses in contrast with the gains estimated by the tournament promoters.[5] The most recent and sophisticated e*x post* studies, seem to suggest no consistent positive statistically significant net economic benefits (Matheson 2006).[6] In any case, several authors notice that it is difficult to isolate the impact of the event and given that it is probably small relative to the overall economy, one may not be able reject the null of no economic benefits even if true benefits occur.

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[2] Dwyer et al. (2005) propose a more comprehensive computable generating equilibrium model (CGE) to assess the economic impact of such events.

[3] The benefits may not go all to the host country but to foreign neighbor countries or multinationals. For example, the 16 official *partners* for the 2006 FIFA World Cup in Germany were multinationals and only two were German. Yet all the official *suppliers* were German companies.

[4] Public funding is often required for the event infrastructures. This could imply that other potential more productive investments are not funded (or postponed) or that taxes have to rise (Siegfried and Zimbalist 2000). Those public expenditures may or not have positive impact on the economy. Sporting events specialized infrastructures such as stadiums or swimming pools have a limited use and potentially benefit only a small part of the tax payers that paid for it. More general construction projects such as cities core redevelopment and infrastructure building may benefit more directly the country or local community. Similarly, the benefits from investing in cultural or lifestyle amenities can attract highly educated and creative young people that are essential to economic growth.

[5] The authors suggest that host cities accumulated losses of US$ 5.5 to US$9.3 billion as opposed to the US$4 billion gain estimated by the organizers.

[6] Please refer to Matheson (2006) for an extensive survey of *ex ante* and *ex post* economic impact studies (Tables 1 and 2).

2.2 Market impact of investment decisions

The extensive event study literature focusing on announcement effects provides evidence that, on average, stock price reaction is consistent with market efficiency: prices rapidly and fully adjust to the release of new corporate information.[7]

2.2.1 Market reaction to major capital investments

Capital expenditures decisions are the key financial decisions in terms of contribution to firm-value (Miller and Modigliani 1958).

Under the null hypothesis of efficient markets, the announcement effects on market prices should reflect the significance of any unexpected news that influence cash flows or discount rates (McQueen and Roley 1993). Stock prices at time t are given by:

$$P_t = E\left[\sum_{\tau=1}^{\infty} \frac{D_{t+\tau}}{1 + {}_tR_{t+\tau}} \Big/ \Omega_t\right] \qquad (1)$$

where $D_{t+\tau}$ are the expected dividends at time $t + \tau$; ${}_tR_{t+\tau}$ is the expected discount rate at time $t + \tau$; and $E[./\Omega_t]$ are the conditional expectations upon the available information set Ω at time t.

There are alternative stock price reactions to announcements of capital expenditures plans (Woolridge and Snow 1990; Burton et al. 1999):

- a positive market reaction reflects that managers maximize shareholder wealth and undertake positive-NPV projects; hence, the larger the economic valued added by these projects, the larger the positive impact. If we assume rational expectations and random economic news, a positive market reaction reflects that investors are positively surprised by the unexpected news;
- a zero market reaction to the announcement could reflect investors have perfect foresight and fully anticipate the effects and timing of future positive NPV projects. The market value of a company would reflect in advance the effects of these or other investments that the firm would have to pursue to maintain its (anticipated) competitive advantages. Therefore, the market reaction to the announcement does provide a proper measure of the economic merit of hosting a mega-event;
- finally, a negative market reaction could either reflect that investors view these projects as "empire-building" decisions, or that investors are myopic, i.e., they pay too much attention to short-term earnings and penalize long-term capital investments.

Previous empirical literature finds that, on average, stock prices seem to respond favorably to announcements of individual firms major capital investments.[8] Further

[7] For thorough reviews, see, for example, Fama (1991) and Dimson and Mussavian (1998). Several recent studies present evidence contrary to market efficiency suggesting either overshooting in prices or gradual information dissemination (see for example, Fama 1998).

[8] See, for example, Woolridge and Snow (1990), Jones et al. (2004) and Titman et al. (2004) and references therein.

the stock price reaction is greater, the level of new investments announced. McConnell and Muscarella (1985) show that firms' stock market responses to capital expenditures announcements reflect their investment opportunities. Similarly, Blose and Shieh (1997) show the market response is larger to announcements of firms with good investment opportunities. Yet Titman et al. (2004) show that the increased investment expenditures may be associated with negative stock returns when investors believe that managers invest in negative NPV projects for their own benefits.[9]

2.2.2 Partially-anticipated events

Stock price changes on the announcement date only reflect a part of the overall economic effect of an event when investors partially anticipate the event. Market reaction to announcements depends on investors' perception of the likelihood of the event. The announcement effect is most of the times smaller than the economic impact of the event and failure to find significant announcement returns may be explained by partial anticipation. Stock prices may as well reflect investor disappointment if investors had prior expectations on the occurrence of events with positive value than do not materialize (Malatesta and Thompson 1985). Several studies have estimated the likelihood of observing an event based upon firms characteristics and found that the extent of market reaction is affected by investors' prior expectations.[10]

2.2.3 Mega-events

Mega-events announcements may produce a short-term impact on the stock prices of the listed companies that benefit directly from the event such as construction and building materials, tourism-related, communications and media companies. More long-term effects could also arise due to general multiplier effects and, even more important, as a result of country projection. Merton (1987) refers to changes in investor recognition as a source of value. Investors only invest in the assets of which they are aware and require higher returns to compensate for the shadow cost of incomplete information. Organizing a large event such as the Olympic games can overrun that cost and, through an expansion of shareholders' base, lead to a decrease in required returns translating into higher stock market valuations. The increased exposure to international media may also produce long-term benefits through increased tourism receipts in the years after the event.

Veraros et al. (2004) examine the effect of the announcement of the hosting city for the 2004 Olympic games on the stock exchanges of Greece and Italy and find a

[9] Related with this is what is sometimes designated by Capital Myopia that refers to excessive investments pursued by companies that erroneously believe that there is scope for further profitable capital investments ignoring that competition will drive away economic rents.

[10] See, for example, Acharya (1993) or Akhigbe et al. (2004) and the references therein.

significant positive effect on the Athens Stock Exchange.[11] Yet no (negative) effect is observed for the losing country (Milan Stock Exchange).

2.2.4 Investor sentiment

Several authors show that changes in investor mood are associated with changes in market prices. Thus, prices could move regardless of the true economic impact of the events or the degree of anticipation associated. Recent literature shows that events that have a general impact on investor sentiment, such as national team soccer results, produce statistically and economically significant returns. For example, Edmans et al. (2007) find that a loss in World Cup leads to a next-day abnormal return of negative 38 basis points, and claim that this loss effect is driven by investor sentiment.

3 Development of hypotheses

We evaluate the following hypotheses:

(i) The announcement of a mega event such as the Olympics, the World Football Cup, the European Football Cup or the World Exposition is associated with a positive market reaction in the selected country stock exchange.[12]

A significant positive average market reaction in the selected country is consistent with shareholder value maximization reflecting that investors believe that hosting a mega-event creates value for listed firms. The announcement conveys good news and market reaction reflects the change in value attributed to uncertainty resolution. A null market reaction could reflect that the perceived net benefits for the listed firms are trivial, or that investors have perfectly anticipated the timing and effects of the event. A negative market reaction for the winning country could reflect either that investors' believe that hosting is a value-destroying event or that investors are myopic.

(ii) The announcement of a mega event such as the Olympics, the World Soccer Cup, the European Soccer Cup or the World Exposition is associated with a negative market reaction on the losing country stock exchange.

A significant negative market reaction for the losing country is consistent with shareholder value maximization under the assumptions that investors view "hosting" as a value-creating event and do not have a perfect foresight.

(iii) Individual industries that potentially benefit more from the event exhibit higher market reaction.

[11] A similar study conducted by Berman et al. (2000) found no significance effect on the overall market, and only limited effects on stock prices of infrastructure development companies based in New South Wales where the Olympic Games were hosted.

[12] The *statistical* null hypothesis tested in Section 5 is that the impact of the announcement of the event is null and so forth for the other hypotheses.

The positive/negative effects can be asymmetric reflecting that there are differential net potential benefits for the economies of the winning/losing countries.[13] A similar price impact across industries, regardless of the potential economic benefits they can extract from the event, is consistent with investor sentiment.

(iv) Abnormal returns (for the winning countries) vary across events and industries and are driven by the relative importance of the event (relative to the underlying economy), the time-span between the announcement and the realization of the event, and the degree of partial anticipation.

Significant differences in the cross-section of abnormal returns are evidence in favor of arguments that predict that the observed effects are associated with differential benefits across countries and industries.

4 Data and tests

4.1 Data

Announcement dates were gathered from several sources (through mail contact or websites): IOC (International Olympic Committee) for the Summer and Winter Olympic Games; FIFA (Fedération Internationale de Football Association) for the World Football Cups; UEFA (Union des Associations Européennes de Football) for the European Football Cups; Bureau International des Expositions for the World and Specialized Exhibitions; and the EC (European Commission) for the European Capitals of Culture. Announcement dates are available upon request.

