Mega-events as a signal of liberalisation

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ABSTRACT

Why do countries compete to host mega-events, like Summer Olympics, Expos or World Cups? In this paper, we provide novel evidence supporting a new signalling model of liberalisation for countries bidding for mega-events. Strengthening previous identification strategies, we discover some heterogeneous effects on exports among countries with different legal families. Investigating why legal families matter, we found different liberalisation behaviours among countries after bidding for mega-events. Common-law countries, having ex-ante lower trade tariffs with respect to civil-law countries, primarily liberalise capital controls that ambiguously affect trade, while civil-law countries reduce trade tariffs. These findings are confirmed when inward FDI are considered and justified by a new theoretical framework, where we formalised how capital controls and trade liberalisations increase consumer welfare and tax revenues. Including capital controls and multinational firms in a novel gravity model of trade, we finally provide a formal explanation for the multiple bidding behaviour.

JEL classification: F11, F14, F23, H30, K15, Z20.

Keywords: International trade, Mega-Events, Liberalisations, Legal Origin, Gravity model of trade, Multinational firms.

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1. Introduction

The debate on the effect of hosting a mega-event has received an increasing attention in recent years. Many economists have expressed skepticism on the advantage of hosting a mega-event, because subsequent revenues do not compensate the large cost of the event. Siegfried and Zimbalist (2000) as well as Coates and Humphreys (2003) assert that projects related to mega-events are comparable to "white elephants" – structures, which are operational only during mega-events, with no utility afterwards – and any benefits derived from infrastructure investment may be achieved independent of the events. On the other hand, other scholars as Preuss (2004) or Rose and Spiegel (2011) argue that hosting a mega-event influences national reputation by increasing tourism and gaining exposure on the international stage. Rose and Spiegel (2011) find a significant, positive and large permanent effect on exports for countries bidding for or hosting the Summer Olympics. According to the authors, exports of countries bidding for the Summer Olympics are about 35% larger than non-hosting countries and the effect is similar for World Cup hosting countries. Rose and Spiegel state that the export's increase is attributable to liberalisation policies pursued by the countries after the bidding[1].

The robustness of the Rose and Spiegel (2011) Olympic effect has subsequently been questioned by Bista (2017) who, using different estimation techniques[2], finds no robust positive effect on export, casting doubt on the signalling effect[3].

In this paper, we extend the results of Rose and Spiegel (2011) and the findings by Bista (2017), discovering some heterogeneity in the mega-event liberalization effect, which explains why previous authors found such heterogeneous results. Exploiting the legal families' theory, we

[1] In the Rose and Spiegel (2011) setting, governments choose whether to liberalise maximising their utilities, considering that liberalisation policies increase the revenue of the exporting sector (raising domestic export-sector prices) and decrease the revenue of the importing sector (lowering domestic import-sector prices), and that the cost of hosting the event is supported by the importing and exporting sector at different weights. Nations evaluate gains to the export sector in different ways but they cannot convincingly reveal their evaluations to the potential investors. Solving this model, Rose and Spiegel (2011) show that a separating equilibrium exists; countries which send the signal liberalise while countries that don't send the signal don't liberalise. According to this model, bidding for the Summer Olympics is always followed by liberalisation policies; other behaviours are out of equilibrium because of the expected cost of hosting the event. These countries, bidding for the Summer Olympics, signal to the world their intention to liberalise; bidding is therefore a "burning money policy" that signals the future intents of the country to private investors. The signal is informative because it is only attractive to the set of countries that sincerely intend to pursue liberalisations, given the expected cost of bidding.

[2] As Santos Silva and Tenreyro (2006) state, "log-linearisation of an exponential model in the presence of heteroskedasticity leads to inconsistent estimates. This is because the expected value of the logarithm of a random variable depends on higher-order moments of its distribution. Therefore, if the errors are heteroskedastic, the transformed errors are correlated with the covariates". To solve this issue they propose to employ a Poisson Pseudo Maximum Likelihood (PPML) estimator, to control the heteroskedasticity bias in the log-linearization of the gravity model of trade.

[3] In this paper, we improve the previous identification strategies excluding from the counterfactual countries that hosted or bid for other kinds of mega-events, such as Expo and World Cup, that are proved to be used for signalling liberalization policies (Rose and Spiegel, 2011, and Bista, 2011).

discovered that only export in civil-law countries is affected by the bidding. Our results are robust to the different estimation techniques, model specifications and error correlation structures. Investigating why legal family matters, we discover different liberalisation behaviour among countries after bidding for a mega-event. Civil-law countries, having ex-ante higher trade tariffs with respect to common-law countries, primarily liberalise by reducing trade tariffs while common-law countries, having ex-ante the lowest level of trade tariffs, liberalise by reducing capital controls. These findings are confirmed in our analysis when inward FDIs are taken into consideration. The inflow of foreign direct investments increases only in the common-law countries.

Using the Colombia World Cup withdrawal as an exogenous shock, we then reject any endogenous selection bias in the export growth effect. Moreover, we discovered that Colombia's export grew after the country hosted Copa América in 2001 and that the upturn is comparable to the increase of export after the bidding of mega-events. This result rises to some questions about what kind of events should be considered "mega" or, in other word, eligible for signalling.

By checking the liberalisation outcome of the bidding countries, we provided some other evidences that justify the signalling theory, using the Wacziarg and Welch (2003) liberalisation dates. We proved that signalling and liberalising is the only strategy that maximise the export's growth, while countries that liberalise without signalling do not experience any significant increase of export.

We finally justify all these results in a new theoretical framework. Including capital controls and multinational firms in a novel gravity model of trade with firms' international mobility, we provide evidence that consumer surplus and fiscal revenues may be increased if capital controls were eased. Easing capital controls in the consumer market induces the most productive foreign firms to produce locally by lowering trade flows and increasing FDIs. Accordingly, the price index of the representative consumer decreases, and the consumer surplus growths, thanks to the lower prices charged by multinational firms engaged in FDI. With more firms producing locally, the tax base of the liberalising country increases, as in the case of export trade tariffs reductions. We therefore formalise a new original bidding model, where the bigger and more liberalising countries repeatedly bid to signal to international firms the extent of their liberalisations. Finally, the predicted bidding behaviour is empirically confirmed when multiple bids are taken into consideration.

In this paper, we are the first to jointly investigate the effect of different mega-events on several aspect of economic activity, by providing definitive evidences about why it is important to internationally compete for hosting mega events. To the best of our knowledge, we are even the firsts

to integrate capital control and multinational firms' mobility in the traditional gravity model of trade, with relevant implications in terms of consumer welfare estimation.

2. Signalling effect and Mega-events

2.1 Strengthening the identification strategy: Olympics as mega-events.

Differently from Rose and Spiegel (2011) and Bista (2017), we decided to consider the Olympics as only a special case of the broad class of mega-events. According to signalling models, governments send a credible signal of liberalisation bidding for a costly event. The (bidding) signal is credible only if it is associated with a potential positive cost. The higher the cost, the larger the perceived credibility is. Bidding for the event, the country signals to international markets that it can afford the expenses for planning and hosting the event, whose costs are covered by the increase of exporting sector's revenues (according to Rose ad Spiegel, 2011). Competing on a global stage to host the Olympics has therefore the same legacy and implication of competing for other kind of costly events that are globally organised.

World cups and Expos have almost the same features of Summer Olympic Games for cost, media coverage, competition, distinction and uniqueness. These events have a big impact on the international stage and a nation can spread a credible signal or gain reputation and visibility on international market bidding for each of them. The idea to consider mega-events jointly is moreover supported by the behaviour of nations bidding for or hosting the Summer Olympics. Nations strongly compete to host every kind of mega-events, and they nearly always host and bid for different kind of mega-events. Germany, for example, before hosting the Summer Olympic Games in 1972, had bid for the 1962 and 1966 World Cups; Belgium, after hosting a Universal Exhibition in 1958, unsuccessfully bid for the 1960 and 1964 Summer Olympic Games; Switzerland bid for the 1948 Summer Olympic Games, hosted a World Cup in 1954 and bid again for the 1960 Summer Olympic Games[4]. More than 70% of the countries hosting the Summer Olympic Games have hosted at least one other kind of mega-event (World Cup or Expo) and even among the countries that bid for the Summer Olympic Games, more than 70% have bid or hosted another kind of mega-event, in a relative short period of time[5]. We will run therefore even into an identification problem if we try to evaluate separately Expo, the Olympics and World Cup permanent effects on exports. Moreover, estimates of the bidding effect would be downward biased if we include in the counterfactual countries that have

[4] See Tables A.1 and A.2 in Appendix A.
[5] Only 20% of nations bidding for the Summer Olympic Games were not able to host any kind of mega-event (excluding Winter Olympics or other secondary exhibitions).

hosted or bid for other kinds of mega-events, as it has been widely proved (Rose and Spiegel, 2011, and Bista, 2011) that both World Cups and Expos are correlated with market liberalisation. Consequently, for all these theoretical and empirical reasons, we consider mega-events jointly.

2.2 Why should legal families influence the Olympics and mega-event effect?

We chose to consider the legal families of the countries because we expect that most of the heterogeneous effects exhibited by the previous scholars are due to the different liberalization outcomes that are directly affected by the heterogeneous legal origin of the countries. As shown by several authors, as for instance La Porta (1998) or Djankov et al. (2006), legal origin are a good instrument for many variables related to business regulation and economic government attitude[6]. By not controlling the legal and regulatory structure, bias may be produced in the computation of the Olympics and mega-event effects, because the results of liberalisation policies are affected by differences in local governance institutions and legal frameworks, as proved by Yakovlev and Zhuravskaya (2013) for the liberalisation outcomes of the small business sector in Russia, or by Aghion et al. (2008), who are the firsts to disclose how local labour market institutions influence liberalization reforms.

The majority of researchers (starting from the seminal paper of Dainow, 1966) identify two main secular legal traditions: common-law and civil-law countries. The former embraces all the countries whose legal system is originated from the British Common law while the latter from the French-law. French legal origin countries, whose legal system evolved from the Roman law code, are defined as the 'pure' civil law countries. German-law countries, whose legal system is based on the French civil code but with greater judicial law making power, are a special case: their codes were originated from Roman law but then they developed some elements common to the British legal system, in order to create a responsive legal doctrine. Other marginal legal families are Scandinavian-law countries (their code is less derivative of Roman law than German or French) and socialist countries (countries which adopted the socialist law after the Russian revolution, reverting then to French or German law after the fall of the Communism in 1989).

[6] Legal origins are the most common and available variables that are suitable to measure institution and legal differences among countries. Furthermore, it has been widely proved that legal origins affect all the other institutional variables, for which they are often used as instruments. More recent and detailed variables cannot be used given the time and country extension of our analysis.

From a theoretical point of view, as showed by Beck et al. (2003), legal system influences the economy through two main channels: the political and the adaptability channel. The political channel emphasize the role of State power on private economic life while the adaptability channel underline how different legal systems evolve with changing conditions.

The "political channel" deals with the different priority that legal traditions attached to private property rights versus the rights of the State. As stated by Beck et al. (2003), civil-law codes were constructed in the 19th century to strengthen State power, by placing the "prince above the law" (Hayek, 1960). Over time, the State power's dominance over the judiciary system has produced legal traditions relying more on the power of the State and less on the rights of individual investors (Mahoney, 2001). The political channel thus highlights the degree to which States in civil-law countries control the judicial system and institutions, emphasizing the difference with the common-law countries. The higher level of State power in civil-law countries has produced different economic structures during the years. Civil-law countries have revealed a higher state ownership of media, higher government ownership of banks, higher share of public-owned companies, heavier reliance on conscription, more entry and labour regulation, more legal formalism and less security of property right (La Porta et al. 2008).

The "adaptability" channel emphasizes instead how the legal framework evolves with changing conditions (Hayek, 1960). Legal traditions that adapt efficiently to minimize the gap between the contracting needs of the economy and the capabilities of the legal system, foster financial development more effectively than more rigid systems (Merryman, 1985). According to the majority of the comparative law scholars' (Posner, 1973, Beck et al., 2003), Common laws advance proficiently as judges react case by case to unexpected and changeable conditions. While on the contrary, French legal origin countries are more likely to promote legal formalism and mechanical jurisprudence than British Common-law or German civil-law countries (that accepted a responsive legal doctrine). Consequently, French legal origin countries have more formal and stricter legal systems than German and British legal origin countries, with negative repercussions for financial development and contract enforcement. Nowadays, British and German legal origin countries have substantially developed superior financial intermediaries and markets, with better property right protection than French civil-law countries (Beck et al., 2002).

To sum up, legal traditions that promotes the authority of State related to private property rights deter the development of free and competitive economies, while legal traditions that effectively evolve with unpredictable conditions, by abolishing inefficient laws and producing more efficient

ones, support free and better-developed economies (e.g. contract enforcement). These conclusions are shared by Mirjan Damaška (1986), who labels civil law as "policy implementing" and common law as "dispute resolving". The most clear and concise definition is probably provided by La Porta et al. (2008), who described legal traditions "as a style of social control of economic life", where "common law stands for the strategy of social control that seeks to support private market outcomes, whereas civil law seeks to replace such outcomes with state-desired allocations" (La Porta et al., 2008).

La Porta, Lopez-de Silanes, Shleifer and Vishny (LLSV, 1997, 1998) are moreover the firsts to prove the consequences of the legal origin system on the economic and juridical framework. They studied the impact of legal origin system on the investor protection (outside shareholder and outside senior creditors) using primarily corporate and bankruptcy laws. LLSV (1997, 1998) verified empirically that the protection of outside investors is superior in common-law countries rather than in civil-law countries and that the worst protection is supplied by the French legal origin system. Then, using legal origins as an instrument for legal rules, showed that the legal investor protection is a sturdy predictor of financial development (as argued by Robert Clark, 1986). Other papers demonstrate that the consequences of legal origin on laws and rules are not limited to finance: regulation of labour markets - Botero et al. (2004), government ownership of banks - La Porta et al. (2002), government ownership of media - Djankov et al. (2003), the burden of entry regulations - Djankov et al. (2002) and military conscription - Mulligan and Shleifer (2005) - are affected by the legal origin system too. Civil-law countries, having heavier government control, ownership and regulation, develop higher formalism in laws, rules and procedures (Djankov et al. 2003) that are negative for several aspects of the economy, resulting in greater corruption, larger unofficial economy and higher unemployment.

Differences in the legal system are proved to affect also trade, through similarity (Islam and Reshef, 2014) and the enforcement of contracts (Nunn, 2007). Sharing similar legal institutions increases the value of trade flows because it lowers the cost of trade, reducing the information cost to exchange goods among different regulatory frameworks. Instead, the enforcement of contracts influences both the value and the quality of the good exported. Legal systems that are able to ensure better contract enforcement reduce uncertainty, lowering more intensively the cost of producing goods with a complex production structure, in which multiple contractors are involved. According to the theory of comparative advantage, countries with better contract enforcement therefore export more complex goods than other countries, because of the more effective legal procedures. Nunn (2007) finds empirical evidence supporting this idea: civil-law countries, which are worse at

enforcing contracts (Djankov et al. 2003; Hayek 1960; La Porta et al. 2008), export relatively less goods produced in contract-intensive industries, compared to common-law countries. In the civil legal system, legal procedures are indeed heavily regulated resulting in higher expected duration, less congruity, less trustworthiness and fairness decisions, as demonstrated by Djankov et al. (2003). The highest level of legal formalism of civil-law countries weakens the enforcing of contract, raising the risk and cost of doing business (Johnson, McMillan, and Woodruff, 2002a) and influencing the firm's decision to underwrite international contracts or to locate investment in sectors that are relationship-specific (Grossman and Hart, 1986; Hart and Moore, 1990; Klein, Crawford and Alchian, 1978; Williamson, 1979, 1985, Johnson et al., 2002b). All factors that are extremely relevant in the investment location decision of international firms (FDI).