The sampling criterion was availability of daily country and industry indices returns with at least half a year before the event. The final sample consists of 81 announcements.[14] The first announcement date is May 16, 1955 and refers to the 1960 Summer Olympic Games hosted by Italy. The last announcement date in our sample is July 2, 2003 and refers to the 2010 Winter Olympic Games that will be hosted by Canada. The average lag between the announcement and the realization of the mega-events for the 81 events is 57.5 months.

Table 1 shows the breakdown of the events analyzed by type of event and by organizing country.[15] Our sample includes six Summer Olympic Games (1984 onwards), eight Winter Olympic Games (1988 onwards), six World Football Cups (1990 onwards), ten European Football Cups (1984 onwards), 11 World Exhibitions (1982 onwards), ten Specialized World Exhibitions (1980 onwards) and

[13] In alternative, positive or negative market reactions, respectively for the winning or losing countries could reflect investor sentiment. A stronger (negative) effect for losing countries is consistent with behavioral arguments.

[14] Some events are co-organized by two or more countries. For example, Belgium and Netherlands organized the 2000 European Football Cup together. In that case we consider them as separate observations.

[15] There are a few cases for which there is no market information for the winning country when the nomination was announced. For example, this is true for the 1988 Summer Olympic Games in the former Soviet-Union or the 1988 Winter Olympic Games in Korea.

Table 1 Events analyzed: hosting country and type of event

Hosting country/ Type of event	Summer olympic games	Winter olympic games	World football cups	European football cups	World exhibitions	World specialized exhibitions	European capitals of culture
(81)	(6)	(8)	(6)	(10)	(11)	(10)	(30)
EUROPE (58)							
Germany (8)			2006	1988	2000	1983/ 1993/2003	1988/1999
Austria (2)				2008			2003
Belgian (3)				2000			2000/2002
Denmark (1)							1996
Spain (5)	1992				1992		1992/2000/ 2002
Finland (1)							2000
France (7)		1992	1998	1984			1989/1993/ 2000/2004
Greece (3)	2004						1997/2006
Netherlands (5)				2000		1982/2002	1987/2001
Ireland (2)							1991/2005
Italy (7)		2006	1990	1980		1992	1986/2000/ 2004
Norway (2)		1994					2000
Poland (1)							2000
Portugal (3)				2004	1998		2001
United Kingdom (4)				1996		1984	1990/2008
Czech Republic (1)							2000
Sweden (2)				1992			1998
Switzerland (1)				2008			
NORTH AMERICA (11)							
Canada (4)		1988/2010			1986	1980	
USA (7)	1984/1996	1980/2002	1994		1982/1984		
ASIA (10)							
Japan (5)		1998	2002		1985/2005	1990	
South Korea (2)			2002		1993		
China (3)	2008				2010	1999	
OCEANY (2)							
Australia (2)	2000					1988	

(number of events organized in parentheses)

European Capitals of Culture (1986 onwards). Even after excluding the European Capitals of Culture, Europe has been the most successful venue attracting these events. Worldwide, by country, the US is the top organizer followed by Japan, Canada, Germany and Italy. Table 10 in "Appendix" shows descriptive statistics regarding the relative magnitude of the events analyzed. Mega-event investments vary depending on the type the event. The Summer Olympic Games and the World

Football Cups are the largest events with total investment of over 10% the host country GNP.

We also gathered information for the losing candidacies when available. This information, shown in Table 2, was only available for a subset of events and dates.[16] The most active (not successful) bidder is Canada followed by Sweden.

Returns for the winning and losing countries were obtained from Datastream and computed using a total return index measured in US dollars.[17]

For the multiple analysis we use GDP and industrial production index data from IMF. Market capitalization data were obtained from Datastream. The Olympic Games voting results for the several rounds were obtained from Lyberg, Wolf "Fabulous 100 years of the IOC; facts, figures and much, much more", Lausanne 1996, pp. 308–313 and from the IOC website. The World Football Cup voting results were provided by FIFA. Table 3 shows the votes gathered by the winning and the losing countries for the several rounds of voting.

4.2 Tests

4.2.1 Abnormal returns

To measure the magnitude of stock price reactions to announcements we use the standard abnormal returns technique based upon the several benchmarks described below.

We examine the effects of the nomination news on returns as of the announcement date. We analyze several other windows to account for partial anticipation and leakages in information or delayed effects due to thin trading.

Daily abnormal returns were calculated using constant-mean, market-adjusted and risk-adjusted methods described in Brown and Warner (1985).[18] The date of the announcement is designated as day $t = 0$. Daily returns are collected for the period ($t = -140$ to 20). The estimation and event periods were defined respectively as $[-140, -21]$ and $[-20, 20]$.

Abnormal returns, AR_{it}, are obtained as the difference between observed (log) returns of the country i at event day t, R_{it}, and the expected return generated by a chosen benchmark $E(R_{it})$. $E(R_{it})$ is defined as follows, respectively for the constant-mean return, the market-adjusted and the risk-adjusted methods:

$$E(R_{it}) = {}^{1}/_{120} \sum_{t=-140}^{-21} R_{it} \qquad (2)$$

[16] Stock market information was not available for several losing countries by the time of the nomination announcement (for example, China, in respect to the 2000 Summer Olympic Games or Morocco, in respect to the 1998 and 2002 World Football Cups).

[17] Datastream indices were preferred over other domestic market and industry indices when available because they are constructed on a uniform basis across markets and are not backfilled with firms added or deleted from the index. The exception was the total return series for Spain general index (IBEX) obtained directly from Bolsa de Madrid.

[18] Kothari and Warner (2006) show that the tests are not highly sensitive to the benchmark model of abnormal returns. Market-adjusted returns are not included here for all tests. Results are available upon request.

Table 2 Events analyzed: losing candidacies

Losing country/ type of event	Summer olympic games (13)	Winter olympic games (13)	World football cup (2)	World exhibitions (6)
EUROPE (19)				
Germany (1)	2000			
Austria (1)		2010		
France (2)	1992/2008			
Greece (1)	1996			
Italy (2)	2004	1988		
Norway (1)		1992		
United Kingdom (2)	2000		2006	
Russia (1)				2010
Sweden (5)	2004	1992/1994/1998/ 2002		
Switzerland (2)		2002/2006		
Turkey (1)	2008			
NORTH AMERICA (9)				
Canada (6)	1996/2008	2002		1998/2000/2005
USA (2)		1994/1998		
Mexico (1)				2010
ASIA (3)				
Japan (1)	1988			
South Korea (2)		2010		2010
AFRICA (2)				
South Africa (2)	2004		2006	
OCEANY (1)				
Australia (1)	1996			

(number of bids in parentheses)

$$E(R_{it}) = Rm_t \tag{3}$$

$$E(R_{it}) = \widehat{a}_i + \widehat{b}_i Rm_t \tag{4}$$

The presence of unequal integration of the countries analyzed makes it difficult to find a good model for the pricing of these securities. We assume that the degree of integration is fixed through the period of estimation of risk exposures and that markets are fully integrated with the world market. We thus use an unconditional world market model. Parameters a and b were estimated regressing market index returns on the world market index (R_m) over the estimation period.

Table 3 Events analyzed: voting results for the winning and losing countries over the several rounds

Event	Host Country	Ranking						Bid in previous event?
		1st Round	2nd Round	3rd Round	4th Round	5th Round	Always leading?	
Panel A. Winning Countries								
Summer Olympic Games								
1984	USA	single candidacy					Yes	No
1992	Spain	first	first	first			Yes	No
1996	USA	second	third	first	first	first	No	No
2000	Australia	second	second	second	first		No	Yes
2004	Greece	second	first	first	first		No	Yes
2008	China	first	first				Yes	No
Winter Olympic Games								
1980	USA	single candidacy					Yes	No
1988	Canada	first	first				Yes	No
1992	France	second	first	first	first	first	Yes	No
1994	Norway	first	second	first			No	Yes
1998	Japan	first	first	first	first		No	No
2002	USA	first					Yes	Yes
2006	Italy	first					Yes	No
2010	Canada	second	first				Yes	No
World Exhibitions								
1998	Portugal	first					Yes	No
2000	Germany	first					Yes	No
2005	Japan	first					Yes	No
2010	China	first	first	first	first		Yes	No
World Football Cups								
1990	Italy	first					Yes	No
1994	USA	first					Yes	No
1998	France	first					Yes	No
2002	Japan	single candidacy					Yes	No
2002	S. Korea	single candidacy					Yes	No
2006	Germany	first	second	first			No	No
Panel B. Losing Countries								
Summer Olympic Games								
1988	Japan	second					no	no
1992	France	first	second	second			no	no
1996	Greece	first	first	First	second	second	yes	no
2004	Italy	second	second	second	second		no	no
2008	Canada	second	second				no	no
Winter Olympic Games								
1994	Sweden	third	first	second			yes	yes
1998	USA	fourth	second	second	second		yes	no

Table 3 (continued)

Event	Host Country	Ranking						Bid in previous event?
		1st Round	2nd Round	3rd Round	4th Round	5th Round	Always leading?	
2002	Switzerland	second					no	no
2006	Switzerland	second					no	yes
2010	Korea	first	second				no	no
World Exhibitions								
1998	Canada	second					no	no
2000	Canada	second					no	yes
2005	Canada	second					no	yes
2010	Korea	second	second	second	second		no	no
World Football Cups								
2006	South Africa	second	second	second			no	no

Averaging abnormal returns across markets in common event time, we obtain the average cross-sectional abnormal return given by:

$$AAR = {}^{1}/_{N} \sum_{t=1}^{N} AR_{it} \qquad (5)$$

where N is the number of countries in the sample.

By cumulating the average residuals over a particular time interval ($-20 <= t_1 <= 0$; $0 <= t_2 <= 20$), we obtain the cumulative average abnormal returns (*CARs*) as follows[19]:

$$CAR[t_1, t_2] = \sum_{t=t_1}^{t_2} AAR_t \qquad (6)$$

The procedure is similar when we analyze the effects for a particular industry. *CARs* are computed first averaging daily abnormal industry returns across markets and then cumulating industry average abnormal returns over the days that comprise the event window under scrutiny.[20] To compute industry returns we use the 32 Datastream industry-level four index series.

We use both parametric and non-parametric tests to assess the statistical significance of average abnormal returns. The use of several tests aims at ensuring the robustness of results when the usual assumptions of independence in the cross-

[19] Because we use continuously compounded returns, buy and hold returns for a specific time-span are achieved simply summing the log returns. If we assume that discrete returns are distributed as iid log normal variables, cumulative log returns are normal distributed.

[20] The benchmark to compute industry market- and risk-adjusted abnormal returns was the country's total return market index.

section, constant variance or normality of returns are incorrect.[21] The parametric test statistics examined are Brown and Warner (1980, 1985) with and without crude dependence adjustment, the standardized residual test and Boehmer et al. (1991) standardized cross-sectional test. The non-parametric statistics are the sign test, Corrado (1989)'s rank test and Wilcoxon-signed rank test.[22]

4.2.2 Cross-sectional analysis

To estimate the impact of the determinants on the cross-sectional variation of abnormal returns, we estimate the following equation using fixed effects for industries[23]:

$$CAR_{js} = \beta_0 + \beta_1 SIZE_j + \beta_2 LAG_j + \beta_3 LIQ_j + \beta_4 REC_j + \beta_5 EXP_j + \beta_6 REP_{js} + \beta_7 VOT_j + \sum_k \gamma_k D_k + \eta_{js} \quad (7)$$

where CAR_{js} are the cumulative abnormal returns for industry *s* (in host country *j)*; $SIZE_j$ is the ratio between the event capital expenditure and the host country *j* GDP; LAG_j is the time lag between the announcement and the moment of the event hosted by country *j*; LIQ_j is the ratio between country *j* market capitalization and its GDP; REC_j is a dummy that equals *1* if the economy is in recession at the time of the event hosted by country *j* and *0* otherwise; EXP_j is a dummy that equals *1* if the economy is in expansion at the time of the event hosted by country *j* and *0* otherwise; REP_{js} is the ratio of industry *s* market capitalization and the overall market capitalization of country *j*; VOT_j is the difference in the percentage of votes between winning country *j* and the losing country with the largest number of votes in the last round; D_k are dummies for each type of event (Olympic Games, etc.); and η_{js} is an i.i.d. error term.

Our main variable of interest is *VOT*. We expect that the smaller the difference in the percentage of votes between the two candidates in the last round, the larger the surprise in the announcement news and therefore the larger the impact on prices.

We control for a set of other variables found important by previous studies. The variable *SIZE* is motivated by Burton et al. (1999) that report that the market impact of capital expenditures announcements is stronger for larger projects. Yet, the findings of Woolridge and Snow (1990) do not confirm this relation. Given that we are comparing countries with very different economy sizes we use relative instead of

[21] Kothari and Warner (2006) show that with short horizons, the usual test statistic is not highly sensitive to assumptions about the cross-sectional or times-series dependence or normality of returns. Further, they show that short horizon event study tests are generally well-specified but the power of the tests is sensitive to sample size and firm characteristics (such as volatility). For firms with low volatility, sample size of 20 is enough attain full power for a 1% abnormal return.

[22] The tables below report the statistics for the usual Brown and Warner (1980, 1985) parametric tests and for the sign test. Other results are available upon request.

[23] We run the same regression for market CARs (instead of industry CARs) using OLS (instead of fixed effects) without the industry-specific variable *REP*.

absolute size.[24] The variable *LAG* proxies investors' myopia. Burton et al. (1999) and Woolridge and Snow (1990) fail to find any significant different effect in market reaction between long-term and short-term project announcements. *LIQ* tries to capture how well the economic output of a particular country is mirrored in its stock market. *REP* is an industry-specific variable to control for the importance of a particular industry in the stock market. To accommodate the findings of McQueen and Roley (1993) that report a negative relation between market impact and economic activity, we also include the variables *REC* and *EXP*. These variables proxy economy-wide activity. We follow McQueen and Roley (1993) methodology to define economic states. Finally, we include dummies for the type of event and allow for industry fixed effects to account for differential benefits across industries.

4.2.3 Partially anticipated effects

We analyze two specifications to evaluate the role of partial anticipation.

Partial anticipation I On the basis of the model derived in "Appendix", we propose the following empirical testable model:

$$CAR_i = \alpha + \phi\, p_i + \delta\, D_i + \mu_i \qquad (8)$$

where CAR_i are the cumulative abnormal returns over the event window for country *i* aggregate market index; (*i* = winners, losers); p_i is defined as the probability of country *i* hosting the event; D_i is a dummy variable that equals *1* if the country *i* is nominated and *0* otherwise; and μ_i is a i.i.d. error term.

To estimate α, ϕ and δ we pool the cumulative abnormal returns of the winning and losing countries across events.

If the country is chosen to host (or not host) the event, expected abnormal returns are given by, respectively:

$$E(CAR_j) = \overbrace{\hat{\alpha} + \hat{\phi}\, p_j + \hat{\delta}}^{\text{Unanticipated effect for Winner}} \qquad (9)$$

$$E(CAR_1) = \overbrace{\hat{\alpha} + \hat{\phi}\, p_l}^{\text{Unanticipated effect for Loser}} \qquad (10)$$

Given the expressions (A-4) and (A-5) in "Appendix"

$$\phi = -\frac{NPV_I}{V_{I-1}(1 + E(R_I))} \qquad (11)$$

[24] Veraros et al. (2004) argue that the difference in the reaction of Athens and Milan stock exchanges could result from economy size differences (Greece and Italy) and the importance of the two cities potentially hosting the event (Athens and Rome).

$$\delta = \frac{(1-p_j)NPV_j}{V_{j-1}(1+E(R_j))} - \phi p_j$$

$$= \overbrace{\frac{(1-p_j)NPV_j}{V_{j-1}(1+E(R_j))}}^{\text{Unanticipated effect}} + \frac{NPV_l}{V_{l-1}(1+E(R_l))}p_j$$

$$= \overbrace{\frac{NPV_j}{V_{j-1}(1+E(R_j))}}^{\text{Total economic impact}} - p_j\left(\frac{NPV_j}{V_{j-1}(1+E(R_j))} - \frac{NPV_l}{V_{l-1}(1+E(R_l))}\right) \quad (12)$$

where V_{j-1} and V_{l-1} denote, respectively, the winning country j and the losing country l market valuation just before the event is announced; NPV_j and NPV_l stand for the economic impact of the event for each country.

Rational arguments yield the following predictions: $\alpha = 0$, $\phi < 0$ and $\delta > 0$. Assuming that the effects observed reflect solely the economic impact of the event (i.e., $\alpha = 0$), δ and ϕ will capture all the relevant effects. $\phi\, p_l$ reflects that stock prices will adjust downwards for the losing country in the anticipated effect (that the country would win). $\phi p_j + \delta$ reflects the upwards adjustment in stock prices for the winning country in the unanticipated effect (that the country would win). If the economic impact of the event was similar for the two countries (in percentage of its actual market capitalization), δ would capture the total economic impact of the project. Ceteris paribus, the greater the economic effect of the project, the larger the magnitude of the parameters, δ and ϕ. When the event is not anticipated at all, δ captures the full economic impact for the winning country ($E(CAR_j) = \delta$ and $E(CAR_l) = 0$).[25]

Partial anticipation II To account for market expectations in (8), we use the percentage of votes received by the country in the last round.[26] This may be considered an objective prior probability assuming rational expectations. Yet, the selection process is highly competitive and, in the successive rounds of voting, the ranking is often reversed, and front runners are many times overtaken by other candidates. One could argue that initial and intermediate rankings also influence investors' expectations. To account for that, we tested the following alternative specification:

$$CAR_i = \varphi_0 + \varphi_1 PS_i + \varphi_2 TS_i + \lambda_0 D_i + \lambda_1 D_i PS_i + \lambda_2 D_i TS_i + \omega_i \quad (13)$$

where CAR_i and D_i are defined as in (8); (i = winners, losers); PS_i is a dummy variable that equals *1* when the announcement news are a partial surprise and *0*

[25] If stock prices are influenced by sentiment, δ reflects the effect of positive sentiment while α captures the negative sentiment in prices. Further, if sentiment effects are more pronounced for losing countries, $|\alpha| > |\delta|$. Finally, $\phi = 0$, reflecting that prices are affected by investor sentiment, regardless of the objective probability of observing the event.