Taking all these into account, we expect that the liberalisation outcomes will be heavily affected by the legal families of the countries. Civil law countries are expected to experience the highest increase in export after the bidding, as they have ex-ante the strongest regulated markets and highest level of enforcement. The positive impact on export for the common law countries can be attenuated instead by the increased competitive effect of the civil law countries and the lower ex-ante regulation[7]. Conversely, the lowest level of legal formalism and contract enforcement of the common-law countries might positively influence the investment decisions (FDIs) of multinational firms, who may be more likely to locate their investments in countries that guarantee better and faster legal procedures.

[7] We expect to find a stronger impact for countries whose legal system is originated from the French code (the French legal origin system countries), whose governments have had a more coercive attitude in comparison to the governments of common-law countries (the British legal origin system countries). The largest range of liberalisations occurring after mega-events in the civil-law countries will produce a stronger effect in comparison to the common-law countries that have already developed pro-trade economies. The reduction of trading cost in Civil-law countries is indeed expected to be larger than in Common-law countries. The relatively smaller range of new liberalisations of the British law countries and the larger competitive effect derived from the increased openness of the civil-law countries should instead weaken the exports' growth for the common-law countries. Moreover, common-law countries, producing and exporting complex goods (thanks to the better enforcement of contract), may be less sensitive to trade friction reductions, because of the lower elasticity of substitution of the complex goods.

3. Estimates of the mega events effect on export and the impact of legal origins

3.1 Empirical specification and data

To account for the influence of legal origin on the liberalisation outcome, we estimate the mega-event bidding effect for each legal family. Legal families of countries are classified as in the paper of La Porta et al. (2008)[8], as it is standard in this stream of literature.

Following the approach of Rose and Spiegel (2011), we exploit the standard and well-known empirical gravity model of trade for our analysis, as the benchmark model. The bilateral trade between two countries is a function of the "masses" (monadic characteristic of the country, as GDP) and of the friction between the two countries (dyadic characteristics as distance, shared border, presence of trade agreement, common language) plus a multilateral resistance term.

We specify the log-linear model of trade as:

$$ln(X_{ijt}) = \sum_{l=1}^{L} \gamma_l (Bid_{itl}) + \beta Z_{ijt} + \sum_{i=1}^{I} Exp_i + \sum_{j=1}^{J} Imp_j + \sum_{t=1}^{T} Year_t + \varepsilon_{ijt} \qquad \text{(Eq. 1)}$$

where the legal origin system (*l*) is British (common-law countries), French (the pure civil-law countries) or German (the "hybrid civil-law" countries). Scandinavian and Socialist countries are not included in the analysis because of their low number. The subscript *i* identifies the exporting country while the subscript *j* identifies the importing country and *t* denotes time (from year 1949 to 2006). X_{ijt} is the nominal exporting value from country *i* to country *j* (in thousands of US dollars) at time *t*. Bid_{itl} is a set of 3 binary variables, one for each legal family *l*, equal to one if the country *i* (the exporter) hosted or bid for a mega-event (Summer Olympics, World Cup or Expo) in or before the year *t* and zero otherwise. As an example, if a country hosted or bid for the Olympics in 1990, the variable is equal to one from 1990 to 2006. For World Cup, in addition to the hosting countries, we only consider the real bidders, which are countries that didn't withdraw before the FIFA vote[9], while for Universal Exhibition, we include only the hosting countries, given that does not exist a reliable list of bidding countries for the past Universal Exhibition. The potential bias of including unknown

[8] Legal families' classification is provided by Shleifer, in the supplementary material (data) of their paper, available at https://scholar.harvard.edu/shleifer/publications/economic-consequences-legal-origins

[9] These countries send a credible signal, because they pay the expected cost to host the World Cup. Sometimes other countries withdraw before the FIFA vote, as they bid for political reasons.

Expo bidder countries in the counterfactual is quite low, given the strong correlation among the bidding of different kind of mega-events, and has a negative sign. Our identification strategy is consequently not weakened.

We choose to compute a mega-event bidding binary variable for each legal family[10] for the sake of clarification. These three binary variables capture the permanent effect on export of bidding for any mega-event, for each legal family *l*. Therefore, γ is the vector that embodies the effect on exports of bidding for a mega-event for French, German and British legal origin countries. Exp_i and Imp_j are exporter and importer fixed effects while $Year_t$ identifies the time fixed effects capturing common trend in global trade.

Z_{ijt} is a set of control variables usually employed in the gravity equation (Helpman et al., 2008, Rose and Spiegel, 2011, Bista, 2017, Méngova, 2012) that are not collinear to the fixed effects. It includes: the log of nominal GDP (in thousand USD) per capita of importer and exporter countries; the log of importer and exporter populations; the log of the distance between countries *i* and *j*; a dummy variable that is equal to one if *i* and *j* share the same currency at time *t*; a dummy variable equal to one if *i* and *j* have the same official language at time *t*; a binary variable equal to one if a regional trade agreement is signed between *i* and *j* at time *t*; a binary variable equal to one if the two countries share a border; the log of the product of the areas of the two countries; a binary variable equal to one if the two countries had a common coloniser; a binary variable equal to one if the two countries were in a colony-relationship at time *t*; a binary variable equal to one if the two countries were being in a colonial relationship; a binary variable equal to one if the two countries are part of the same country at time *t* and, differently from previous models (Helpman et al. 2008, Rose and Spiegel 2011, Bista 2017, Méngova 2012), a binary variable whose value is unity if the two countries share the same legal origin system.

We employ the well-known Head et al. (2010) dataset that is supplied by CEPII[11]. This dataset contains bilateral trade flows for 208 nations, from 1949 to 2006, recorded annually. It includes zero trade flows and missing trades. In this dataset, GDPs (not deflated, in accordance to trade flows) and populations come from the World Bank's World Development Indicators (WDI).

[10] In a previous version of the paper we computed the interactions between the permanent effect of bidding on export (Bid_{it}) and the legal origin of the country *i* ($LegalOriginSystem_i$), but results were not easy to understand. Therefore we compute Bid_{itl} as $Bid_{it}|LegalOriginSystem_i$.

[11] French research centre in international economics: http://www.cepii.fr

An additional dataset is used for some robustness checks. This dataset corresponds to the data used by Rose and Spiegel (2011) and includes bilateral trade flows for 196 nations, recorded annually from 1950 to 2006; it is not balanced and reports only strictly positive trade flows. Trade flows are measured in US $, taken from IFS Direction of Trade and deflated by US CPI for all Urban Consumer. The list of candidates and hosting countries for Summer Olympic Games, World Cups and Universal Exhibitions (Expos) is presented in Appendix A.

3.2 Benchmark results

In Table 1, we show estimates of Equation 1, using the Head et al. (2010) dataset. Differently from the previous authors, we use tri-clustered standard errors to control for contemporaneous errors correlation within the same importer, exporter and year. In such a way, we control for shocks affecting importer and exporter over time and for common shocks affecting all the countries in a given year.

Computing the mega-event bidding binary variables for each legal family *l*, we capture the permanent effect on export of bidding for a mega-event, conditioned to the legal origin of the country. According to the signalling model, countries bidding for the event signal future liberalisation policies. Our assumption is that legal families, affecting the liberalisation outcome, influence the impact on export of countries bidding, successfully or unsuccessfully, for Universal Exhibitions (Expos), World Cups or Summer Olympic Games. Results in Table 1 confirms our expectations.

Table 1 - The mega-events bidding effect on export for common and civil-law countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Estimation Technique	OLS	OLS	OLS	OLS	PPML	OLS	structural PPML-OLS
Dependent Variable	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	X_{ijt}	$\ln(X_{ijt})$	$\ln(\widehat{Exp}_{it})$
Mega-event Bidding effect in British legal origin countries	0.034	0.032	-0.2	0.001	-0.135	-0.136	-0.264***
	(0.11)	(0.11)	(0.13)	(0.12)	(0.13)	(0.10)	(0.06)
Mega-event Bidding effect in Civil law c. (French+German)	0.61***						
	(0.13)						
Mega-event Bidding effect in French legal origin countries		0.585**	0.502***	0.53**	0.229**	0.395*	0.171***
		(0.17)	(0.13)	(0.18)	(0.11)	(0.18)	(0.042)
Mega-event Bidding effect in German legal origin countries		0.678***	0.618***	0.663***	0.352***	0.696***	0.505***
		(0.16)	(0.13)	(0.15)	(0.04)	(0.18)	(0.135)
Year Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Importer Fixed Effect	Y	Y		Y	Y	Y	
Exporter Fixed Effect	Y	Y			Y	Y	Y
Importer-exporter fixed effect (dyadic)			Y				
Exporter linear trend				Y			
Reduced sample (only Mega-Events bidding countries)						Y	
Standard Errors	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	Robust
N	486,927	486,927	486,927	486,927	547,766	131,609	2,784
R-sq	0.683	0.683	0.83	0.684		0.81	0.97
H_0: ME bidding in civil law = ME bidding in common law (p-values)	0.00***						
H_0: ME bidding in French law = ME bidding in German-law (p-values)		0.16					

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Note: In this table, we have 26 countries bidding for a mega-event. Standard errors are clustered at Exporter, Importer and Year level. Control variables are the log of GDP per capita and log of population of importer and exporter countries, log of distance between importer and exporter, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, coloniser, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

As shown in Table 1, from Model 2 to Model 7, exports for the pure civil-law countries (French legal origin countries) and for the German legal origin countries increase after the bidding, in a range from +19% to +79% and +42% to +97% respectively[12], depending on the estimation technique and model specification. Differently, common-law countries exhibit a null effect. Our hypothesis about the heterogeneous impact of legal origins is tested in Models 1 and 2 of Table 1. The effect for the common law countries (the British legal origin countries) is statistically different from the impact for the civil law countries (p-value < 0.001), whereas for French and German legal origin countries the impact on export is similar (p-value > 0.10).

All the results are robust to different sources of error correlation (standard errors are three way clustered, at importer, exporter and year level) and they are confirmed when we use an heteroskedasticity robust estimator (Model 5), such as the PPML model[13], as in Bista (2011). In Model 6, we also control for potential endogeneity derived from an endogenous sample selection that we control considering as counterfactual only the countries having bid for at least one mega-event. Coefficients remain positive and significant for the civil law countries, proving that the heterogeneous mega event effect is robust to the potential self-selection bias. To avoid any other possible sample bias, due to misclassification of countries' legal families[14], or to the impact of large custom union, we estimate Model 2 of Table 1 excluding from the sample China and all the European Union countries[15]. Results (that are not shown on the table to facilitate reading, but fully available on request) continue to be positive and significant for the civil law countries (the export increase about +82% and +125% for French and German legal origin countries respectively), while for common law countries the impact remains not statistically different from 0[16]. Furthermore, it is interesting to note that most of the European countries bid or host for mega events before to submit for membership to the EU or join the custom union, properly confirming the positive correlation between bid and liberalization behaviour. As example, before all customs duties and restrictions are lifted between the six member[17] of the European Economic Community in 1968, United Kingdom host a world cup in 1966 (before to submit for EU membership in 1967, after the French veto of 1960), Belgium bid for the 1960 and

[12] the percentage increase is equal to $exp\gamma_l$ - 1
[13] See Santos Silva and Tenreyro (2006) for the log-linearization of gravity equations.
[14] As it is the case of China that is coded as a German legal origin country, following La Porta et al. (2008) classification.
[15] We exclude from the sample Austria, Belgium, Cyprus, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Netherland, Polish, Portugal, Luxemburg, Slovakia, Slovenia and Sweden.
[16] We estimate Model 2 in Table 1 excluding China and all the European Union countries from the sample. Considering this reduced sample, the export increase is equal to +82% (the estimated coefficient is equal to +0.6, with p-value <0.05) for the ME bidding effect for French law countries, and +125% (coefficient equal to +0.81, with p-value < 0.001) for German legal origin countries. For Common law countries, the ME bidding impact on export continues to be not significant (+0.17, with p-value > 0.15). Completed estimates are available on request.
[17] The Six founding members of EU are Belgium, Italy, France, West German, Netherlands and Luxembourg.

1964 Summer Olympic Games, West German for the 1962 World Cup, Italy host the 1960 Summer Olympics while France bid for the 1968 Summer Olympics Games.

Finally, in Model 7, we estimate parameters consistent with theoretically founded structural gravity models (as for instance in the Anderson and Wincoop, 2003, type models), controlling for time varying importer and time varying exporter fixed effects. Time varying importer fixed effects capture the inward multilateral resistance and total expenditure of importers' terms while time varying exporter fixed effects control for outward multilateral resistance and countries' output shares of exporters' terms. Because mega-event bidding effects are collinear with the time varying exporter fixed effects, we computed structural estimates using a two-steps method, as usual for this kind of model. In the first step, we regress the trading value on exporters and importers' time varying fixed effects and on variable trade cost, using the Correia et al. (2019) PPML multi-way fixed effects estimator. In the second step, we regress the Olympics effect on the predicted time-varying exporters' fixed effects computed from the first step.

The first equation of the two-step procedure is:

$$X_{ijt} = \alpha_0 Exp_{it}^{\chi_{it}} Imp_{jt}^{\theta_{jt}} Z_{ijt}^{\beta} \eta_{ijt} \qquad \text{(Eq. 2)}$$

where vector Z includes all the dyadic variables and η_{ijt} is an error factor with $E(\eta_{ijt} | Exp_{it}, Imp_{jt}, Z_{ijt}) = 1$. After having estimated χ_{it} using the Correia et al. (2019) PPML algorithm, we compute the fitted time varying fixed effects $\widehat{Exp_{it}}$.

The mega-event bidding effect is finally computed with the following equation:

$$ln(\widehat{Exp_{it}}) = \sum_{l=1}^{L} \gamma_l (Bid_{itl}) + \beta_1 \ln(S_{it}) + \sum_{t=1}^{T} Year_t + \sum_{i=1}^{I} Exp_i + \epsilon_{it} \qquad \text{(Eq. 3)}$$

where S includes the monadic attributes of the exporter country (GDP per capita and population) while ϵ_{it} is an error term that is normally distributed, with mean equal to 0.

Results in Model 7 confirm our previous finding. The mega-event bidding effect is positive only for Civil-law countries while for Common-law countries the impact is smaller than 0. The difference is statistically significant and it confirms the importance of legal origins for trade liberalisation outcomes.

4. Some robustness tests

In the following paragraphs, we run some robustness checks to strengthen the reliability of our identification strategy and to provide further evidences supporting the credibility of the signalling and liberalisation model. Moreover, we consider a special case of the mega-event effect, namely the Olympic effect, which has been widely investigated by previous authors (Bista, 2017, Rose and Spiegel, 2011), to provide some comparable results. Lastly, we test the trade liberalizing behaviour of the countries, using the number of new bilateral trade agreements that has been signed every year.

4.1 The exogenous shock: the case of failed World Cup in Colombia and the Copa América effect in 2001.

We already proved that the positive effect of mega-event on export is independent of particular country trend – in Model 4 of Table 1, we controlled for exporter linear trend – or endogenous selection – using the reduced sample of bidding countries, as in Model 6 of the same table. To definitely exclude the endogenous selection problem, we check for the effect on Colombia exports of the 1982 World Cup withdrawal. Colombia, a French legal origin country, was selected to host the 1986 World Cup but suddenly, in 1982, withdrew due to financial difficulties. The 1986 Fifa World Cup was then assigned to Mexico, and Colombia did not bid or host other large events[18] until 2001. In 2001, and for the first time, Colombia successfully hosted the Copa America, assigned in 1999 by the Conmebol.

If the signalling model is right, and the country not sending the signal does not liberalise, we should not observe any increase in the Colombia export after the withdrawal. Constructing two dummy variables, one for the years between 1982 and 2000 and one for 2001-2006, we are able to distinguish the World Cup withdrawal effect (between 1982 and 2000) and the Copa América hosting effect (from 2001 to 2006). As shown in Table 2, Colombia had not experienced any trade increase until 2001, while from 2001 to 2006 its export grew in a range between +30% and +60%, a value comparable to the increase of export after the bidding of mega-events. The null effect on exports of the failed world cup definitely excludes any endogenous selection bias. Furthermore, the increase of export after the Copa América raises some doubts about what kind of events should be included in the mega-event class. As documented by the Copa América effect, it seems plausible that countries could send credible signal of liberalisation to the international market bidding even for large events.

[18] We consider Copa América as a large event, because it is not organised on a global scale.

Table 2 - The Colombia 1982 withdrawal and the Copa América reputational effect in 2001

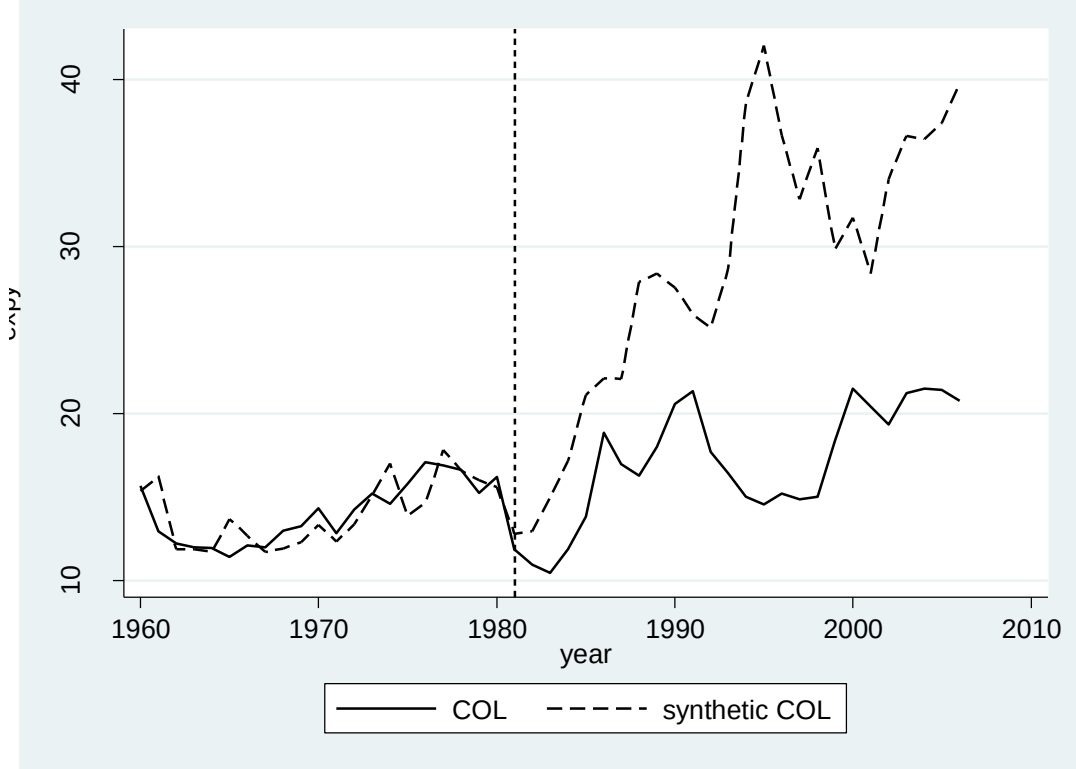
	(1)	(2)	(3)
Estimation Technique	OLS	OLS	PPML
Dependent Variable	$\ln(X_{ijt})$	$\ln(X_{ijt})$	X_{ijt}
Failed World Cup host, 1982-2000	0.160	0.134	0.098
	(0.12)	(0.08)	(0.08)
Copa América 2001 hosting effect	0.473***	0.425***	0.266*
	(0.13)	(0.10)	(0.10)
Year Fixed Effect	Y	Y	Y
Importer Fixed Effect	Y	Y	Y
Exporter Fixed Effect	Y		Y
Exporter linear trend		Y	
S.E.	3-Way clustered	3-Way clustered	3-Way clustered
N	486,927	486,927	547,766
R-sq	0.683	0.682	

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Note: This table shows the effect of Colombia withdrawal in 1982 and Copa América Hosting effect in 2001. Standard errors are clustered at Exporter, Importer and Year level. Control variables are the log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporter, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, coloniser, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

To further stress the robustness of our result, we decided to estimate the Failed World Cup effect with a non-parametric approach. We use the Synthetic Control method developed by Abadie and Gardeazabal (2003) to compare the impact on Colombia's openness (exports on GDP) with the openness of a synthetic control country (the counterfactual). To build the synthetic counterfactual, we use a set of 7 South American countries with French legal origins that host at least one *Copa América* or bid for other kinds of mega-events. We construct the synthetic counterfactual minimising the Root Mean Squared Prediction Error including population, real GDP per capita and past level of exports on GDP as control variables. Results are in Figure 1. In this figure, we compare Colombia with the synthetic counterfactual. We observe a strong negative effect on Colombia trade openness (Export to GDP ratio) starting from the year of the withdrawal, when compared to its synthetic counterfactual.

Figure 1 - The Colombia World Cup withdrawal effect in 1982 on the Export to GDP ratio



Note: Control group includes South American countries with French legal origin that have hosted at least one Copa América or bid for a mega-event.

4.2 Liberalise without signalling

To test if countries that liberalise without signalling experience an export growth similar to the mega-event bidding countries, we introduce in our model the Wacziarg and Welch (2003) liberalisation dates. Wacziarg and Welch (2003) define the liberalisation dates based on the Sachs and Warner (1995) openness criteria, increasing the availability of the openness indicator until 2001.

According to their criteria, a country is classified as closed if at least one of the following characteristics is displayed: (i) average tariff rates equal or greater than 40%; (ii) nontariff barriers covering 40% or more of trade; (iii) a black market exchange rate depreciated at least 20% more than the official exchange rate; (iv) a state monopoly on major export; (v) a socialist economic system. Every year, the Wacziarg-Welch variable assume a value equal to zero if the economy is coded as closed, 1 otherwise.

Merging the Head et al. (2010) dataset with the WW dataset, we are able to cover 146 countries, from 1950 to 2001. We estimate the mega-event bidding effects controlling for these liberalisations dates, being well aware about all the limitations imposed by the use of a simple dummy

to define if, and how much, a country is liberalised. Nevertheless, if the mega-event effect will be robust to the liberalisations dates, we will give further support to the signalling theory. On the other hand, if we will observe a strong decrease of the bidding effect, we will cast doubt on the signalling effect to international markets.

We firstly add three WW liberalisation binary variables (one for each legal family) as a control variables in Equation 1. Results are shown in Table 3.

Table 3: Controlling the mega-event bidding effect for the Wacziarg and Welch (2003) liberalisation date.

	ME effect, controlling or not for WW date	
	ME bidding effect	
British legal Origin Countries	*0.029*	**0.053**
French legal Origin Countries	*0.428***	**0.412****
German legal Origin Countries	*0.518***	**0.393****
Controlling for WW liberalisation date	*N*	**Y**

Note: this table displays OLS estimate for the Summer Olympics hosting (SOG) and mega-event bidding effect controlling or not for the Wacziarg and Welch (2003) liberalisation date, for Equation 1. Estimates include importer, exporter and year fixed effects and standard errors are clustered at exporter, importer and year level. Control variables are the log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporters, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, colonizer, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

The positive effect on exports for the mega-events bidding countries decreases from +53% to +51% for the French legal origin countries and from +67% to +48% for the German legal origin countries; no relevant differences are found for the Common law countries. The mega-event bidding effect for civil law countries slightly decreases but continue to be positive, large and significant, supporting the signalling model.

As final check, we test the interaction effect between the mega-event bidding variables and the Wacziarg and Welch (2003) liberalisation dummies. The goal is to capture the impact on export for countries that signal (bid) and liberalise, and for countries that liberalise without signalling (bidding). If the signalling model is right, we should observe a higher export's growth for countries that signal and liberalise. Results are in Table 4, with p-value in parenthesis. It is straightforward to

note that signalling and liberalise (the last row of Table 4, where the two binary variables are equal to 1) is the strategy that maximizes the export's growth for the civil law countries, while, for the British legal origin countries, the impact continues to be not significant for all the three different strategies. French and German legal origin countries that bid for a mega-event and liberalised experience an increase of export of about +57% and +177% respectively, while when they liberalise without signalling (the first row in Table 4) the effect is not statistically different from zero. As predicted by the theory, the choice of bidding without liberalizing (second row in Table 4) is not a sustainable option (less than 3% of observations carry on this strategy), because of the potential cost of hosting the event. At the end of 2001, only Hungary bid for a mega event without being coded as an open economy country.

Table 4: Signalling and liberalise strategies

			Effect on export		
Mega-event bidding	WW liberalisation date	% of time countries chose the selected strategy	British l.o. countries	French l.o. countries	German l.o. countries
0	1	22.5%	-0.097 (0.53)	-0.036 (0.78)	0.761 (0.16)
1	0	2.9%	0.123 (0.47)	0.065 (0.73)	0.704[19] (0.017)
1	**1**	**12.8%**	-0.041 (0.80)	**0.444** **(0.01)**	**1.011** **(0.10)**

P-value in parenthesis

Note: this table reports OLS estimate (Equation 1) for the interaction between the mega-event bidding effect and the Wacziarg and Welch (2003) liberalisation date. The % of time for the selected strategy is the total number of year for all countries in the sample where the economy is or isn't coded as open (WW liberalisation date) and the government bid or doesn't bid for a mega-event (Mega-event bidding) divided by the total number of country-year observations. Estimates include importer, exporter and year fixed effects and standard errors are clustered at exporter, importer and year level. Control variables are the log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporters, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, colonizer, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

These results strongly support the signalling model, where countries bid for a mega-event to signal to international markets future liberalisation policies. Given that firms do not directly observe future liberalisation behaviour, and investments are directed only to countries sending credible signals (burning money policies) of liberalisations, countries liberalising without signalling don't experience any increase of exports comparable to the export's growth of the signalling countries.

[19] This coefficient is estimated on only 4 country-year observations and it includes countries that bid for a mega-events just some year before liberalising (according to the conditions defined by the WW liberalisation date).

4.3 The Olympic effect

As a further robustness test, we choose to check if the impact of legal families is confirmed when we consider a single kind of mega-event that has been widely examined by previous scholars: the Summer Olympics Games. Rose and Spiegel (2011) found a significant, positive and large permanent effect on exports for countries bidding for or hosting the Summer Olympics, using an OLS estimator. This Olympic effect was then questioned by Bista (2017), who, using a Poisson Pseudo Maximum Likelihood (PPML) estimator to control the heteroskedasticity bias in the log-linearization of the gravity model of trade, found no robust positive effect on export. If our assumptions are rights, and legal origins influence the liberalisation outcomes, we should observe a positive increase of export only for civil law countries. Moreover, the positive effect should be robust to the two estimation techniques (OLS and PPML).

To give results comparable to previous papers, we chose to exploit the Rose and Spiegel (2011) dataset. Estimates of Equation 1 that are reported in Table 5, Model 1, are therefore comparable to the former authors' results.

Table 5 - The Olympics hosting effect on trade, in common and civil-law countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimation technique	OLS	OLS	OLS	OLS	OLS	OLS	OLS	PPML
Dependent Variable	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	X_{ijt}
Summer Olympics hosting countries	0.295*** (0.03)	0.295+ (0.16)						
Summer Olympics in British legal origin c.			-0.092 (0.09)	-0.092 (0.07)	-0.097 (0.08)	-0.097 (0.08)	-0.28* (0.13)	-0.122* (0.06)
Summer Olympics in Civil-law countries			0.56*** (0.11)		0.457*** (0.11)			
Summer Olympics in French legal origin c.				0.605*** (0.11)		0.478*** (0.11)	0.498*** (0.11)	0.328*** (0.06)
Summer Olympics in German legal origin c.				0.497** (0.16)		0.426*** (0.12)	0.538*** (0.15)	-0.0362 (0.099)
Year fixed effect	Y	Y	Y	Y	Y	Y	Y	Y
Exporter fixed effect	Y	Y	Y	Y				Y
Importer fixed effect	Y	Y	Y	Y			Y	Y
Exporter-Importer f.e.					Y	Y		
Exporter linear trend							Y	
Standard errors	Country-pair clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered
N	449,220	449,220	449,220	449,220	449,220	449,220	449,220	449,220
Is the Olympic effect homogeneous between civil and common-law countries? (p-values)			0.00***		0.00***			
Is the Olympic effect homogeneous between French and German-law countries? (p-values)				0.52		0.74		

*Standard errors in parentheses + p<0.10m *p<0.05, **p<0.01, ***p<0.001.*

Note: Table 5 shows estimates of the empirical gravity model specified in Equation 1. In the first specification (Model 1), we compute the Olympics effect as in Rose and Spiegel (2011). Correcting the standard errors for contemporaneous correlation among the same exporter, importer and year (three-way clustered standard errors, reported from Model 2 to 8) decreases the significance level found by Rose and Spiegel (2011). Control variables are log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporter, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, coloniser, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country. Our dataset included 184 countries, with ten countries, which have hosted the Olympic Games at least once.

Differently from Rose and Spiegel (2011) and Bista (2017), we use tri-clustered standard errors to control for contemporaneous error correlation within the same importer, exporter and year. In such a way, we control for shocks affecting importer and exporter over time and for common shocks affecting all the countries in a given year. Clustering standard errors for importer, exporter and year (Model 2) increases the standard errors found by Rose and Spiegel by about 500%, from 0.03 to 0.16. The significance level decreases from 99.9% to 90%. From Model 3, we observe the

Olympics effect conditioned to the legal origin system: these coefficients report the impact on exports of hosting the Summer Olympic Games in the countries with the specified legal system, compared to the non-hosting countries. According to OLS estimates, we observe that the positive effect of the Summer Olympic Games on export found by Rose and Spiegel (2011) exclusively derives from the civil-law countries (the French and German civil-law countries). The data confirm that the effect of hosting the Summer Olympic Games diverges considering the legal origin system of the hosting country. Civil-law countries experienced a positive, persistent and robust effect on export (between +58% and +75%) after hosting the event while the common-law countries experience a non-significative or slightly negative effect. For the French legal origin countries, we estimate a permanent increase between +61% and +83% while German legal origin countries are affected by an export increase between +53% and +71%. The difference in effect between the common-law (British) and the civil-law (French and German) hosting countries is statistically significant at 99.9% while we reject the hypothesis of different effect between German and French legal origin countries. These results are robust even when we include individual exporter linear trend (Model 7) and, for the French legal origin countries, when we consider a different estimator (Model 8), such as the PPML. We recall that, considering only the Summer Olympics hosting countries, we include in the counterfactual all the countries bidding and not hosting the Summer Olympics and bidding or hosting for other types of mega-events. This implies a negative bias in the identification of the permanent effect of signalling on export, because of the positive effect of the bidding. Finally, referring to the last model, it is straightforward to note that the null effect found by Bista (2017) is more directly the result of the heterogeneity in the Olympic effect rather than the consequence of the heteroskedasticity bias.