[26] Very recently, online sports and non-sports exchanges, initiated trading on contracts where account holders may buy or sell the future outcome of various events. Intrade.com, for example, allows to trade contracts that bet on the venue (region) that will host the Summer Olympics.

otherwise; TS_i is a dummy variable that equals *1* when the announcement news are an almost total surprise and *0* otherwise; andω_i is an i.i.d. error term.

The specification (13) accommodates the fact that investors form their expectations on the basis of all rounds of voting. Further we also take into account the country bidding record. The motivation for including this piece of information is grounded on the idea that the selection outcome is influenced by the lobbying power of the candidacies (Veraros et al. 2004): if the country did bid for hosting the last event and lost, investors may perceive that the lobbying power is limited and anticipate that, once again the candidacy will not succeed.

We classify the announcement news as *total surprises*, out of line to market expectations, when:

- for the winning country, the country did not consistently lead the ranking in the previous voting rounds, and had bid for hosting the previous event;
- for the losing country, the country lead the ranking in some of the previous voting rounds, and had not bid for hosting the previous event.

Announcement news are classified as *partial surprises* when:

- for the winning country, the country consistently lead the ranking in all the previous voting rounds, and had bid for hosting the previous event; or the country did not lead the ranking in all previous voting rounds but had not bid for hosting the previous event.
- for the losing country, the country never lead the ranking in the successive voting rounds, but had not bid for hosting the previous event; or the country lead the ranking in only one of the previous voting rounds but had bid for hosting the previous event.

Expected abnormal returns for the winning and losing bidders for the cases of total surprise and partial surprise can be summarized as follows:

Surprise/Country	Winning	Losing
No Surprise	$\varphi_0+\lambda_0$	φ_0
Partial Surprise	$\phi_0 + \phi_1 + \lambda_0 + \lambda_1$	$\varphi_0+\varphi_1$
Total Surprise	$\phi_0 + \phi_2 + \lambda_0 + \lambda_2$	$\varphi_0+\varphi_2$

Rational arguments yield the following predictions. For the winning country $\varphi_0 + \lambda_0 = 0$; $\varphi_0 + \varphi_1 + \lambda_0 + \lambda_1 > 0$; $\varphi_0 + \varphi_2 + \lambda_0 + \lambda_2 > 0$; and $\varphi_0 + \varphi_2 + \lambda_0 + \lambda_2 > \varphi_0 + \varphi_1 + \lambda_0 + \lambda_1$. As for the losing country, the predictions are $\varphi_0 = 0$; $\varphi_0 + \varphi_1 < 0$; $\varphi_0 + \varphi_2 < 0$; and $|\varphi_0 + \varphi_2| > |\varphi_0 + \varphi_1|$. If there is no surprise, abnormal returns as of the announcement date should be null. The greater the surprise, the greater the positive (negative) impact of the nomination news for the winning (losing) country.[27]

[27] If prices are affected by investor sentiment, regardless of the objective probability of observing the event, the behavioral effect is subsumed by parameters ϕ_0 and λ_0.$\phi_0 + \lambda_0 > 0$; $\phi_0 < 0$; and—$\phi_0 > \lambda_0/2$ (asymmetrical effect).

5 Results

5.1 Abnormal returns

The average abnormal returns are shown in Tables 4, 5 and 6.

5.1.1 Winning countries

Aggregate market reaction Table 4 shows the abnormal returns at and around the moment the nomination information was released, for each type of event. The table shows the abnormal returns controlling for worldwide market effects that we assume to be unaffected by that particular country specific event. We present market-model and mean-adjusted CARs and significance tests for four windows of interest: [−1,1], [0,0], [0,1] and [0,5].[28]

We observe no significant stock price reaction at the announcement dates. This is true for all the events we analyze except for a positive reaction at the announcement of Specialized Exhibitions: the sign test shows that eight out the ten countries in sample showed a positive abnormal return. Overall the magnitude of the observed market reaction is economically and statistically insignificant.

The magnitude and significance of the CARs for the other windows analyzed is not significantly from zero with two exceptions: market-model CARs register a positive significant effect for the Specialized Exhibitions over the window periods [0,1] and [0,5]; and there is a negative significant CAR [−1,1] for the European Capitals of Culture. In both cases the results are barely significant and only if we use non-parametric tests.

The evidence does not suggest a differential market reaction for sport or cultural events.

Individual markets reaction As noted above, we expect that the impact varies across events and markets reflecting several factors such as the importance of the event relative to the underlying economy or the degree of partial anticipation. The results in Table 4 could thus reflect that there is considerable variation across individual markets. We observe that some markets experience positive returns while others experience negative returns but in most cases these are not statistically or economically significant.[29] The negative reactions are consistent with myopic investors that penalize long-term investments. Alternatively one could argue that the market perceives these (in most cases public) investments as economy-wide damaging projects.

Thus, regarding our first hypothesis, we cannot reject the null of no significant average aggregate market reaction to the announcements of hosting country nominations. The individual market analysis suggests that some markets react positively to the announcement of mega-events while others react negatively. Yet, overall, the effect is trivial and, on average, not significantly different from zero. The results hold across different event categories. The findings seem to be fairly robust:

[28] We looked upon other significance parametric and non parametric tests. Results are not shown in a table to save space. The significance of the results discussed in the paper is barely unchanged.

[29] There are some exceptions. For example, Greece experienced statistically positive abnormal of returns (+7.8%) regarding the announcement of the nomination to host the 2004 Olympic Games.

Table 4 Abnormal returns at and around the announcement date: winning countries

	Market Model				Constant-Mean Model			
	[−1,1]	[0,0]	[0,1]	[0,5]	[−1,1]	[0,0]	[0,1]	[0,5]
Panel A. Summer Olympic Games (*6 countries*)								
CARs (%)	0.6869	−0.0802	0.7956	−1.1199	0.3492	−0.2030	0.4678	−2.0425
θ_1	(0.477)	(−0.167)	(0.828)	(−0.389)	(0.232)	(−0.405)	(0.466)	(−0.678)
θ_2	(0.465)	(−0.163)	(0.808)	(−0.379)	(0.228)	(−0.397)	(0.458)	(−0.666)
# Positive	3	3	3	3	2	3	2	2
τ_1	(0.000)	(0.000)	(0.000)	(0.000)	(−0.816)	(0.000)	(−0.816)	(−0.816)
Panel B. Winter Olympic Games (*8 countries*)								
CARs (%)	−0.1475	−0.2688	−0.2315	0.1392	−0.6561	−0.4788	−0.8302	0.0401
θ_1	(−0.163)	(−0.894)	(−0.385)	(0.077)	(−0.573)	(−1.255)	(−1.088)	(0.018)
θ_2	(−0.150)	(−0.821)	(−0.353)	(0.071)	(−0.598)	(−1.310)	(−1.136)	(0.018)
# Positive	4	2	3	3	4	3	3	3
τ_1	(0.000)	(−1.414)	(−0.707)	(−0.707)	(0.000)	(−0.707)	(−0.707)	(−0.707)
Panel C. World Football Cups (*6 countries*)								
CARs (%)	−0.2937	−0.0248	−0.2027	−0.8063	−0.3328	−0.1635	−0.0706	−0.7306
θ_1	(−0.239)	(−0.060)	(−0.247)	(−0.328)	(−0.243)	(−0.358)	(−0.077)	(−0.267)
θ_2	(−0.237)	(−0.060)	(−0.245)	(−0.325)	(−0.227)	(−0.335)	(−0.072)	(−0.249)
# Positive	3	3	2	2	3	2	4	2
τ_1	(0.000)	(0.000)	(−0.816)	(−0.816)	(0.000)	(−0.816)	(0.816)	(−0.816)
Panel D. European Football Cups (*10 countries*)								
CARs (%)	0.3847	−0.2258	0.1807	0.3968	0.2104	−0.1793	−0.0356	0.3472
θ_1	(0.457)	(−0.804)	(0.322)	(0.236)	(0.213)	(−0.544)	(−0.054)	(0.176)
θ_2	(0.396)	(−0.697)	(0.279)	(0.204)	(0.190)	(−0.485)	(−0.048)	(0.156)
# Positive	7	4	7	5	5	4	4	6
τ_1	(1.265)	(−0.632)	(1.265)	(0.000)	(0.000)	(−0.632)	(−0.632)	(0.632)
Panel E. World Exhibitions (*11 countries*)								
CAR (%)	−0.6108	−0.2423	−0.4596	−0.3447	−0.4180	−0.1325	−0.3484	−0.4618
θ_1	(−0.683)	(−0.812)	(−0.771)	(−0.193)	(−0.439)	(−0.417)	(−0.548)	(−0.242)
θ_2	(−0.689)	(−0.820)	(−0.778)	(−0.195)	(−0.460)	(−0.438)	(−0.575)	(−0.254)
# Positive	3	3	4	4	5	4	5	4
τ_1	(−1.508)	(−1.508)	(−0.905)	(−0.905)	(−0.302)	(−0.905)	(−0.302)	(−0.905)
Panel F. Specialized Exhibitions (*10 countries*)								
CARs (%)	0.4678	0.2475	0.6002	0.2300	0.2591	0.2147	0.5925	−0.1793
θ_1	(0.589)	(0.935)	(1.134)	(0.145)	(0.307)	(0.762)	(1.052)	(−0.106)
θ_2	(0.658)	(1.045)	(1.267)	(0.162)	(0.351)	(0.872)	(1.203)	(−0.121)
# Positive	7	7	8	8	6	8	7	7
τ_1	(1.265)	(1.265)	(1.897)*	(1.897)*	(0.632)	(1.897)*	(1.265)	(1.265)