4.4 The Signalling effects for the real Olympic Games unsuccessful bidders

We assess the impact of legal system on the Summer Olympic Games unsuccessful bidders (results in Table 6) as a further robustness test. Differently from Rose and Spiegel (2011), we consider only the "real unsuccessful" bidder, namely countries that bid for the Summer Olympic Games and have never hosted them or any other kind of mega-events. Most of the countries unsuccessfully bidding for the Summer Olympic Games have hosted some other kind of mega-event. Rose and Spiegel (2011) demonstrated positive effects for both World Cups and Expos; consequently, some identification issues arise if we consider unsuccessful Summer Olympic bidders that are in reality successful bidders for other mega-events.

Considering only the "real unsuccessful bidders", the number of treated countries largely decreases. There are only one British law unsuccessful bidder (that is South Africa, bidding unsuccessfully for the 2004 Summer Olympic Games, but hosting it in 2012, out of our sample) and 5 Civil law unsuccessful bidders (three German legal origin countries – China, Hungary, and Austria – and two French legal origin countries – Netherlands and Turkey).

Nevertheless, the bidding effect for the pure Civil-law countries remains positive and significant (from +47% to +356%), even if the coefficients capturing the bidding effect for the German-law countries change back to non-significant[20] (p-value < 0.15) when exporter linear trend is considered.

[20] The Olympics effect for the German legal origin countries unsuccessful bidder in model 3 is equal to 0 with p < 15%. We recall that standard error are 3-way clustered at importer, exporter and year level.

Table 6 - The Olympics bidding effect on export for the real unsuccessful bidders

	(1)	(2)	(3)	(4)
Estimation Technique	OLS	OLS	OLS	PPML
Dependent Variable	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$	X_{ijt}
Unsuccessful Summer Olympics Bidding effect in British legal origin countries	0.039	-0.024	0.029	-0.069
	(0.08)	(0.03)	(0.07)	(0.10)
Unsuccessful Summer Olympics Bidding effect in French legal origin countries	1.519***	1.093***	1.490***	0.404***
	(0.17)	(0.15)	(0.16)	(0.07)
Unsuccessful Summer Olympics Bidding effect in German legal origin countries	0.518+	0.484+	0.458	0.385***
	(0.31)	(0.27)	(0.31)	(0.10)
Year Fixed Effect	Y	Y	Y	Y
Importer Fixed Effect	Y		Y	Y
Exporter Fixed Effect	Y			Y
Importer-exporter fixed effect (dyadic)		Y		
Exporter linear trend			Y	
Standard Errors	3-Way clustered	3-Way clustered	3-Way clustered	3-Way clustered
N	486,927	486,927	486,927	547,766
R-sq	0.683	0.838	0.683	

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.*

Note: In this table, we have only 5 real unsuccessful bidding countries; standard errors are clustered at Exporter, Importer and Year level. Control variables are the log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporter, log of the product of the two areas of the countries, a set of binary variables equals to one if the two countries share the same currency, official language, border, regional trade agreement, coloniser, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

4.5 The average number of new trade agreements signed every year, before and after bidding for mega-events.

As last check, we evaluate if the average number of bilateral trade agreements signed every year by the countries belonging to the different legal families differently increases after the countries bid for mega events. Using the DESTA[21] database, that collects all trade agreements notified to the World Trade Organization, we compute for each country and each year a variable that is equal to the number of counterparties (countries) included in the new trade agreements. If no agreements are signed in the specific year, the variable is equal to 0. As an example, when in 1995 MERCOSUR

[21] https://www.designoftradeagreements.org/

issued a Memorandum of Understanding laying out the conditions for a trade agreement with Bolivia, we point out 4 new trade agreements to Bolivia, because 4 countries (Brazil, Argentina, Paraguay, Uruguay) were included in the MERCOSUR in 1995.

In Table 7, we reports the average number of bilateral trade agreements signed by each country in each year, from 1950 to 2006. It is straightforward to note at first glance that only civil law countries (French and German legal origin countries) have increased the average number of trade agreements after bidding for mega events. The average number rises from 0.52 and 3.06 to 4.3 and 6.63 for, respectively, German and French legal origin countries, while for British legal origin countries the average number of new bilateral trade agreements remains essentially unchanged, from 2.59 to 2.74.

Table 7 - Average number of bilateral trade agreements signed for each year, from 1950 to 2006.

	Average number and sd. dev (in parenthesis)		Number of observations	
	Without ME bidding	After ME bidding	Without ME bidding	After ME bidding
British legal origin countries	2.59 (8.0)	2.74 (10.6)	2532	193
French legal origin countries	3.06 (10.4)	6.63 (14.8)	3703	511
German legal origin	0.52 (2.2)	4.3 (12.3)	62	212

Note: this table reports the average number of bilateral trade agreements signed by the different legal origin countries in each year, for the countries bidding and not bidding for at least one kind of mega event.

We lastly run a new regression where we control for the average number of trade deals occurred in every year, to capture common trend in market liberalisations. We perform this analysis on a complete and reduced dataset that includes only the countries that bid for at least one mega event, in order to measure the different liberalisation behaviour of these countries. Since we are dealing with counting data, we chose to perform our analysis using OLS, Poisson and Ordered Probit estimator. We control for year and country or legal origin fixed effects, to capture the average increase, or decrease, for each country or legal family. Our dependent variable ($treaties_{it}$) is the number of counterparties with which country *i* signed one trade agreement, registered by the WTO, in year *t*. Results are in Table 8.

Table 8 – Number of trade agreements signed in each year, after mega-event biddings

	(1)	(2)	(3)	(4)
Estimation Technique	OLS	OLS	Poisson	Ordered Probit
Dependent Variable	$Treaties_{it}$	$Treaties_{it}$	$Treaties_{it}$	$Treaties_{it}$
British legal origin countries, after mega-event bidding	0.22	1.57	0.08+	-0.18
	(0.68)	(1.25)	(0.05)	(0.20)
French legal origin countries, after mega-event bidding	3.38***	3.02***	0.71***	0.48***
	(0.62)	(0.87)	(0.02)	(0.11)
German legal origin countries, after mega-event bidding	1.35	1.06	0.41***	0.47**
	(1.60)	(1.11)	(0.06)	(0.18)
Year Fixed Effects	Y	Y	Y	Y
Country Fixed Effects		Y		
Legal origin Fixed Effects	Y		Y	Y
Reduced Sample (Only ME bidding countries)				Y
N	8021	8021	8021	1481
Adj R-sq	0.17	0.22	0.34	0.13

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.*

Note: this tables reports the effect of bidding for a mega event on the number of trade agreement signed every year. It is shown a clear heterogeneous effect for countries belonging to different legal families.

Civil law countries seem to exhibit an increase in the average number of bilateral trade agreements[22], while the variation for common law countries is not statistically different from zero or only slightly positive. Once again, data confirm the heterogeneous liberalization behavior of countries belonging to different legal families.

5. At the root of heterogeneity

5.1 The impact of tariffs and capital controls on trade

Using the Economic Freedom of the World report, developed by the Fraser institute, we tried to discover why different legal families exhibited heterogeneous effect on export after bidding for a mega-event. We enriched the Head et al. (2010) dataset to test the impact of some regulatory variables

[22] Even if for some specification of the model the value for German legal origin countries are not statistically different from zero, due to the low number of counterfactual observations.

on trade. The Economic Freedom of the World report includes some freedom and openness data for about 150 countries, every five years from 1970 to 2005[23]. We focused on the Tariffs and Capital controls variables. These variables are computed by the Fraser institute in a range from 0 to 10, where 10 is the best value in terms of openness meaning that tariffs or capital controls are completely missing. The tariffs variable includes revenue from trade taxes (% of traded value), mean tariff rate and standard deviations of tariff rates, while the capital control variable is computed using multiple IMF data. The International Monetary Fund reports on up to 13 types of international capital controls: the 0-to-10 rating computed by the Fraser Institute is the percentage of capital controls not levied as a share of the total number of capital controls listed, rounded and multiplied by 10. The within variation – timing variation – of the variables for all the countries is equal to more than 50% of the overall standard deviation and is comparable among British, French and German legal origin countries. Values for the Tariffs and Capital Control variables are reported in Table 9.

[23] This dataset is therefore smaller than the original. Data are reported every 5 years, when variables computed by the Frasier Institute are available.

Table 9 - Average values of Tariffs and Capital Controls for the countries that have bid for at least one mega-event

	Tariffs		Capital Controls		Number of observation	
	Before ME bidding	After ME bidding	Before ME bidding	After ME bidding	Before ME bidding	After ME bidding
British legal origin countries	7.93 (1.2)	7.88 (1.31)	1.82 (0.47)	6.62 (2.84)	7	33
French legal origin countries	5.01 (2.50)	7.42 (2.07)	0.95 (1.03)	4.13 (3.27)	19	84
German legal origin	7.34 (0.93)	8.35 (0.88)	0.5 (1)	5.81 (3.31)	4	36
British=French (p-value)	0.007	0.167	0.024	0.00		
German=British (p-value)	0.403	0.091	0.047	0.279		
German=French (p-value)	0.051	0.002	0.477	0.015		

Average value and standard deviation in parentheses

Note: This table reports Tariffs and Capital controls indexes computed by the Fraser Institute (Economic Freedom of the World report). Variables range from 0 to 10, where 10 meaning that tariffs or capital controls are completely missing.

Referring to the countries bidding for a mega-event, we observe in Table 9 that only civil-law countries increase the Tariffs freedom or, in other words, decrease trade costs. The score for French legal origin countries increases from 5 to 7.4. For common-law countries, the Tariffs freedom variable slightly decreases, from 7.93 to 7.88. This strengthens our idea that common-law countries are a priori more trade liberalised than civil-law countries (before bidding for a mega-event the Tariffs variable is equal to 7.93 for British and 5.01 for French) and that the heterogeneous effects are due to the different legal framework and government behaviour. After the mega-events bidding, French and British legal origin countries reach a similar score of the Tariffs freedom variable. German legal origin countries exhibit instead an initial a score of the Tariffs variable (tariffs freedom) between the French and British values, while, after the bidding, they display the highest score of our sample, demonstrating an export oriented economic attitude.

The number of controls on the capital market is however the lowest in common-law countries, before and after the bidding. Before the bidding, common-law countries have a score for the Capital controls variable that is equal to 1.8 (0.95 for French civil-law countries) while after the bidding the score increases to 6.6 (4.1 for French civil-law countries). The final value of the capital openness variable for the common-law countries is 60% larger than the value for the French legal origin countries. The difference is statistically significant.

We conclude that, after the bidding, common-law countries have reduced controls only on the capital market, while civil-law countries have even lowered trade tariffs. This different liberalising behaviour is the source of the heterogeneous effect we previously reported. Tariff reductions, decreasing fixed and variable cost of trade, affect positively trade while reducing capital controls has an ambiguous impact. In an export versus FDI model of trade, as in Helpman et al. (2004), easing capital controls reduces indeed the relative cost of FDI versus export; thus, firms are more likely to prefer FDIs to exports. As a result, the impact on the aggregates exports of easing importer's capital controls is negative. This is confirmed by our estimates in Table 10.

Table 10 - Tariffs and Capital Controls effects on trade

	(1)	(2)	(3)
Estimation Technique	OLS	OLS	OLS
Dependent Variable	$\ln(X_{ijt})$	$\ln(X_{ijt})$	$\ln(X_{ijt})$
Exporter capital control reduction	-0.131*	-0.06	-0.125+
	(0.066)	(0.05)	(0.07)
Exporter Tariffs variable reduction	0.211*	0.19**	0.207*
	(0.084)	(0.06)	(0.08)
Importer capital control reduction	-0.171**	-0.11**	-0.171**
	(0.06)	(0.04)	(0.05)
Importer Tariffs variable reduction	0.152*	0.151*	0.151**
	(0.07)	(0.07)	(0.06)
Year Fixed Effect	Y	Y	Y
Importer Fixed Effect	Y		Y
Exporter Fixed Effect	Y		
Importer-exporter fixed effect		Y	
Exporter linear trend			Y
S.E.	3-Way clustered	3-Way clustered	3-Way clustered
N	29,090	29,090	29,090
R-sq	0.78	0.90	0.78

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Note: This table shows the impact of capital controls and tariff reductions (variables computed by IMF, every 5 years) on national trade flows. For the sake of clarity, in the descriptions of explanatory variables we describe as reduction an increase of the capital and tariffs variable (we recall that according to the Fraser dataset the higher the values are, the higher the openness level is). Standard errors are clustered at Exporter, Importer and Year level. Control variables are the log of real GDP per capita and population of importer and exporter countries, log of distance between importer and exporters, log of the product of the two areas of the countries, a set of binary variables equal to one if the two countries share the same currency, official language, border, regional trade agreement, coloniser, legal system or are in a current colony relationship or have been in a former colony relationship or in the same country.

Tariff reductions are shown to boost the value of trade flow between two countries – 1 point reduction of the exporter Tariffs variable increases export of about +23% – while easing capital controls decreases the average values of trade flows. If the importer removes one of the thirteen kinds of capital controls coded by IMF, trade flow shrinks on average by about -12%. These results contribute to explain why legal families, affecting the countries' economic structure and liberalisation behaviour, influence the output of the mega-event bidding effect.

5.2 The impact of mega events on the net inflows of foreign direct investments

To confirm our intuition, we test if the increase of the net inflows of foreign direct investments is larger in common-law countries, after the bidding. The idea that British-law countries increase national economic output leveraging foreign investments is justified by the data displayed in Tables 9 and 10 and is supported by several declarations of investment and business deals signed by the governments of the mega-event hosting countries. One recent example of this kind of declarations, was proposed at the London Olympics in 2012, where the UKTI's British Business Embassy published record-breaking Foreign Direct Investment results, claiming the creation and safeguard of more than 100.000 jobs.