Table 4 (continued)

	Market Model				Constant-Mean Model			
	[−1,1]	[0,0]	[0,1]	[0,5]	[−1,1]	[0,0]	[0,1]	[0,5]
Panel G. European Capitals of Culture (*30 countries*)								
CARs (%)	−0.6067	−0.1695	−0.1401	−0.4299	−0.9455	−0.1988	−0.1968	−0.5455
θ_1	(−1.114)	(−0.933)	(−0.386)	(−0.395)	(−1.607)	(−1.013)	(−0.502)	(−0.463)
θ_2	(−0.838)	(−0.702)	(−0.290)	(−0.297)	(−1.106)	(−0.698)	(−0.345)	(−0.319)
# Positive	11	14	16	14	10	14	15	13
τ_1	(−1.461)	(−0.365)	(0.365)	(−0.365)	(−1.826)*	(−0.365)	(0.000)	(−0.730)

This table reports average abnormal returns (AAR) at the announcement date and cumulative average abnormal returns (CARs) for several other event windows around the announcement day. Abnormal returns are constant-mean and risk-adjusted returns. Model parameters were estimated regressing market index returns on the world market index over the period [−120, −20] in event time. θ_1 and θ_2 are the Brown and Warner (1980, 1985) *t*-test statistics, without and with crude dependence adjustment. τ_1 is the z-statistic for the sign test.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

abnormal performance remains economically and statistically insignificant at and around the announcement date regardless of the model we use to compute abnormal returns or the chosen parametric or non parametric test we use to assess significance.

This non-significant average impact is consistent with perfect foresight or trivial perceived economic effects for listed firms. Yet the results of the individual market analysis show that the impact is country-varying and, for some markets (or events), the effects are positive and even statistically significant.

Individual industries reaction We also evaluate the price impact of the announcement at an industry-level. We compute industry CARs for 32 individual industries. For each industry we compute the cumulative cross-market average abnormal return. Our primary interest is to examine whether those industries that were *a priori* identified as directly gaining from the organization of the event, did observe more positive significant abnormal returns. Table 5 shows the announcement date AARs and the announcement date to next-day CARs for seven industries: Beverages, Construction, Leisure and Tourism, Media, Retail, Communications and Transportation.[30] The last row of each panel shows the grand mean (across all industries). Panels A to G contain the results for each event category.

Overall the results are similar to those in Table 4: the effect is economically and statistically insignificant.[31] As highlighted above, there seems to be a positive effect associated with the announcements of Specialized Exhibitions (+0.5%). Additionally, the Winter Olympic Games show now a negative effect (−1.0%). These results are statistically significant for the constant-mean residuals. When we examine individual industry abnormal returns, we fail to find consistent positive returns for

[30] Results for the other industries are not reported here to save space.

[31] The aggregate values shown at the bottom of Table 5 are equally-weighted averages of industry indices. The comparison of these equally-weighted values with the value-weighted averages reported in Table 4, show that market weights do not drive the results.

Table 5 Industry abnormal returns at and around the announcement date: winning countries

	Market Model		Constant-Mean Model	
	[0,0]	[0,1]	[0,0]	[0,1]
Panel A. Summer Olympic Games				
Beverages (#5)	0.254	1.244	0.422	2.686
	(0.263)	(0.643)	(0.394)	(1.254)
Construction (#6)	0.098	0.118	0.074	1.192
	(0.154)	(0.092)	(0.474)	(3.815)***
Leisure and Tourism (#4)	0.377	0.146	0.112	−0.487
	(0.819)	(0.159)	(0.191)	(−0.416)
Media (#5)	0.217	0.484	0.083	1.521
	(0.323)	(0.360)	(0.107)	(0.980)
Retail (#3)	−0.08	−0.295	−0.338	−0.692
	(−0.185)	(−0.341)	(−0.457)	(−0.467)
Communications (#4)	0.155	1.351	0.082	1.542
	(0.397)	(1.727)*	(0.127)	(1.199)
Transportation (#5)	0.302	0.304	0.009	1.093
	(0.544)	(0.275)	(0.012)	(0.722)
Global Average	0.0485	0.1028	−0.1959	0.1117
	(0.398)	(0.421)	(−1.307)	(0.373)
Panel B. Winter Olympic Games				
Beverages (#6)	−0.009	0.409	−0.689	−0.797
	(−0.019)	(0.439)	(−1.105)	(−0.639)
Construction (#8)	−0.633	0.895	−0.852	0.270
	(−1.284)	(0.908)	(−1.491)	(0.236)
Leisure and Tourism (#5)	0.022	−0.310	−0.746	−1.948
	(0.033)	(−0.230)	(−0.911)	(−1.189)
Media (#7)	−1.144	−0.580	−1.741	−1.764
	(−2.410)**	(−0.612)	(−2.870)***	(−1.454)
Retail (#7)	0.733	0.703	0.161	−0.397
	(1.642)	(0.788)	(0.279)	(−0.344)
Communications (#6)	−0.471	−0.395	−0.643	−1.344
	(−1.147)	(−0.481)	(−1.113)	(−1.164)
Transportation (#7)	0.127	−0.103	−0.215	−0.360
	(−1.147)	(0.367)	(−0.370)	(−0.309)
Global Average	0.0634	0.0037	−0.4394	−1.0037
	(0.631)	(0.018)	(−3.710)***	(−4.230)***
Panel C. World Football Cups				
Beverages (#5)	−1.216	−0.272	−1.181	−0.070
	(−1.520)	(−0.170)	(−1.371)	(−0.040)
Construction (#6)	−0.475	−0.401	−0.588	−0.427
	(−1.309)	(−0.553)	(−1.172)	(−0.425)
Leisure and Tourism (#5)	0.778	0.877	0.529	1.036
	(0.777)	(0.438)	(0.444)	(0.436)
Media (#4)	−0.111	−0.479	−0.099	−0.208
	(−0.183)	(−0.397)	(−0.129)	(−0.135)
Retail (#5)	0.909	1.626	0.717	1.364

Table 5 (continued)

	Market Model		Constant-Mean Model	
	[0,0]	[0,1]	[0,0]	[0,1]
	(1.676)*	(1.497)	(1.017)	(0.967)
Communications (#5)	0.810	1.110	0.678	1.349
	(1.344)	(0.920)	(0.710)	(0.707)
Transportation (#6)	0.637	−0.370	0.573	−0.395
	(1.156)	(−0.336)	(0.908)	(−0.313)
Global Average	−0.0549	−0.1528	−0.1099	−0.0309
	(−0.459)	(−0.638)	(−0.755)	(−0.106)
Panel D. European Football Cups				
Beverages (#5)	0.491	0.061	0.314	0.038
	(1.019)	(0.064)	(0.602)	(0.037)
Construction (#6)	0.156	0.298	0.177	0.448
	(0.525)	(0.503)	(0.441)	(0.558)
Leisure and Tourism (#5)	0.464	1.197	0.377	1.258
	(0.486)	(0.627)	(0.369)	(0.616)
Media (#4)	0.097	0.356	−0.168	0.216
	(0.176)	(0.322)	(−0.280)	(0.180)
Retail (#5)	−0.175	−0.262	−0.346	−0.161
	(−0.392)	(−0.294)	(−0.654)	(−0.152)
Communications (#5)	−0.496	−0.470	−0.717	−0.565
	(−1.163)	(−0.551)	(−1.393)	(−.549)
Transportation (#6)	−1.586	−1.388	−2.056	−1.557
	(−1.970)*	(−0.862)	(−2.370)**	(−0.897)
Global Average	0.0278	0.1668	−0.1395	0.2767
	(0.221)	(0.663)	(−0.912)	(0.905)
Panel E. World Exhibitions				
Beverages (#10)	−0.327	−0.400	−0.191	−0.429
	(−0.618)	(−0.378)	(−0.344)	(−0.376)
Construction (#11)	0.091	0.017	0.018	−0.296
	(0.276)	(0.026)	(0.043)	(−0.348)
Leisure and Tourism (#6)	0.449	0.370	0.658	0.396
	(0.841)	(0.346)	(1.094)	(0.329)
Media (#8)	0.607	1.312	0.867	1.411
	(1.307)	(1.412)	(1.638)	(1.333)
Retail (#8)	0.060	0.070	−0.039	−0.099
	(0.177)	(0.103)	(−0.088)	(−0.113)
Communications (#7)	0.709	0.641	0.733	0.748
	(1.739)*	(0.785)	(1.467)	(0.749)
Transportation (#9)	0.194	0.704	0.099	0.215
	(0.512)	(0.931)	(0.203)	(0.221)
Global Average	0.1345	0.0623	0.1911	0.0177
	(1.633)	(0.378)	(1.923)	(0.089)
Panel F. Specialized Exhibitions				
Beverages (#9)	0.516	0.665	0.749	1.037
	(0.969)	(0.624)	(1.231)	(0.853)

Table 5 (continued)

	Market Model		Constant-Mean Model	
	[0,0]	[0,1]	[0,0]	[0,1]
Construction (#10)	0.058	0.313	0.155	0.797
	(0.176)	(0.472)	(0.397)	(1.023)
Leisure and Tourism (#3)	−0.628	0.385	−0.691	1.872
	(−0.713)	(0.218)	(−0.623)	(0.844)
Media (#7)	−0.052	−0.567	0.049	−0.437
	(−0.133)	(−0.730)	(0.113)	(−0.510)
Retail (#9)	−0.509	−0.843	−0.401	−0.420
	(−1.316)	(−1.090)	(−0.928)	(−0.486)
Communications (#7)	−0.106	−0.793	0.098	−0.188
	(−0.267)	(−1.004)	(0.204)	(−0.196)
Transportation (#10)	−0.228	0.626	−0.041	1.193
	(−0.531)	(0.730)	(−0.081)	(1.178)
Global Average	−0.1302	0.0539	−0.1054	0.4711
	(−1.217)	(0.252)	(−0.833)	(1.862)*
Panel G. European Capitals of Culture				
Beverages (#24)	−0.069	0.337	−0.173	0.203
	(−0.200)	(0.485)	(−0.435)	(0.255)
Construction (#30)	−0.046	0.263	−0.257	0.019
	(−0.229)	(0.660)	(−0.989)	(0.036)
Leisure and Tourism (#15)	−0.312	−0.168	−0.328	−0.191
	(−0.834)	(−0.224)	(−0.746)	(−0.217)
Media (#22)	0.615	0.754	0.541	0.643
	(1.830)	(1.121)	(1.505)	(0.894)
Retail (#22)	−0.291	0.077	−0.259	−0.259
	(−1.008)	(0.133)	(−0.785)	(−0.785)
Communications (#18)	0.016	0.347	−0.139	0.200
	(0.055)	(0.577)	(−0.340)	(0.244)
Transportation (#25)	0.322	0.388	0.272	0.334
	(0.972)	(0.586)	(0.739)	(0.454)
Global Average	0.0578	0.1666	−0.0327	0.1061
	(0.763)	(1.099)	(−0.358)	(0.581)

This table reports industry average abnormal returns (AAR) at the announcement date, and day of the announcement and next day cumulative average abnormal returns (CARs). # denotes the number of markets used to compute the industry average abnormal returns. Abnormal returns are constant-mean and risk-adjusted returns. Model parameters were estimated regressing market index returns on the world market index over the period [−120, −20] in event time. The table shows the abnormal returns for the industries that *a priori* would benefit more from the event. The last row shows the global average AR and CAR across *all* industries (up to 32). In parentheses we report Brown and Warner (1980, 1985) *t*-test statistics, without crude dependence adjustment.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

Table 6 Abnormal returns at and around the announcement date: losing countries

	Market Model				Constant-Mean Model			
	[−1,1]	[0,0]	[0,1]	[0,5]	[−1,1]	[0,0]	[0,1]	[0,5]
Panel A. Summer Olympic Games (*5 countries*)								
CARs (%)	−1.1602	−0.0967	−1.0230	0.5208	2.2832	0.9738	0.1149	−2.4676
θ_1	(−0.785)	(−0.196)	(−1.039)	(0.176)	(0.996)	(1.274)	(0.075)	(−0.538)
θ_1	(−0.570)	(−0.143)	(−0.754)	(0.128)	(0.978)	(1.251)	0.074)	(−0.529)
# Positive	2	3	2	3	4	4	2	3
τ_1	(−0.447)	(0.447)	(−0.447)	(0.447	(1.342	(1.342)	(−0.447	(0.447)
Panel B. Winter Olympic Games (*5 countries*)								
CARs (%)	0.5074	0.2802	−0.0160	0.5253	0.8870	0.6367	0.2619	0.7717
θ_1	(0.313)	(0.518)	(−0.015)	(0.162)	(0.514)	(1.106)	(0.227)	(0.223)
θ_2	(0.321)	(0.532)	(−0.015)	(0.166)	(0.518)	(1.116)	(0.229)	(0.225)
# Positive	2	3	3	1	2	4	4	2
τ_1	(−0.447)	(0.447)	(0.447)	(−1.342)	(−0.447)	(1.342)	(1.342)	(−0.447)
Panel C. World Exhibitions (*4 countries*)								
CARs (%)	0.4727	0.1898	0.3343	0.9237	0.0798	0.5230	0.0517	0.3347
θ_1	(0.803)	(0.968)	(0.852)	(0.785)	(0.046)	(0.896)	(0.044)	(0.096)
θ_2	(0.791)	(0.953)	(0.839)	(0.773)	(0.044)	(0.866)	(0.043)	(0.092)
# Positive	3	3	3	4	2	4	2	3
τ_1	(1.000)	(1.000)	(1.000)	(2.000)**	(0.000)	(2.000)**	(0.000)	(1.000)
Panel D. World Football Cups (South Africa) (*1 country*)								
CARs (%)	0.9040	0.4095	0.6283	0.5535	0.1536	−0.073	−0.493	1.4042

This table reports average abnormal returns (AAR) at the announcement date and cumulative average abnormal returns (CARs) for several other event windows around the announcement day. Abnormal returns are constant-mean and risk-adjusted returns. Model parameters were estimated regressing market index returns on the world market index over the period [−120, −20] in event time. θ_1 and θ_2 are the Brown and Warner (1980, 1985) *t*-test statistics, without and with crude dependence adjustment. τ_1 is the z-statistic for the sign test.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

the selected industries and, in most cases, the effects are small and not statistically different from zero.

These results are inconsistent with value-maximization theories because we fail to observe a positive significant effect for industries that *a priori* would benefit most from the event. In any case, as above, results could reflect that the effects have already been anticipated by investors.

5.1.2 Losing countries

If the announcement of the nomination affects negatively the losing country, market expectations must have included, prior to the announcement, the likelihood country

could win and benefit from the organization of the event. When the country loses, prices adjust downwards.

Table 6 shows the aggregate stock market effects for losers. Our sub-sample includes only those events for which there was information regarding the losing candidates. Because of that, we had to exclude some of the World and all the European Football Cups. We also excluded the Specialized Exhibitions and the European Capitals of Culture because these were single candidacies-events. Further we excluded some losers for which market price information was not available. The final sub-sample comprises thus fifteen announcements (five Olympic Summer Games, five Olympic Winter Games, one World Football Cup and four World Exhibitions.

We do not find a statistical significant negative market reaction as the partial anticipation or sentiment arguments would predict. On the contrary, for the specific case of the World Exhibitions we even observe a couple of positive CARs.

The bulk of the evidence so far is consistent with perfect foresight or trivial economic effects. Yet the results of the individual market analysis show a wide variation in price reaction. Below, we investigate whether between the variation in impact (across markets and events) is systematically related to factors such as partial anticipation.

5.2 Cross-sectional analysis

5.2.1 Variables

We evaluate the relation between the observed abnormal performance and a set of event, market and industry attributes as proposed by the empirical specification in (7). Abnormal returns are constant-mean adjusted returns. Table 10 in "Appendix" presents descriptive information for the variables of interest included in the cross-sectional analysis. The information refers to a subset (32) of the events for which information was available for all variables. These are six Summer Olympic Games, eight Winter Olympic Games, one World Football Cup, ten World Exhibitions and seven Specialized Exhibitions.

The average (median) mega-event has an investment of around 1% (0.2%) of the host country GNP, is announced 69 (71) months in advance, and gets 56% (39%) votes more than the losing country in the last round of voting. When we split the sample into groups according to the type of event, we observe that the most important type of event are the Summer Olympic Games, that show an average (median) relative size of 3.3% (1.7%), followed by the Olympic Winter Games and the World Exhibitions that register the same average of 1.1%. The average (median) percent of votes received by the winning country in excess of the other final candidate, just before the outcome of the bidding process is revealed, is 56% (39%). The result suggests that the outcome of these biddings is largely anticipated. In fact, this is the case for the Specialized Exhibitions for which, in all cases, there was only a single candidacy. As for the World Exhibitions, only the four more recent ones were competitive biddings. This is not the case for other events for which the bidding process is rather competitive like the Olympic Games and the Football Cups. The information regarding the voting rounds is only publicly available for the Olympic Games, the World Exhibitions and, very recently, for the World Football Cups. The Olympic Games seem to be the most highly competitive biddings: the

average (median) difference in votes between the winning and losing countries in the last round is respectively 28.8% and 32.7% (20.3% and 27.5%) for the Winter and Summer Games with a minimum of 2.3% (2000 Summer Olympic Games in Australia). The average (median) difference in votes for the five World Football Cups, for which voting results have been made publicly available, is 34.7% (26.3%) with a minimum of 4.3% for the 2006 Cup in Germany.[32] As for the World Exhibitions, the average (median) difference in votes is 66.9% (100%).[33]

5.2.2 GLS estimates

We regress cumulative abnormal returns (CAR[0,1]) against the set of variables described in the previous section. Table 7 shows the estimated coefficients of the industry fixed effects regressions for two specifications (with and without the variable *REP*). We use a total of 699/701 pooled industry observations regarding 32 events.