Our dataset includes net inflows of FDIs, at aggregated national level, for about 183 countries, from 1970 to 2006. Data are provided by the IMF at current (nominal) US dollar.

$$\ln(FDI_{it}^{IN}) = \sum_{l=1}^{L} \gamma_l (Bid_{itl}) + \beta Z_{it} + \sum_{i=1}^{I} \alpha_i + \sum_{t=1}^{T} Year_t + \varepsilon_{it} \qquad \text{(Eq. 4)}$$

FDI_{it}^{IN} are Net inflow FDI in country *i* at year *t*, Bid_{itl} is a set of three dummy variables capturing the permanent effect of mega-event bidding for the three different legal families, while Z_{it} is a set of control variables that includes the log of GDP of countries *i*, the log of the total GDP of the countries exporting to country *i*, the log of the average distance to these markets and the average number (GDP weighted) of Regional Trade Agreement and Common Currency market with the same set of exporting countries. α_i and $Year_t$ are a set of binary variables capturing country and year fixed effects and ε_{it} is the error term. To compute the permanent effect of the bidding on the net inflow of FDI, we exclude from the sample nations having no more than 2 years of observations after the event, in order to reduce the noise produced by the high volatility of the flows and capture the long-term effects. This condition excludes only South Africa, for which we have only two years of observations

after the event. Increasing the timespan for South Africa (after 2006), the effect on FDI become similar to the other common law countries.

Table 11 - The Mega-events bidding and hosting effect on net inflows of FDI

	(1)	(2)	(3)	(4)	(5)
Estimation Technique	OLS	PPML	OLS	OLS	OLS
Dependent Variable	$\ln(FDI_{it}^{IN})$	FDI_{it}^{IN}	$\ln(FDI_{it}^{IN})$	$\ln(FDI_{it}^{IN})$	$\ln(FDI_{it}^{IN})$
Mega-event Bidding effect in British legal origin countries	5.491***	3.72**	2.78+	1.459	
	(1.19)	(1.36)	(1.41)	(1.00)	
Mega-event Bidding effect in French legal origin countries	-0.653	0.129		-0.599	
	(0.57)	(0.63)		(0.49)	
Mega-event Bidding effect in German legal origin countries	0.332	-0.241*		0.085	
	(0.33)	(0.12)		(0.28)	
Mega-event Hosting effect in British legal origin countries					0.562**
					(0.19)
Mega-event Hosting effect in French legal origin countries					0.466
					(0.277)
Mega-event Hosting effect in German legal origin countries					0.226
					(0.302)
Year Fixed Effect	Y	Y	Y	Y	Y
Country Fixed Effect	Y	Y	Y	Y	Y
Reduced sample (only British legal origin countries)			Y		
Reduced sample (only Mega Events bidding countries)				Y	Y
Standard Errors	Year and Country clustered	Year and Country clustered	Year and Country clustered	Year and Country clustered	Year and Country clustered
N	4,628	5,945	1,652	769	769
R-sq	0.82		0.84	0.86	0.86

*Standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Note: Control variables are the log of GDP of countries *i*, the log of the total GDP of the countries exporting to country *i*, the log of the average distance to these markets, the average number (GDP weighted) of Regional Trade Agreement and the average number (GDP weighted) of Common Currency markets with the countries exporting to *i*. Negative FDI_{it}^{IN} (there are 489 observations where disinvestments are larger than investments) are set equal to 0. Results are robust even controlling for the probability of negative flows (that are negatively correlated with the mega-event bidding) in all our equations (we use the same approach as in the Heckman sample selection model).

Results in Table 11 confirm our expectations. Foreign direct investments are permanently larger only in British legal origin countries that bid for at least one mega-event. The impact is robust to different model specifications[24] and error correlation structure, even if standard errors increase until a non-significative level when the number of counterfactual observations is sharply reduced (as in Model 4). Nevertheless, the sign of the impact remains positive even if the value is slightly reduced. This conclusion does not change when the hosting effect is considered: hosting a mega-event permanently increases the net inflow of FDI only for the common legal origin countries.

6. Theoretical Model

6.1 A Gravity model of trade with multinational firms and capital controls.

To explain why both common and civil law countries compete so fiercely to host different kind of mega-events, we need to develop a new model of trade with international firms' mobility, including trading and capital controls costs[25]. We therefore decided to expand the Melitz and Redding (2014) model of trade with heterogeneous firms adding capital controls cost, as in and Helpman et al. (2004). Firms produce differentiated products, after drawing a labour productivity parameter φ from a Pareto function with shape parameter *k*, defined by:

$$g(\varphi) = \frac{k\varphi_{MIN}^{k}}{\varphi^{k+1}}, \qquad P(\tilde{\varphi} < \varphi) = G(\varphi) = 1 - \left(\frac{\varphi_{MIN}}{\varphi}\right)^{k}$$

As usual, in these kinds of models, *k* is assumed to be greater than the elasticity of substitution σ (with $\sigma > 1$) , to have finite firm size. After paying a sunk fixed cost f_{Ei} to enter in country *i*, firms observe their productivity and choose to either produce or exit and not produce. If they decide to produce, they pay a fixed cost (in terms of unit labour cost w_i) equal to $w_i f_{ii}$, to manufacture and sell the goods to market *i*. If the productivity level is above a threshold φ_{ij}^{*}, firms increase their profits choosing to export to country *j*, paying a fixed cost for producing and exporting equal to $w_j f_{ij}$, with $w_j f_{ij} > w_i f_{ii}$. Exporting firms from country *i* with a productivity level greater than $\varphi_{jj}^{*M,i}$ (multinational firms) maximise their profitability producing directly in country *j*, where they pay a

[24] Results do not significantly change even when we control for the number of Bilateral Investment Treaties signed by each country in each year.

[25] To simplify the analysis we consider only countries that gain from liberalisations, with one unique sector that is representative of the whole economy. Conclusions do not change removing this simplifications.

fixed cost to produce equal to $w_j f_{jj}^M$. Once again, $w_j f_{jj}^M > w_j f_{ij} > w_i f_{ii}$. This framework is similar to Helpman et al. (2004). The marginal cost of producing the goods in country *i* is equal to $\frac{w_i}{\varphi}$ and the variable cost to transport the produced goods from country *i* to country *j* is quantified by the iceberg trade cost τ_{ij}. Consumer preferences are assumed to take the constant elasticity of substitution Dixit and Stiglitz (1977) form; consequently, given the demand function and the monopolistic setting, firms charge the constant mark-up $\left(\frac{\sigma}{\sigma-1} \text{ with } \sigma > 1\right)$ over the marginal cost.

We assume that capital controls in country *j* (c_j) affect the fixed cost to produce (f_{jj}^M) of foreign (multinational) firms. This assumption is intuitively similar to the Helpman et al. (2004) model, where firms producing abroad (FDI) face fixed costs of production higher than the exporting firms' fixed costs (f_{ij}), because of the duplicated production facilities costs. Exchange controls, transaction taxes, higher interest cost, ownership limitations or licenses for foreign investor (that are some of the capital controls coded by the IMF) are supposed to increase the fixed cost to produce in the foreign country, as recurrent or sunk costs. When they are paid as sunk costs, they are written down over several year ($f_{jj}^M = f_{jjRecurrent}^M + \frac{1}{t} f_{Sunk}^M$) as usual in accounting practice, when firms select where to locate the production plant to maximize their profits. c_j is the proxy for capital controls, whose value is greater than 1 and is increasing in the number of capital controls reported by IMF. Similar to the trade variable cost, we formalize c_j as an iceberg cost to obtain tractable equations.

Foreign firms pay the fixed cost $c_j w_j f_{jj}^M$ to produce in country *j*, and this cost is larger than the fixed cost ($w_i f_{ij}$) payed by the exporting firms and by the domestic firms ($w_j f_{jj}$). To simplify the analysis, multinational firms do not export from foreign countries, but they choose only to serve the market locally or to export from their original country. For sake of clarity, we suppress the sector indexation.

Multinationals are indifferent to produce the good in the foreign market *j* if the profits earned producing in the foreign country *j* (Π_{jj}) are equal to the exporting profits earned producing in country *i* (Π_{ij}). Namely:

$$\Pi_{jj}(\varphi) = \Pi_{ij}(\varphi)$$

$$\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\frac{w_j}{P_j\varphi}\right)^{1-\sigma} X_j - c_j w_j f_{jj}^M = \frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\frac{w_i \tau_{ij}}{P_j\varphi}\right)^{1-\sigma} X_j - w_j f_{ij} \qquad \text{(Eq. 5)}$$

where φ is the productivity of the firm, σ the elasticity of substitution between the goods produced by the firms, w_j (w_i) the wage payed to a worker in country j (i), P_j the price index of country j, X_j the total demand in country j and $c_j w_j f_{jj}^M$ is the fixed cost of producing and selling in country j, for a multinational firm M. τ_{ij} is the variable trade cost (in the usual iceberg formulation) and $w_j f_{ij}$ is the fixed cost to produce in country i and export to country j. Solving Equation 5 for the level of productivity φ, we obtain :

$$\varphi_{jj}^{*M,i} = \left\{ \frac{w_j\left(c_j f_{jj}^M - f_{ij}\right)}{\left[w_j^{1-\sigma} - \left(w_i\tau_{ij}\right)^{1-\sigma}\right]\left[\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma}\frac{X_j}{P_j^{1-\sigma}}\right]} \right\}^{\frac{1}{\sigma-1}} \quad \text{(Eq. 6)}$$

Or, as explained in Appendix

$$\varphi_{jj}^{*M,i} = \varphi_{ij}^{*}\left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)}{\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1} - 1}\right]^{\frac{1}{\sigma-1}} \quad \text{(Eq. 7)}$$

where $\varphi_{jj}^{*M,i}$ is the level of productivity where the profit of a multinational firms M is equal if it produces in the own country i or in country j and φ_{ij}^{*} is the usual level of productivity above which the firms located in country i start to profitably export to country j.

Profits of firms with a productivity level greater than $\varphi_{jj}^{*M,i}$ are larger when they produce directly in market j rather than export to market j. Consequently, the production of firms with a productivity level φ larger than $\varphi_{jj}^{*M,i}$ will be located in the foreign country j. The value of this threshold is positively correlated with the relative larger fixed cost of producing into the importing market rather than from the exporting market (the numerator of Equation 7) and negatively correlated with the relative larger variable cost of exporting ($\frac{w_i\tau_{ij}}{w_j}$). Moreover, the productivity threshold is lower when the goods that the firms produce are more substitutable, as shown by the elasticity of substitution parameter (σ). For illustrative purpose, we restrict our analysis to the case where $\varphi_{jj}^{*M,i} > \varphi_{ij}^{*}$. Nevertheless, firms with relative variable trading cost, $\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1}$, larger than relative fixed

cost, $\frac{c_j f_{jj}^M}{f_{ij}}$, might have positive profit when they produce abroad and negative profit if they export. An example are all sectors where transport cost are too large to export in distant countries.

The other productivity thresholds for exporting and domestic firms are computed as usual and are formally identified by:

$$\varphi_{ij}^* = \left\{ \frac{w_j f_{ij}}{\left(w_i \tau_{ij}\right)^{1-\sigma} \left[\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \frac{X_j}{P_j^{1-\sigma}}\right]} \right\}^{\frac{1}{\sigma-1}} \quad \text{(Eq. 8)}$$

$$\varphi_{ii}^* = \left\{ \frac{w_i f_{ii}}{(w_i)^{1-\sigma} \left[\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \frac{X_i}{P_i^{1-\sigma}}\right]} \right\}^{\frac{1}{\sigma-1}} \quad \text{(Eq. 9)}$$

Equation 8 defines the inferior productivity level above which a firm with productivity φ decides to export $\left(\varphi_{jj}^{*M,i} < \varphi \leq \varphi_{ij}^*\right)$ while Equation 9 specifies the minimum productivity level of domestic firms that produce in country *i*.

Given the Pareto distribution of productivity, the mass of multinational firms of country *i* producing in country *j* ($M_j^{M,i}$) is equal to:

$$M_j^{M,i} = \left(\frac{\varphi_{ij}^*}{\varphi_{jj}^{*M,i}}\right)^k M_{ij} \quad \text{(Eq. 10)}$$

where M_{ij} is the mass of firm exporting from country *i* to country *j* that is equal to $M_{ij} = \left(\frac{\varphi_{ii}^*}{\varphi_{ij}^*}\right)^k M_i$. M_i is the mass of domestic firm producing in country *i*. Plugging Equation 7 in Equation 10 we derive:

$$M_j^{M,i} = \left[\frac{\left(\frac{w_i \tau_{ij}}{w_j}\right)^{\sigma-1} - 1}{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)} \right]^{\frac{k}{\sigma-1}} M_{ij} \qquad \text{(Eq. 11)}$$

that defines the number of multinational firms producing in country *j* as a function of the relative fixed and variable cost to produce in country *i* or *j* and the productivity shape distribution parameter *k*.

Assuming that the initial investment that any multinational firm *M* faces to produce in country *j* is equivalent to the fixed cost of producing, $(c_j w_j f_{jj}^M)$[26], the total level of FDI from country *i* to country *j* is equal in the first year to:

$$FDI_j^{M,i} = M_{ij} \left[\frac{\left(\frac{w_i \tau_{ij}}{w_j}\right)^{\sigma-1} - 1}{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)} \right]^{\frac{k}{\sigma-1}} c_j w_j f_{jj}^M \qquad \text{(Eq. 12)}$$

It follows that, considering the number of exporting firms M_{ij} unchanged, an increase in capital openness (that is measured by the decrease of the capital control cost variable *c*) pushes more firms to produce directly in the exporting market *j*, increasing FDI.

$$\frac{dFDI_j^{M,i}}{dc_j} = M_{ij} \frac{w_j f_{jj}^M \left[c_j f_{jj}^M (\sigma - k - 1) - f_{ij}(\sigma + 1)\right]}{(\sigma - 1)\left(c_j f_{jj}^M - f_{ij}\right)} \left(\frac{\left(\frac{w_i \tau_{ij}}{w_j}\right)^{\sigma-1} - 1}{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)} \right)^{\frac{k}{\sigma-1}} < 0 \qquad \text{(Eq. 13)}$$

[26] We could define f_{jj}^M as the share of (sunk and recurrent) cost written down over several years. A more complex specification that capitalises the sunk cost component of f_{jj}^M could be provided. Nevertheless, conclusion remains unchanged.

As shown in Equation 13, whenever k>σ>1 and $c_j f_{jj}^M - f_{ij} > 0$, the sign of the derivative is negative. It follows that a reduction of capital control c_j increase the level of FDI, augmenting the number of multinational firms that chose to produce in *j*.