The regressions show an adjusted R-square of 19% and estimates are similar for the two specifications. We find statistically significant coefficients for the independent variables *LAG*, *VOT* and *REP* as well as for the two dummies *D_WOG* and *D_WE*.

The coefficient associated with the variable *VOT* is very significant (at 1% level) and is consistent with investors partially anticipating the outcome of the bidding process. The more competitive the voting process (i.e., the smaller the difference in votes between the winning and the losing candidates), the larger the surprise and the greater the market impact. For a decline of 10% in the difference between the percentage of votes for winning and losing bidders, the CARs increases 0.23%.

As for the variable *LAG*, the coefficient is economically and statistically significant at the 1% level. Consistent with the investors' myopia hypothesis, the reaction to the announcement is smaller the larger the lag between the announcement and the realization of the event. For each further month, the CARs declines by 0.01%.

The coefficient of the control variable *REP* is significant at a 5% level. This positive relation between industry market weight and price impact could reflect awareness. If the industry is well-represented, investors will be more inclined to believe that mega-event news will affect the companies belonging to that industry.

5.3 Partial anticipation

5.3.1 Partial anticipation I

To evaluate the role of partial anticipation we test the model specification in (8). We pool the CARs for winners and losers. Our sample comprises 39 observations (24 winners and 15 losers).

[32] This was a very tight victory: Germany secured 12 out of the 23 votes against the 12 received by South Africa (the other candidate in the final round).

[33] The minimum was 2.4% for the 2000 World Exhibition: Germany secured 21 out the 41 votes against the 20 received by Canada.

Table 7 Cross-sectional regressions

Independent variables	Coefficients of industry fixed effects regression models	
	(1)	(2)
SIZE	−0.0008	0.0230
	(−0.016)	(0.475)
LAG	−0.0001***	
	−0.0001*** (−2.833)	(−2.795)
LIQ	−0.0058	−0.0052
	(0.209)	(−0.190)
REC	0.0033	0.0035
	(0.944)	(1.003)
EXP	−0.0024	−0.0022
	(−1.339)	(−1.266)
REP	0.0373**	
	(2.082)	
VOT	−0.02320***	−0.0235***
	(−7.956)	(−8.108)
D_SOG	−0.0006	−0.0009
	(−0.132)	(−0.198)
D_WOG	−0.0134***	
	−0.0135*** (−3.138)	(−3.161)
D_WFC	0.0069	0.0068
	(1.465)	(1.440)
D_WE	0.0109**	0.0115**
	(2.124)	(2.228)
# obs./ # events	699/32	701/32
Adj. R2	19.1%	18.8%

This table reports GLS regressions estimates with host country industry cumulative abnormal returns *CARs[0,1]* as the dependent variable. Abnormal returns are constant-mean adjusted. *SIZE* is the ratio between the event capital expenditure and the host country GDP; *LAG* is the time lag between the announcement and the moment of the event; *LIQ* is the ratio between of the country market capitalization and GDP; *REC* is a dummy that equals 1 if the economy is in recession at the time of the event and 0 otherwise; *EXP* is a dummy that equals 1 if the economy is in expansion at the time of the event and 0 otherwise; *REP* is the weight of the industry market capitalization in aggregate market capitalization; *VOT* is the difference in the percentage of votes between the winning and the losing country with the largest number of votes in the last round. *D_SOG*, *D_WOG*, *D_WFC*, *D_WE* and *D_EE* are the dummies for the type of event (Summer Olympic Games, Winter Olympic Games, World Exhibitions and World Specialized Exhibitions). The last two rows report, respectively, the number of observations and the adjusted R^2. Industry fixed effects coefficients are not reported. *t*-statistics are shown in parentheses.

$$CAR_{js} = b_0 + b_1 SIZE_j + b_2 LAG_j + b_3 LIQ_{js} + b_4 REC_j + b_5 EXP_j + b_6 REP_{js} + b_7 VOT_j + \sum_k g_k D_k + h_{js}$$

j stands for country. *s* stands for industry.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

Panel A of Table 8 gives the results.[34] The parameter associated with the prior probability of winning is negative (but not statistically significant). As for the parameter associated with the dummy for the nomination, we observed a positive and statistically significant estimate. The fit of the regression is poor but the evidence suggests that the effects are consistent with the predictions of the model proposed in the "Appendix":

- losers register, on average, a negative price effect and the magnitude of the effect is associated with their priors of winning, and
- winners register, on average, positive price impacts; the magnitude of the effect is positively (negatively) related with the degree of surprise (anticipation) in the nomination news.

5.3.2 Partial anticipation II

We now turn to the alternative specification model of partial anticipation in (13). This specification uses a more refined proxy of the degree of surprise (anticipation) in the announcement news, using the information in all the successive rounds of voting.

The regression results are shown in Table 9. As for the previous model we estimate the model with unbalanced and balanced samples (panels A and B, respectively). To evaluate the effects for the winning and losing countries we perform a series of linear tests of the estimated parameters.

The fit of the model is good and similar for the unbalanced and balanced samples (adjusted R-square of 46% and 60%, respectively). We comment upon Panel A given that both panels show very similar results.

Overall the estimated parameters are in line with the predictions. We observe that:

- (1) when the outcome of the bidding process contains little or no news (in other words, there is partial or no surprise) there is no significant market reaction for the losers: *Intercept* + *PS* (−0.32%) and *Intercept* (0.54%) are not statistically significant. For the winning countries, the effect is negative if there is no (*Intercept* + *D* = −0.68%) or only partial surprise (*Intercept* + *PS* + *D* + *D***PS* = −0.89%) but not statistically significant at the 5% level.
- (2) when the outcome of the bidding process is a total surprise, the market reaction is negative and statistically significant for losers (*Intercept* + *TS* = −3.31%). For the nominated countries we observe a very significant positive reaction (*Intercept* + *TS* + *D* + *D***TS* = +4.96%) Further, we reject the null that the effects are the same for partial or total surprises.

Summarizing, when we control for prior expectations, the announcement of mega-events is associated with a positive market reaction in the nominated country

[34] We also run the regression with a balanced sample, including only those events for which we had information regarding the winning and the losing bidders (14 events, 28 observations -14 winners and 14 losers). The results are inconclusive.

Table 8 Partial anticipation model I—estimated parameters

	Estimate	*t*-value
Panel A. Unbalanced panel		
Intercept	0.8598	(0.768)
p	−3.8013	(−1.608)
D	1.5138	(1.810)**
# (winning/losing)	39 (24/15)	
Adj. R2	4.1%	
Null Hypothesis	*p*−value (Wald test)	
|α|=|δ|	(0.580)	
Panel B. Balanced panel		
Intercept	−0.9437	(−0.249)
p	0.4791	(0.055)
D	1.0229	(0.684)
# (winning/losing)	#28 (14/14)	
Adj. R2	0.0%	
Null Hypothesis	*p*-value (Wald test)	
|α|=|δ|	(0.987)	

This table reports OLS regressions of cumulative abnormal returns over the event day and next-day *CARs [0,1]* for winning and losing countries. Abnormal returns are constant-mean adjusted. *p* is defined as the probability of country hosting the event and is given by the percentage of votes received by the country in the last round of voting; *D* is a dummy variable that equals *1* if the country is nominated and *0* otherwise. The table also reports the number of observations and the adjusted R^2. The last row shows the *p*-values for linear tests of significance for the parameters. Estimates are multiplied by 100. $CAR_i = a + f p_i + d D_i + m_i$.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

and a negative reaction in the losing country. The greater the surprise, the greater the positive (negative) impact of the nomination news for the winning (losing) country.

6 Conclusions

This paper tests whether the selection of countries to host international sporting and cultural events is associated with significant stock market reaction in the winning and losing countries. Using a cross-section of 81 events, we find that on average there is no significant market impact in either the winning and losing countries. Further, the stock prices of companies in industries more likely to extract direct benefits from the organization of the event do not change significantly upon the announcement. Given that some selections are anticipated, the market reaction around the announcement date does not seem to accurately proxy the perceived economic impact of these events. In fact, when we control for the prior expectations upon the outcome of the voting, the announcement of mega-events is associated with a positive market reaction in the nominated country and a negative reaction in the losing country. Overall we interpret our findings as supportive of rational valuation

Table 9 Partial anticipation model II—estimated parameters

	Estimate	*t*-value
Panel A. Unbalanced panel		
Intercept	0.5374	(0.636)
PS	−0.8564	(−0.877)
TS	−3.8508	(−3.220)***
D	−1.2201	(−1.324)
*D*PS*	1.0137	(0.823)
*D*TS*	8.2827	(5.487)***
# (winning/losing)	39 (24/15)	
Adj. R2	46.3%	
Null Hypothesis	*p*-value (Wald test)	
Intercept + PS = 0	(0.513)	
Intercept + TS = 0	(0.000)***	
Intercept + PS = Intercept + TS	(0.002)**	
Intercept + D = 0	(0.062)*	
*Intercept + PS + D + D*PS = 0*	(0.422)	
*Intercept + TS + D + D*TS = 0*	(0.000)***	
*Intercept + PS + D + D*PS = Intercept + TS + D + D*TS*	(0.000)***	
|*Intercept*| = |*Intercept + D*|	(0.185)	
Panel B. Balanced panel		
Intercept	0.5375	(0.685)
PS	−0.7889	(−0.857)
TS	−3.8508	(−3.468)***
D	−1.1494	(−1.248)
*D*PS*	1.4165	(1.141)
*D*TS*	9.3502	(6.050)***
# (winning/losing)	28 (14/14)	
Adj. R2	60.0%	
Null Hypothesis	*p*-value (Wald test)	
Intercept + PS = 0	(0.601)	
Intercept + TS = 0	(0.000)***	
Intercept + PS = Intercept + TS	(0.001)***	
Intercept + D = 0	(0.203)	
*Intercept + PS + D + D*PS = 0*	(0.982)	
*Intercept + TS + D + D*TS = 0*	(0.000)***	
*Intercept + PS + D + D*PS = Intercept + TS + D + D*TS*	(0.000)***	
|*Intercept*| = |*Intercept + D*|	(0.212)	

This table reports OLS regressions of cumulative abnormal returns over the event day and next-day *CARs [0.1]* for winning and losing countries. Abnormal returns are constant-mean adjusted. *PS* is a dummy variable that equals *1* when the announcement news are a partial surprise and *0* otherwise; *TS* is a dummy variable that equals *1* when the announcement news are an almost total surprise and *0* otherwise; and *D* is a dummy variable that equals *1* if the country is nominated and *0* otherwise. The table also reports the number of observations and the adjusted R^2. The last rows show the *p*-values for several tests of significance for the sum of parameters. Estimates are multiplied by 100. $CAR_i = \beta_0 + \beta_1 PS_i + \beta_2 TS_i + \lambda_0 D_i + \lambda_1 D_i PS_i + \lambda_2 D_i TS_i + \omega_i$.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels for bilateral tests.

and partial anticipation: when the announcement news are total surprises, market reaction is statistically significant, positive for winners and negative for losers, reflecting that investors believe that selections to host mega-events are positive news.

The market reaction we observe seems to reflect only a part of the overall perceived economic benefit of these mega-events. It is thus not correct to extrapolate these results to judge the economic merit of hosting these mega-events. The evidence suggests further that the economic benefits of hosting these mega-events vary across markets and events. The main finding of our study is that part of the variation in market reaction is associated with the degree of anticipation of the outcome of the bidding process. Further work is required to establish the other determinants of the observed cross-sectional variation in market reaction.

Table 10 Descriptive statistics

	Mean	Median	Minimum	Maximum	SD
Panel A. All events (#32)					
SIZE	0.0124	0.0017	0.0000	0.1056	0.0245
LAG	68.7	70.5	13	120	23.1
VOT	56.3%	38.7%	2.3%	100.0%	42.1%
Panel B. Summer Olympic Games (#6)					
SIZE	0.0326	0.0170	0.0005	0.1056	0.0021
LAG	77.5	78.5	69.0	85.0	7.3
VOT	32.7%	27.5%	2.3%	88.2%	29.3%
Panel C. Winter Olympic Games (#8)					
SIZE	0.0110	0.0024	0.0001	0.0725	0.0022
LAG	69.1	70.5	64.0	77.0	4.5
VOT	28.8%	20.3%	2.8%	100.0%	32.1%
Panel D. World Football Cups (#5)*					
VOT	34.7%	26.3%	4.3%	100.0%	39.1%
Panel E. World Exhibitions (#10)					
SIZE (#1)	0.0102	0.0014	0.0000	0.0475	0.0023
LAG (#1)	76.2	69.0	38.0	124.0	29.6
VOT (#6)	66.9%	100.0%	2.5%	100.0%	43.4%
Panel F. Specialized Exhibitions (#7)					
SIZE	0.0010	0.0003	0.0000	0.0057	0.0021
LAG	49.3	47.0	13.0	88.0	27.7
VOT	100.0%	100.0%	100.0%	100.0%	0.0%

This table shows descriptive statistics of the events. *SIZE* is the ratio between the event capital expenditure and the host country GDP; *LAG* is the time lag between the announcement and the moment of the event (number of months); *VOT* is the difference in the percentage of votes between the winning and the losing country with the largest number of votes in the last round. # denotes the number of events used to computed the cross-sectional statistics.

*Only 1 included in the cross-sectional regressions and used to compute the statistics in Panel A.

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Appendix

A model of market impact of partially anticipated events

This appendix presents a simple model of partial anticipation that generates a set of hypotheses tested in our study. The model is built upon the models proposed by Malatesta and Thompson (1985) and Edmans et al. (2007).

We assume that investors partially anticipate the likelihood that a particular country hosts one or several international sporting or cultural events. Let's denote p_i as the probability of country *i* hosting the event. Before the nominated host country is announced, the anticipated economic impact of the event is already reflected in the market valuations of the bidding countries. The economic impact of a particular event (its net present value) for candidate country listed firms is denoted by *NPV*. If country *j* is chosen to host the contest (the winning country), the (positive) market price effect at the date of announcement is given by $(1-p_j) \times NPV_j$. The observed market reaction is thus a biased estimate of the true economic effect and is inversely related to the prior probability of winning. As for the market impact of the candidate countries whose bids were rejected (the loser countries), we should observe a negative market effect following the announcement, and, in absolute terms, positively related with the prior probability of winning. If we focus on the two countries in the last round of the voting process, when the final outcome is announced, the market price effect for the losing country *l* is given by $-p_l\, NPV_l$ that equals $-(1-p_j)NPV_l$.

The potential benefits brought by the organization event are expected to be different from country to country (*NPV* varies across bidding candidates) and consequently the absolute magnitude of the stock market effects to winners and losers can differ substantially. Therefore, *a priori*, asymmetric effects are expected for the winning and losing countries.

In assessing the probability of winning (losing), investors may consider the degree of competitiveness of the contest, whether the country is considered to be a front runner in advance and the initial rounds of the voting (that are publicized before the final outcome is realized). Our empirical model in Section 4 accommodates some of these features.

At the time of the announcement, two possible outcomes may result. Either the country wins the organization of the event or loses. Let's denote *VW* as the market valuation of a particular country at time *0* if it hosts the event and *VL* its market valuation otherwise. Market valuation just before the event is announced ($t=-1$) for a candidate country is thus given by:

$$V_{i-1} = \frac{E(V_{i0})}{1+E(R_i)} = \frac{p_i VW_i + (1-p_i)VL_i}{1+E(R_i)} \qquad (A-1)$$

Given that

$$VW_i = VL_i + NPV_i$$

(A-1) can be rewritten as:

$$V_{i-1} = \frac{VL_i + p_i NPV_i}{1 + E(R_i)} \qquad (A-2)$$

Abnormal returns at the date of the announcement can be computed as:

$$AR_i = \frac{1 + R_i}{1 + E(R_i)} - 1 \qquad (A-3)$$

where

$$R_i = \frac{V_{i0}}{V_{i-1}} - 1$$

and $E(R_i)$ is the company's expected return for a given return generating process.

For the winning country j, $V_{0j} = VW_j$, and abnormal returns are thus given by:

$$AR_j = \frac{VW_j / V_{j-1}}{1+E(R_j)} - 1$$

$$= \frac{VW_j / \left[p_j VW_j + (1-p_j) VL_j\right] / \left(1 + E(R_j)\right)}{1+E(R_j)} - 1$$

$$= \frac{VW_j}{p_j VW_j + (1-p_j) VL_j} - 1$$

$$= \frac{VL_j + NPV_j}{VL_j + p_j NPV_j} - 1$$

that can be rewritten as

$$AR_j = \frac{VL_j + p_j NPV_j + (1-p_j) NPV_j}{VL_j + p_j NPV_j} - 1 = 1 + \frac{(1-p_j) NPV_j}{VL_j + p_j NPV_j} - 1 = \frac{(1-p_j) NPV_j}{V_{j-1}(1+E(R_j))} \qquad (A-4)$$

For the losing country l, $V_{0l} = VL_l$, and abnormal returns are given by:

$$AR_l = \frac{VL_l}{VL_l + p_l NPV_l} - 1$$

that can be rewritten as

$$= \frac{VL_l + p_l NPV_l - p_l NPV_l}{VL_l + p_l NPV_l} - 1 = 1 - \frac{p_l NPV_l}{V_{l-1}(1+E(R_l))} - 1 = \frac{-p_l NPV_l}{V_{l-1}(1+E(R_l))} = \frac{-(1-p_l) NPV_l}{V_{l-1}(1+E(R_l))} \qquad (A-5)$$

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