Reducing capital controls has also a positive effect on consumer surplus. As usual[27], the welfare of the representative consumer *i* can be written as: $V_i = \frac{w_i}{P_i}$. The price index in country *i*, is equal to:

$$P_i^{1-\sigma} = M_i \int_{\varphi_{ii}^*}^{\infty} \left(\frac{\sigma}{\sigma-1}\frac{w_i}{\varphi}\right)^{1-\sigma} * \frac{dG(\varphi)}{1-G(\varphi_{ii}^*)} + \sum_j M_j \left[\left(\frac{1-G\left(\varphi_{ji}^*\right)}{1-G\left(\varphi_{jj}^*\right)} - \frac{1-G\left(\varphi_{jj}^{*M,i}\right)}{1-G\left(\varphi_{jj}^*\right)}\right)\int_{\varphi_{ji}^*}^{\varphi_{jj}^{*M,i}} \left(\frac{\sigma}{\sigma-1}\frac{w_j\tau_{ji}}{\varphi}\right)^{1-\sigma} * \left(\frac{dG(\varphi)}{1-G\left(\varphi_{ji}^*\right)} - \frac{dG(\varphi)}{1-G\left(\varphi_{jj}^{*M,i}\right)}\right) + \frac{1-G\left(\varphi_{jj}^{*M,i}\right)}{1-G\left(\varphi_{jj}^*\right)}\int_{\varphi_{jj}^{*M,i}}^{\infty} \left(\frac{\sigma}{\sigma-1}\frac{w_i}{\varphi}\right)^{1-\sigma} * \frac{dG(\varphi)}{1-G\left(\varphi_{jj}^{*M,i}\right)}\right]$$

where the first adding term on the right of Equations computes the prices $\left(p_{ii} = \frac{\sigma}{\sigma-1}\frac{w_i}{\varphi}\right)$ charged by the domestic firms, the second term the prices levied by the exporting firms $\left(p_{ji} = \frac{\sigma}{\sigma-1}\frac{w_j\tau_{ji}}{\varphi}\right)$ while the last term collects the prices $\left(p_{ii}^{Mj} = \frac{\sigma}{\sigma-1}\frac{w_i}{\varphi}\right)$ charged by the multinational firms producing directly in country *i*. M_i and M_j are the number of entrant firms computed in equilibrium as n_i and n_j in Appendix C. Using Equation 7, we can compute the price index as:

$$P_i^{1-\sigma} = M_i \left(\frac{\sigma}{\sigma-1}w_i\right)^{1-\sigma} \frac{k\varphi_{ii}^{*\,k}}{k-\sigma+1}\varphi_{ii}^{*\,-k+\sigma-1} + \sum_j M_j \left(\frac{\sigma}{\sigma-1}w_j\tau_{ji}\right)^{1-\sigma} \frac{k}{k-\sigma+1}\left(\varphi_{jj}^*\right)^k \varphi_{ji}^{*\,-k+\sigma-1}\left\{1 - \left[\frac{\left(\frac{w_j\tau_{ji}}{w_i}\right)^{\sigma-1}-1}{\left(\frac{c_i f_{ii}^M}{f_{ji}}-1\right)}\right]^{\frac{k}{\sigma-1}-1}\right\} + \sum_j M_j \left(\frac{\sigma}{\sigma-1}w_i\right)^{1-\sigma} \frac{k}{k-\sigma+1}\left(\varphi_{jj}^*\right)^k \left(\varphi_{ji}^*\right)^{-k+\sigma-1}\left[\frac{\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1}-1}{\left(\frac{c_j f_{jj}^M}{f_{ij}}-1\right)}\right]^{\frac{k}{\sigma-1}-1} \quad \text{(Eq. 14)}$$

or plugging the exporting productivity threshold of Equation 8 in Equation 14 and defining

[27] For the sake of clarity, we suppress the sector notation s. If we consider the classical full notation with a large outside sector, market demand became equal to $\beta_s X_j$ where β_s is the expenditure share for the goods produced in sector , while X_j is the total consumption in country *j* .

$$\lambda_1 = \sigma^{1-\frac{k}{\sigma-1}}\left(\frac{\sigma}{\sigma-1}\right)^{-k}\frac{k}{k-\sigma+1}, \Omega_{ji} = \left(\frac{w_j f_{ji}}{X_i}\right)^{1-\frac{k}{\sigma-1}}\left(w_j\tau_{ji}\right)^{-k+\sigma-1}$$

we can write Equation 14 as:

$$P_i^{-k} = M_i\lambda_1\varphi_{ii}^{*\,k}\Omega_{ii}(w_i)^{1-\sigma} + \sum_j M_j\lambda_1\left(\varphi_{jj}^*\right)^k\Omega_{ji}\left\{\left(w_j\tau_{ji}\right)^{1-\sigma} + \left(\frac{\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1}-1}{\left(\frac{c_j f_{jj}^M}{f_{ij}}-1\right)}\right)^{\frac{k}{\sigma-1}-1}\left[(w_i)^{1-\sigma}-\left(w_j\tau_{ji}\right)^{1-\sigma}\right]\right\}$$

(Eq. 15)

It is now straightforward to note from Equation 15 that a reduction of capital controls (c_i) in country *i* decreases the price index of the representative consumer, as long as $w_i < w_j\tau_{ji}$, which is a condition that holds whenever a positive number of firms producing abroad exists[28]. Easing inward capital controls, governments increase the consumer surplus. This is a novel finding with major implications for consumers' gain from trade. Because reductions of capital controls decrease the total amount of imports in favour of FDI, measures of welfare gains computed using trade openness are downward biased, if contemporaneous changes in capital controls are not taken into account.

To illustrate these findings, we report in the following Equation 16, under the classical assumption of a common Pareto productivity distribution for all the countries, a new gravity equation for the total level of export from country *i* to country *j*, where all firms with a productivity level greater than $\varphi_{jj}^{*M,i}$ produce directly in the foreign markets *j*.

$$X_{ij}^{EXP} = M_i\frac{k}{k-\sigma+1}\,\varphi_{MIN}^k\left(\frac{\sigma}{\sigma-1}w_i\tau_{ij}\right)^{-k}\left(\frac{X_j}{P_j^{1-\sigma}}\right)^{\frac{k}{\sigma-1}}\left(\sigma w_j f_{ij}\right)^{1-\frac{k}{\sigma-1}}\left\{1-\left[\frac{\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1}-1}{\left(\frac{c_j f_{jj}^M}{f_{ij}}-1\right)}\right]^{\frac{k}{\sigma-1}-1}\right\}$$

(Eq. 16)

[28] Firms produce in the foreign markets if FDI profitability is larger than export profitability. Given that $c_j w_j f_{jj}^M > w_i f_{ij}$, multinational firms invest abroad only if $w_i < w_j\tau_{ji}$. The free entry condition strengthens this effect, because the number of entrant firms in the foreign market is negatively correlated with the level of capital controls.

Where P_j is defined in Equation 15. A more intuitive formulation can be derived as:

$$X_{ij}^{EXP} = \frac{R_i}{\Phi_i}\left(\frac{X_j}{P_j^{1-\sigma}}\right)^{\frac{k}{\sigma-1}}(\tau_{ij})^{-k}(f_{ij})^{1-\frac{k}{\sigma-1}}\left\{1-\left[\frac{\left(\frac{w_i\tau_{ij}}{w_j}\right)^{\sigma-1}-1}{\left(\frac{c_j f_{jj}^M}{f_{ij}}-1\right)}\right]^{\frac{k}{\sigma-1}-1}\right\} \quad \text{(Eq. 17)}$$

where

$$R_i = \sum_j X_{ij} = M_i\left(\frac{\sigma}{\sigma-1}w_i\right)^{-k}\frac{k}{k-\sigma+1}\,\varphi_{min}^{k}(\sigma w_j)^{1-\frac{k}{\sigma-1}}\Phi_i$$

and

$$\Phi_i = \sum_j \left(\frac{X_j}{P_j^{1-\sigma}}\right)^{\frac{k}{\sigma-1}}(\tau_{ij})^{-k}(f_{ij})^{1-\frac{k}{\sigma-1}}$$

These equations are really close to the standard gravity equation of trade developed by Anderson and van Wincoop (2002) or Melitz and Redding (2014). The first multiplicative terms on the right part of Equations 16 and 17 are the usual gravity equation of trade, while the last term in the square brackets captures the reduction of trade[29] due to multinational firms that choose to produce in the importing market *j*. It is now straightforward to note that omitting to control for variation in capital controls could bias the welfare gain estimated exploiting the variation of the importing share. Decreasing capital controls on market *j* will decrease the importing trade share by increasing the domestic consumption share, because more multinational firms will decide to produce in country *j*. But consumer surplus will be positively affected, as shown in Equation 15.

To formalise these findings, we compute market shares of domestic, multinational and exporting firms as a function of trade and capital cost, in the following equations.

$$\lambda_{ii}^{D} = n_{Ei}(w_i)^{-k}(w_i f_{ii})^{1-\frac{k}{\sigma-1}}\,\Theta_i{}^{-1} \quad \text{(Eq. 18)}$$

$$\lambda_{ii}^{M} = \sum_{j\neq i} n_{Ej}\,(w_i)^{1-\sigma}\left(\frac{w_i\left(c_i f_{ii}^M - f_{ji}\right)}{\left[w_i^{1-\sigma}-\left(w_j\tau_{ji}\right)^{1-\sigma}\right]}\right)^{1-\frac{k}{\sigma-1}}\Theta_i{}^{-1} \quad \text{(Eq. 19)}$$

[29] Note that this value may exceed the total value of trade flow, given that in some special cases (when the relative fixed cost to produce abroad are smaller than the relative variable cost to export) the productivity threshold of FDI may be lower than the exporting threshold, as for some firms may be profitable to produce abroad but not to export.

$$\lambda_{ji}^{Exp} = \sum_{j \neq i} n_{Ej} \left(\tau_{ji} w_j\right)^{1-\sigma} \left\{ \left[\frac{\left(w_j \tau_{ji}\right)^{1-\sigma}}{w_i f_{ji}} \right]^{\frac{k}{\sigma-1}-1} - \left[\frac{w_i^{1-\sigma} - \left(w_j \tau_{ji}\right)^{1-\sigma}}{w_i \left(c_i f_{ii}^{M} - f_{ji}\right)} \right]^{\frac{k}{\sigma-1}-1} \right\} \Theta_i^{-1} \qquad \text{(Eq. 20)}$$

Where $\Theta_i = n_{Ei}(w_i)^{-k}(w_i f_{ii})^{1-\frac{k}{\sigma-1}} + \sum_{j \neq i} n_{Ej} \left(\tau_{ji} w_j\right)^{1-\sigma} \left\{ \left[\frac{\left(w_i \tau_{ij}\right)^{1-\sigma}}{w_j f_{ij}} \right]^{\frac{k}{\sigma-1}-1} - \left[\frac{w_j^{1-\sigma} - \left(w_i \tau_{ij}\right)^{1-\sigma}}{w_j c_j F_{ij}} \right]^{\frac{k}{\sigma-1}-1} \right\} +$

$\sum_{j \neq i} n_{Ej} (w_i)^{1-\sigma} \left(\frac{w_i c_i (f_{ii}^{M} - f_{ji})}{\left[w_i^{1-\sigma} - \left(w_j \tau_{ji}\right)^{1-\sigma} \right]} \right)^{1-\frac{k}{\sigma-1}}$

λ_{ii}^{D} is the market share of domestic firms in the own market, λ_{ii}^{M} is the share of multinational firms in the producing market *i* and λ_{ji}^{Exp} is the market share of all the firms exporting to market *i*. n_{Ei} and n_{Ej} are the number of entrant firms in country *i* and *j* respectively, computed as shown in the Appendix C.

6.2 The mega-event bidding model.

After we described the effect of capital controls on consumer welfare and firms, we can model the behaviour of governments bidding for a mega-event. Governments collect the money to organise a mega-event taxing indiscriminately labour and profits[30].

$$R_i = \delta_i * \left[(\lambda_{ii}^{D} + \lambda_{ii}^{M}) X_i + \sum_j \lambda_{ij}^{Exp} X_j \right] \qquad \text{(Eq. 21)}$$

As shown in Equation 21, fiscal revenues in country *i* (R_i) can be written as a function of an average tax rate of country *i* (δ_i) to the tax base $\left[(\lambda_{ii}^{D} + \lambda_{ii}^{M}) X_i + \sum_j \lambda_{ij}^{Exp} X_j\right]$, where $X_{i,j}$ is the total consumption of goods in countries *i* and *j*, λ_{ij}^{Exp} is the market share of the firms exporting from country *i* to country *j*, λ_{ii}^{D} is the market share of the domestic firms in the own country and λ_{ii}^{M} is the market share of the multinational firms in country *i*. Fiscal revenues are therefore a function of the total production of all firms in the country.

[30] Consumption taxes are not considered, as they are indifferent to our analysis (they are charged on both import and domestic production).

Because firms do not observe future trade tariffs and capital controls, countries signal to international markets their intention to liberalise (and to keep liberalisation policies) bidding for a costly event. Countries compete to retain or attract investments, as firms compete in international market to retain or reach new clients. For firms, advertising is a costly signal that reduces the cost of information and send a credible signal about the quality of the products, as shown in the seminal paper of Kihlstrom and Riordan (1984) or in Kirmani (1997). For national governments, bidding is the costly signal equivalent to the firms' advertising, which sends a credible signal about the competitive quality of the business environment.

When governments are rational[31], they will bid for a mega-event only if the expected hosting costs are at least equal to the increase in fiscal revenues. We define $\hat{R}_i$ the increase in fiscal revenues due to economic liberalisations and $pr(ME) * C(ME)$ the expected cost of the bidding. $Pr(ME)$ is the probability to host one mega-event, and $C(ME)$ is the cost of hosting the event.

We can write the bidding condition as $\hat{R}_i \geq pr(ME) * C(ME)$ or explicitly:

$$\delta_i * \left[\left(\hat{\lambda}_{ii}^{D} + \hat{\lambda}_{ii}^{M} \right) X_i + \sum_j \hat{\lambda}_{ij}^{Exp} X_j \right] - pr(ME) * C(ME) \geq 0$$

where $\hat{\lambda}$ is the increase in domestic and exporting market shares following the liberalisation policies. Liberalising trade tariffs and capital market, governments create a pro-business framework, developing business relationships and promoting business activities. As in Rose and Spiegel (2011), signalling and not liberalising is not a sustainable strategy because of the potential cost of the event. Liberalising without signalling is not optimal (see Table 4 in Paragraph 4.2), because firms do not observe future trade tariffs and capital controls. In equilibrium, liberalising countries will signal their liberalisation policies, bidding for a mega-event, while countries not liberalising will not signal.

Therefore, a level of capital controls and trade tariffs reductions exist that cover the expected cost of the bidding, as specified in Equation 22.

[31] Rational governments act to guarantee a non-negative state budget and to prevent investments with negative rate of return. Our main conclusions are not affected if we remove the non-negative budget assumption. Governments with strong preferences for fiscal deficit budget will be more likely to bid for mega-events but with lower credibility (budget deficit are observables).

$$\frac{dR}{dc_i}\Delta c_i + \sum_j \frac{dR}{d\tau_{ij}}\Delta\tau_{ij} = pr_i(ME) * C(ME) \qquad \text{(Eq. 22)}$$

Plugging equations from 18 to 20 into 22, it is possible to derive the following budget constraint for the bidding countries:

$$\delta_i \frac{d(\lambda_{ii}^D + \lambda_{ii}^M)}{dc_i}\Delta c_i X_i + \delta_i \sum_j \frac{d(\lambda_{ij}^{Exp})}{d\tau_{ij}}\,\Delta\tau_{ij}\,X_j = pr_i(ME) * C(ME) \qquad \text{(Eq. 23)}$$

No further constraints are applied by the consumer welfare, as we showed in Equation 15 that a reduction of capital controls or trading tariffs reduces the price index of the representative consumer, increasing the welfare gain.

6.3 The empirical specification of the mega-event bidding model.

Countries will not bid to host a mega-event if the reduction of Δc_i and $\Delta\tau_{ij}$ do not generate enough fiscal revenues to cover the expected cost of the event. Consequently, the more a country will gain from liberalisations, the more likely it will bid to host a mega-event.

Taking into account a longer period of time ($\bar{t}$), the number of mega-events for which a country can compete increases. In this setting, the probability for country *i* to host at least one mega-event, $pr_{i\bar{t}}^{host}(ME)$, is equal to the number of biddings ($b_{i\bar{t}}$) of country *i* during the timespan $\bar{t}$, multiplied by the average probability $pr_{i\bar{t}}^{win}(ME)$ to win the competition for one of the mega-events planned in the timespan $\bar{t}$. Namely, $pr_{i\bar{t}}^{host}(ME) = b_{i\bar{t}}\, pr_{i\bar{t}}^{win}(ME)$. Plugging this last equation in Equation 23, we derive in Equation 24 the maximum number of biddings, $b_{i\bar{t}}$, that a country will submit, during the period $\bar{t}$, to signal to multinational firms the extent of future liberalisations.

$$b_{i\bar{t}} = \frac{\delta_{i\bar{t}} \frac{d\left(\lambda_{ii\bar{t}}^D + \lambda_{ii\bar{t}}^M\right)}{dc_{i\bar{t}}}\Delta c_{i\bar{t}} X_{i\bar{t}} + \delta_{i\bar{t}} \sum_j \frac{d(\lambda_{ij\bar{t}}^{Exp})}{d\tau_{ij\bar{t}}}\,\Delta\tau_{ij\bar{t}}\,X_{ij\bar{t}}}{pr_{i\bar{t}}^{win}(ME) * C(ME)} \qquad \text{(Eq. 24)}$$

This last equation explains why countries repeatedly bid to host both the same and different kinds of mega-events, providing some intuition to explain the increasing level of competition to host

mega-events. Because λ_{ii}^{M} and λ_{ii}^{Exp} are also a function of capital controls and trade tariffs of other countries, policy reactions to changing global business environment are required to maintain the same level of fiscal revenues and country competitive level (to provide a policy competition model in a general equilibrium setting goes beyond the aim of this paper).

Multinational firms, that directly observe the number of bids in the timespan $\bar{t}$, gain information on the extent of the country liberalisation ($\Delta c_{i\bar{t}}$ and $\Delta \tau_{ij\bar{t}}$), choosing where to locate their production sites in order to maximise their profits[32].

Considering that the numerator of Equation 24 is equal to the domestically produced goods consumption change $\left(\frac{d(\lambda_{ii\bar{t}}^{D}+\lambda_{ii\bar{t}}^{M})}{dc_{i\bar{t}}}\Delta c_{i\bar{t}}X_{i\bar{t}} = \Delta X_{ii\bar{t}}\right)$ and the sum of total exports changes $\left(\sum_j \frac{d(\lambda_{ij\bar{t}}^{Exp})}{d\tau_{ij\bar{t}}}\Delta\tau_{ij\bar{t}}X_{ij\bar{t}} = \sum_j \Delta X_{ij\bar{t}}\right)$ in period $\bar{t}$, we can test if the coefficient $\frac{\delta_{i\bar{t}}}{pr_{i\bar{t}}^{win}(ME)*C(ME)}$ is positive and statistically different from 0, regressing the variation of total export and domestic goods' consumption on the total number of bidding $b_{i\bar{t}}$. We therefore rewrite Equation 24 as

$$b_{i\bar{t}} = \frac{\delta_{i\bar{t}}}{pr_{i\bar{t}}^{win}(ME) * C(ME)}\left(\Delta X_{ii\bar{t}} + \sum_j \Delta X_{j\bar{t}}\right) \qquad \text{(Eq. 25)}$$

and we consider as $\bar{t}$ the period between year 1975 and 2005, in which the Fraser institute computes the capital controls and trade tariffs variables. $\Delta X_{ii\bar{t}}$ and $\sum_j \Delta X_{j\bar{t}}$ are thus the differences of real domestic consumption[33] and real total export between the year 2005 and 1975, while $b_{i\bar{t}}$ is the sum of bids submitted by country *i* during $\bar{t}$ for all mega events (Summer Olympics, World Cup or Expo). We consider such a long period of time for a better identification purpose. To identify the parameter $\frac{\delta_{i\bar{t}}}{pr_{i\bar{t}}^{win}(ME)*C(ME)}$ we need to simplify assuming $\delta_{i\bar{t}} = \delta_{\bar{t}}$ and $pr_{i\bar{t}}^{win} = pr_{\bar{t}}^{win}$. We are therefore estimating the average tax-to-base ratio on the average expected cost to host a mega-event.

Estimates in Table 12 confirm our expectation. The coefficient computed in Model 1 is small, as expected, and significative. If we estimate 2 different parameters for domestic consumption and total export variations (Model 2), we observe that their values are not statistically different (p>90%).

[32] Firms' profits are derived in Equation 5.

[33] The total consumption of domestic produced goods is computed as the total GDP minus the total Exports, at real values (deflated by the CPI urban consumer price), using the Head et al. (2011) dataset.

This seems to support the idea of a unique tax-to-base ratio for export and domestic consumption, confirming that tax revenues are collected independently to the goods' destination markets. From Model 3 to Model 5 we finally compute as explanatory variables the fitted variations of total export ($\widehat{\sum_J \Delta X_{\iota J \bar{t}}}$) and domestic consumption ($\widehat{\Delta X_{\iota\iota\bar{t}}}$) that are produced by changes in capital controls and trade tariffs[34]. This is equivalent to instrument changes of domestic production and total export with the changes in capital controls and tariffs variables respectively, in order to compute the direct effect on the number of bidding. Coefficients continue to be positive[35], confirming that the more a country will gain from liberalising, the more it will bid to host mega-events, for the signalling purpose. To conclude, setting an average tax-to-base ratio ($\delta_{\bar{t}}$) equal to 32.6% (the average tax to GDP ratio for the OECD countries, from 1990 to 2005) and a probability to host the event ($pr_{\bar{t}}^{win}$) equals to one over six (that is about the average number of the countries bidding for the most recent Summer Olympic Games), the average expected loss to host a Summer Olympic is equal to about 988 millions of USD (at 2005 level price), when we consider the coefficient estimated in model 1. A value that seem comparable to the average net cost reported for some events.

[34] The predicted percentage changes are estimated from $\Delta lnX_{ii\bar{t}} = \beta_1 \Delta lnc_{i\bar{t}} + \epsilon_{it}$ and $\Delta ln \sum_j X_{ij\bar{t}} = \beta_2 \Delta lnTariffs_{i\bar{t}} + \eta_{it}$ while $\widehat{\Delta X_{\iota\iota\bar{t}}} = \left(1 + \widehat{\Delta lnX_{\iota\iota\bar{t}}}\right) X_{ii75}$ and $\widehat{\sum_J \Delta X_{\iota J\bar{t}}} = \left(1 + \widehat{\Delta ln \sum_J X_{\iota J\bar{t}}}\right) \sum_j X_{ij75}$

[35] Even if the impact estimated for $\widehat{\sum_J \Delta X_{\iota J\bar{t}}}$ is not significant in Model 3, because of the reduced number of observations and correlation with $\widehat{\Delta X_{\iota\iota\bar{t}}}$. Moreover, the Tariffs variable computed by the Fraser institute is not a perfect proxy for the exporting cost.

Table 12 – Estimates for the ratio of the tax average elasticity over the expected hosting cost of the event $\frac{\delta_{i\bar{t}}}{pr_{i\bar{t}}^{win}(ME)*C(ME)}$, defined in Equation 25.

	(1)	(2)	(3)	(4)	(5)
Estimation Technique	OLS	OLS	OLS	OLS	OLS
Dependent Variable	$b_{i\bar{t}}$	$b_{i\bar{t}}$	$b_{i\bar{t}}$	$b_{i\bar{t}}$	$b_{i\bar{t}}$
Independent variables:					
$\Delta X_{ii\bar{t}} + \sum_i \Delta X_{j\bar{t}}$	1.98e-06***				
	(1.65e-07)				
$\Delta X_{ii\bar{t}}$		1.76e-06***			
		(2.29e-07)			
$\sum_i \Delta X_{j\bar{t}}$		3.25e-06^{+}			
		(1.86e-06)			
$\widehat{\Delta X_{ii\bar{t}}}$			1.92e-06***		2.44e-06***
			(8.21e-07)		(2.32e-07)
$\sum_J \widehat{\Delta X_{ij\bar{t}}}$			5.08e-06	2e-05**	
			(8.44e-06)	(5.40e-06)	
N	140	140	50	86	54
R-sq	0.52	0.53	0.60	0.47	0.60
$\Delta X_{ii\bar{t}} = \sum_j \Delta X_{j\bar{t}}$ (p-value)		0.47			

*Robust standard errors in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001*

Note: This table shows estimates of parameter $\frac{\delta_{\bar{t}}}{pr_{\bar{t}}^{win}(ME)*C(ME)}$ in Equation 25. $\Delta X_{ii\bar{t}}$ and $\sum_j \Delta X_{j\bar{t}}$ are differences in real domestic consumption and real total export between 2005 and 1975, while $b_{i\bar{t}}$ is the total number of bids of country *i* during the same period. $\widehat{\Delta X_{ii\bar{t}}}$ is the fitted variation in domestic consumption computed using the capital control elasticity estimated by regressing the difference of the log of capital control c_i in 2005 and 1975 over the difference of the log of domestic consumption between 2005 and 1975 ($\Delta ln X_{ii\bar{t}} = \beta_1 \Delta ln c_{i\bar{t}} + \epsilon_{it}$). $\sum_J \widehat{\Delta X_{ij\bar{t}}}$ is the fitted variation in total export computed using the Tariffs variable elasticity estimated by regressing the difference of the log of Tariffs variable in 2005 and 1975 over the difference of the log of total export between 2005 and 1975 ($\Delta ln \sum_j X_{ij\bar{t}} = \beta_2 \Delta ln Tariffs_{i\bar{t}} + \eta_{it}$). Standard errors are robust to heteroskedasticity.

7. Conclusion

In this paper, we investigated empirically and theoretically the impact of mega-events on export and FDI. We found robust evidence of an interaction effect between legal families and the impact on exports of bidding, successfully or unsuccessfully, for mega-events. Civil-law countries exhibit a positive, strong and persistent effect after the bidding while common-law countries report a null effect. On the other hand, a positive effect on FDI is confirmed only for common-law countries. We propose a possible explanation for this heterogeneous effect introducing trade tariff and capital control variables. We discover different liberalisation behaviours among countries after bidding for a mega-event. Civil-law countries primarily liberalise by reducing trade tariffs while common-law countries, having ex-ante lower trade tariffs in comparison to civil-law countries, liberalise by reducing capital controls. These findings are confirmed in our analysis when inward FDI are taken into consideration. The inflow of foreign direct investments increases only in the common-law countries.

According to previous signalling model of liberalisations, countries bidding for a mega-event signal to private investors future liberalisation policies that increase investments in exporting sectors, increasing national exports. Nevertheless, common-law countries seem not to take advantage of liberalisation through this channel. We therefore justify our novel findings in a new theoretical framework, including capital controls and trade tariffs. Including capital controls and multinational firms in a novel gravity model of trade, we provide new evidence that consumer surplus and fiscal revenue may be increased if capital controls were eased. Easing capital controls in the exporting market induces the most productive exporting firms to produce locally by lowering trade flows, consumer prices and increasing FDI. Accordingly, the tax base of the liberalising country rises, as in the case of exporting trade tariffs reductions. We therefore formalise a new signalling model, where the bigger and more liberalising countries submit multiple bids for different mega-events to signal to the market the extent of their liberalisations.

From a policy perspective, we provide some relevant findings: easing capital controls increases consumer welfare and fiscal revenue, when multinational firms (FDIs) are taken into consideration, and countries strongly compete to signal the competitive environment of the country to the international market. Liberalising without signalling has a marginal effect on export, because firms do not directly observe the (present and future) liberalisation behaviour of the countries. Signalling the improvement of the economic framework with burning money policies is therefore needed to increase international and export related investments. This is particularly relevant for all emerging countries having the ambition of becoming global players (as happened to China or South Africa). Nevertheless, it seems that even other relatively smaller events can produce a credible signal,

as proved by the Copa América effect. Burning money policies are therefore justified in this new economic framework, in exactly the same way that firms spend money for advertising purpose. The main, even counterintuitive, implication is that countries must bid to host mega-events to attract or preserve international and export related investments. Although from our empirical analysis we found that only civil law countries experience an increase of export that justifies the expected cost of the bidding, in the theoretical and FDI analysis we provided some evidences that explain why common law countries too chose to bid. As civil law countries signal trade liberalisation by bidding for mega-events, to increase investments in the exporting sector, it is reasonable to suppose that the same signalling effect shall apply to international investments for capital controls liberalisation, in common law countries. Given these results, we can assert that both civil and common law countries must signal the extent of their liberalisations, to maximise the economic output.

To the best of our knowledge, we are even the first to propose a gravity equation of trade that includes multinational firms' mobility. According to our specification, import flows decrease when the importer country reduces capital controls, given that more multinational firms prefer to produce in the local market, and the price index of the representative consumer decreases. As a consequence, changes in consumer welfare can not be estimated relying solely on import share variation. This important implication must be considered in all the comparative welfare analysis.

Further development should be to consider symmetric trade and capital controls liberalizations to develop a general equilibrium policy competition model and to classify what kind of event (or burning money policies) must be considered eligible for sending a credible signal to international investors.

References

Abadie, Alberto, and Javier Gardeazabal, 2003. "The Economic Costs of Conflict: A Case Study of the Basque Country ." *American Economic Review*, 93(1): 113-132.

Anderson, J., and E. van Wincoop, 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review*, 93(1), 170-192.

Aghion, Philippe, Robin Burgess, Stephen Redding, and Fabrizio Zilibotti (2008). "The Unequal Effects of Liberalisation: Evidence from Dismantling the License Raj in India."*American Economic Review, 98*, 1397–1412.

Baltagi, Badi H. & Egger, Peter, & Pfaffermayr, Michael, 2014. "Panel Data Gravity Models of International Trade", *CESifo Working Paper Series 4616*, CESifo Group Munich.

Beck, Thorsten & Demirguc-Kunt, Asli & Levine, Ross, 2003. "Law and finance: why does legal origin matter?," Journal of Comparative Economics, Elsevier, vol. 31(4), pages 653-675, December.

Behar, Alberto & Nelson, Benjamin D., 2014. "Trade Flows, Multilateral Resistance, and Firm Heterogeneity", *The Review of Economics and Statistics*, MIT Press, vol. 96(3), pages 538-549, July.

Bista, Rishaw, 2011. "Revisiting the Olympic effect", Working paper, FREIT working paper n. 335

Bista, R., 2017. Revisiting the Olympic Effect. *Review of International Economics*, 25: 279-291. doi:10.1111/roie.12266

Botero, Juan, & Djankov, Simeon, & Rafael Porta & Florencio C. Lopez-De-Silanes, 2004. "The Regulation of Labor", *The Quarterly Journal of Economics*, MIT Press, vol. 119(4), pages 1339-1382, November.

Cameron, A. Colin and L. Miller, Douglas, 2015. "A Practitioner's Guide to Cluster-Robust Inference", *Journal of Human Resources*, Vol.50, No. 2, pp.317-373.

Coates, Dennis and Brad R. Humphreys. 2003. "The Effects of Professional Sports on Earnings and Employment in the Retail and Services Sector of U.S. Cities." *Regional Science and Urban Economics*. 33(2): 175-198.

Correia, Sergio, Paulo Guimarães, Thomas Zylkin: "ppmlhdfe: Fast Poisson Estimation with High-Dimensional Fixed Effects", 2019; arXiv:1903.01690.

Dainow, Joseph. "The Civil Law and the Common Law: Some Points of Comparison," American Journal of Comparative Law, volume 15, number 3 (1966-7), p. 419-35

Damaska, Mirjan R., 1986, The Faces of Justice and State Authority, New Haven, Yale University Press.

Dixit, A., Sitlitz, J.E., 1977, Monopolistic competition and optimum product diversity, American Economic Review 67 (3), 297-308.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2002, "The Regulation of Entry", *Quarterly Journal of Economics* 117 (1), 1-37.

Djankov, Simeon & Shleifer, Andrey, 2003. "Who Owns the Media?," *Journal of Law and Economics*, University of Chicago Press, vol. 46(2), pages 341-81, October.

Djankov, Simeon and McLiesh, Caralee and Ramalho, Rita Maria, 2006. "Regulation and growth", *Economics Letters*, Elsevier, vol. 92(3), pages 395-401, September.

Egger, Peter H. & von Ehrlich, Maximilian, & Nelson, Douglas R., 2012. "Migration and Trade", *The World Economy*, Wiley Blackwell, vol. 35(2), pages 216-241, 02.

Grossman, Sanford J., and Oliver D. Hart. 1986. The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy* 94(4): 691-719.

Hart, Oliver, and John Moore, 1990. Property rights and the nature of the firm. *Journal of Political Economy* 98(6): 1119-1158.

Hayek, Friedrich,1960. "The Constitution of Liberty". Chicago; *University Of Chicago Press*.

Head, K., Mayer, T. & Ries, J., 2010. "The erosion of colonial trade linkages after independence", *Journal of International Economics*, 81(1):1-14

Head, K. and Mayer T., 2011. "Gravity, Market Potential and Development", *Journal of Economic Geography* 11(2): 281-294.

Helpman, Elhanan, Marc J. Melitz, and Stephen R. Yeaple, 2004. "Export Versus FDI with Heterogeneous Firms." *American Economic Review*, 94(1): 300-316.

Islam, Roumeen & Reshef, Ariell, 2006. "Trade and harmonization: if your institutions are good, does it matter if they are different?",Policy Research Working Paper Series 3907, The World Bank.

Johnson, S., McMillan, J., Woodruff, C., 2002a. Courts and relational contracts. *Journal of Law, Economics, and Organization* 18, 221-277.

Johnson, S., McMillan, J., Woodruff, C., 2002b. Property rights and finance. *American Economic Review 92*, 1335-56.

Kihlstrom, Richard E., & Riordan, Micheal H., 1984. "Advertising as a Signal", *Journal of Political Economy* Vol. 92, No. 3, pp. 427-450.

Kirmani, Amna, 1997. "Advertising Repetition as a Signal of Quality: If It's Advertised so Much, Something Must Be Wrong." *Journal of Advertising*, vol. 26, no. 3, pp. 77–86.

Klein, Benjamin & Crawford, Robert G & Alchian, Armen A, 1978. "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process", *Journal of Law and Economics*, University of Chicago Press, vol. 21(2), pages 297-326, October.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 1997. "Legal determinants of external finance", *Journal of Finance 52*, pages 1131-1150.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Law and finance, *Journal of Political Economy 106*, 1113-1155.

La Porta, R., F. L´opez-de-Silanes, A. Shleifer, and R. W. Vishny. 2002. "Investor protection and corporate valuation." *Journal of Finance 57* (3), 1147–1170.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2008. "The Economic Consequences of Legal Origins." *Journal of Economic Literature*, 46(2): 285-332.

Mahoney, P., 2001. “The Common law and economic growth: Hayek might be right”. *Journal of Legal Studies 30*, 503-525.

Méngova, Evelina, 2012. “The Impact of Legal Systems on Trade Flows in Western and Eastern Europe – An Empirical Evaluation.” *The International Trade Journal*, 2012, 26(1), 37-60.

Merryman, J.H., 1985. The Civil Law Tradition: An Introduction to the Legal Systems of Western Europe and Latin America. Stanford University Press, Stanford, CA

Mulligan, C. and A. Shleifer (2005), “Conscription as Regulation”, *American Law and Economics Review 7*, 85–111

Nunn, Nathan, 2007. "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade", *The Quarterly Journal of Economics*, MIT Press, vol. 122(2), pages 569-600, 05.

Posner, Richard A., 1973. Economic Analysis of Law (Little Brown and Company, 1973).

Preuss, H.,2004. “The Economics of staging the Olympics. A Comparison of the Games 1972-2008”, Cheltenham, Glos: Edward Elgar

Rose, Andrew K., and Spiegel, Mark M., 2011. "The Olympic Effect", *Economic Journal*, Royal Economic Society, vol. 121(553), pages 652-677, 06.

Sachs, J. and A. Werner (1995), “Economic Reform and the Process of Global Integration”, Brookings Papers on Economic Activity, 1: 1-95.

Santos Silva, J. M. C., and Tenreyro, Silvana, 2006. "The Log of Gravity", *The Review of Economics and Statistics*, MIT Press, vol. 88(4), pages 641-658, November.

Santos Silva, J.M.C. & Tenreyro, Silvana, 2011. "Further simulation evidence on the performance of the Poisson pseudo-maximum likelihood estimator", *Economics Letters*, Elsevier, vol. 112(2), pages 220-222, August.

Siegfried, John J., and Andrew Zimbalist. 2000. "The Economics of Sports Facilities and Their Communities." *Journal of Economic Perspectives*, 14(3): 95-114

Wacziarg, R. and K. H. Welch, 2003. “Trade Liberalisation and Growth: New Evidence”, NBER Working Paper No. 10152.

Williamson, Oliver, 1979. “Transaction-Cost Economics: The Governance of Contractural Relations”, *Journal of Law and Economics*, 22, issue 2, p. 233-61.

Williamson, Oliver, 1985. The economic institutions of capitalism. New York, NY: Free Press

Evgeny Yakovlev, Ekaterina Zhuravskaya, 2013. “The Unequal Enforcement of Liberalisation: Evidence from Russia’s Reform of Business Regulation”, *Journal of the European Economic Association*, Volume 11, Issue 4, 1 August 2013, Pages 808–838, https://doi.org/10.1111/jeea.12026.

Appendix

A. Bidding countries

Table A.1 - Countries bidding for or hosting the Summer Olympics, World Cup or Expo

Country	1948	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
British legal origin countries																														
AUS									HOST SOG																					
CAN																				HOST EXPO					BID SOG				HOST SOG	
GBR	HOST SOG																		HOST WC											
USA	BID SOG				BID SOG				BID SOG				BID SOG				BID SOG				BID SOG				BID SOG				BID SOG	
ZAF																														
French legal origin countries																														
ARG									BID SOG		BID WC				BID WC						BID SOG		BID WC							
BEL											HOST EXPO		BID SOG				BID SOG													
BRA			HOST WC																											
CHL											BID WC				HOST WC															
COL																														
ESP																			BID WC						BID SOG		BID WC			
FRA																					BID SOG									
GRC																														
ITA													HOST SOG																	
MAR																														
MEX									BID SOG		BID WC										HOST SOG		HOST WC							
NLD					BID SOG																									
TUR																														
German legal origin countries																														
AUT																	BID SOG													
CHE	BID SOG						HOST WC						BID SOG																	
GER															BID WC				BID WC						HOST SO		HOST WC			
HUN													BID SOG																	
JPN													BID SOG				HOST SOG						HOST EXPO							
KOR																														
CHN																														

Country	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	2006
British legal origin countries																													
AUS															BID SOG				BID SOG				HOST SOG						
CAN									BID WC										BID SOG										
GBR													BID WC		BID SOG								BID SOG						BID WC
USA			BID SOG				HOST SOG		BID WC								HOST WC		HOST SOG										
ZAF																											BID SOG		BID WC
French legal origin countries																													
ARG	HOST WC																										BID SOG		
BEL																													
BRA																	BID WC												
CHL																	BID WC												
COL									BID WC																				
ESP					HOST WC										HOST SOG / HOST EXPO														
FRA															BID SOG						HOST WC								
GRC													BID WC						BID SOG								HOST SOG		
ITA													HOST WC														BID SOG		
MAR																	BID WC				BID WC								BID WC
MEX	BID WC								HOST WC																BID WC				
NLD															BID SOG														
TUR																							BID SOG						
German legal origin countries																													
AUT																													
CHE																					BID WC								
GER					BID WC																		BID SOG / HOST EXPO						HOST WC
HUN																													
JPN											BID SOG																		
KOR											HOST SOG														HOST WC				
CHN																							BID SOG						

List of countries that have bid or host for a World Cup (WC), Summer Olympic Games (SOG) or Universal Exhibition (EXPO). Bidder countries are countries that have bid for the specific event of year t but were not award winner

Table A.2: Summer Olympic Bidding countries tend to host or bid for other Mega-events

Country	Legal origin system	Host SOG	Bid SOG	Bid/host for others MEs before SOG bidding	Bid/host for others MEs after SOG bidding
AUS	British	Y	Y		
CAN	British	Y	Y	Y	Y
ESP	French	Y	Y	Y	Y
GER	German	Y	Y	Y	Y
CHE	German		Y		Y
GRC	French	Y	Y	Y	Y
ITA	French	Y	Y		Y
JPN	German	Y	Y		Y
KOR	German	Y	Y		Y
MEX	French	Y	Y		Y
USA	British	Y	Y		Y
NLD	French		Y		
ARG	French		Y		Y
BEL	French		Y	Y	Y
HUN	German		Y		Y
AUT	German		Y		
FRA	French		Y		Y
GBR	British		Y	Y	Y
CHN	German		Y		
TUR	French		Y		
ZAF	British		Y		Y

Note: List of Summer Olympics (SOG) bidding countries that also bid or host for a World Cup or Universal Exhibition.

B. FDI productivity threshold

To compute Equation 7, we multiply the numerator and denominator of Equation 6 for $\frac{w_j f_{ij}}{w_j f_{ij}}$ and $\frac{(w_i\tau_{ij})^{1-\sigma}}{(w_i\tau_{ij})^{1-\sigma}}$ respectively:

$$\varphi_{jj}^{*M,i} = \left\{ \frac{w_j\left(c_j f_{jj}^{M} - f_{ij}\right) * \frac{w_j f_{ij}}{w_j f_{ij}}}{\left[w_j^{1-\sigma} - \left(w_i\tau_{ij}\right)^{1-\sigma}\right] * \frac{\left(w_i\tau_{ij}\right)^{1-\sigma}}{\left(w_i\tau_{ij}\right)^{1-\sigma}} * \left[\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma}\frac{X_j}{P_j^{1-\sigma}}\right]} \right\}^{\frac{1}{\sigma-1}}$$

Solving and rearranging the equation we can rewrite:

$$\varphi_{jj}^{*M,i} = \left\{ \frac{w_j f_{ij}}{\left(w_i \tau_{ij}\right)^{1-\sigma} \left[\frac{1}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \frac{X_j}{P_j^{1-\sigma}}\right]} \right\}^{\frac{1}{\sigma-1}} * \left\{ \frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)}{\left[\frac{w_j^{1-\sigma}}{\left(w_i \tau_{ij}\right)^{1-\sigma}} - 1\right]} \right\}^{\frac{1}{\sigma-1}}$$

or

$$\varphi_{jj}^{*M,i} = \varphi_{ij}^{*} \left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1\right)}{\left(\frac{w_i \tau_{ij}}{w_j}\right)^{\sigma-1} - 1} \right]^{\frac{1}{\sigma-1}}$$

C. Free entry condition

Free entry condition equals $\frac{w_i f_{Ei}}{1-G(\varphi_{ii}^*)} = [1 - G(\varphi_{ii}^*)]\overline{\Pi}_{ii} + \sum_j \left\{ \left[\left(1 - G\left(\varphi_{ij}^*\right)\right) - \left(1 - G\left(\varphi_{jj}^{*M,i}\right)\right) \right] \overline{\Pi}_{ij} + \left[1 - G\left(\varphi_{jj}^{*M,i}\right)\right] \overline{\Pi}_{jj}^{M,i} \right\}$. Where $\overline{\Pi_{ii}}$ are the average profits of the domestic, not exporting, firms, $\overline{\Pi}_{ij}$ are the average profits of the exporting firms and $\overline{\Pi}_{jj}^{M,i}$ are the average profits of the multinational firms, producing in market *j*. Average profit on country *i* are equal to:

$$\begin{aligned}
\overline{\Pi}_i = & \int_{\varphi_{ii}^*}^{\infty} r_{ii} * \left(\frac{dG(\varphi)}{1 - G(\varphi_{ii}^*)}\right) - \int_{\varphi_{ii}^*}^{\infty} w_i f_{ii} * \left(\frac{dG(\varphi)}{1 - G(\varphi_{ii}^*)}\right) \\
& + \sum_j \left[\int_{\varphi_{ij}^*}^{\infty} \left(\frac{1 - G\left(\varphi_{ij}^*\right)}{1 - G(\varphi_{ii}^*)}\right) r_{ij} * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{ij}^*\right)}\right) - \int_{\varphi_{ij}^*}^{\infty} \left(\frac{1 - G\left(\varphi_{ij}^*\right)}{1 - G(\varphi_{ii}^*)}\right) w_j f_{ij} * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{ij}^*\right)}\right) \right. \\
& - \int_{\varphi_{jj}^{*M,i}}^{\infty} \left(\frac{1 - G\left(\varphi_{jj}^{*M,i}\right)}{1 - G(\varphi_{ii}^*)}\right) r_{ij} * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{jj}^{*M,i}\right)}\right) + \int_{\varphi_{ji}^*}^{\infty} \left(\frac{1 - G\left(\varphi_{jj}^{*M,i}\right)}{1 - G(\varphi_{ii}^*)}\right) w_j f_{ij} * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{jj}^{*M,i}\right)}\right) \\
& \left. + \int_{\varphi_{jj}^{*M,i}}^{\infty} \left(\frac{1 - G\left(\varphi_{jj}^{*M,i}\right)}{1 - G(\varphi_{ii}^*)}\right) r_{jj} * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{jj}^{*M,i}\right)}\right) - \int_{\varphi_{jj}^{*M,i}}^{\infty} \left(\frac{1 - G\left(\varphi_{jj}^{*M,i}\right)}{1 - G(\varphi_{ii}^*)}\right) c w_j f_{jj}^M * \left(\frac{dG(\varphi)}{1 - G\left(\varphi_{jj}^{*M,i}\right)}\right) \right]
\end{aligned}$$

Therefore, evaluating the integral and using the export cut off productivity:

$$\overline{\Pi}_i = \frac{k}{k-\sigma+1} w_i f_{ii} (\varphi_{ii}^*)^k (\varphi_{ii}^*)^{-k+\sigma-1} - w_i f_{ii} + \sum_j \left\{ \frac{(\varphi_{ii}^*)^k}{(\varphi_{ij}^*)^k} w_j f_{ij} \frac{\sigma-1}{k-\sigma+1} \left(1 - \left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1 \right)}{\left(\frac{w_i \tau_{ij}}{w_j} \right)^{\sigma-1} - 1} \right]^{\frac{-k+\sigma-1}{\sigma-1}} \right) + \frac{(\varphi_{ii}^*)^k}{(\varphi_{ij}^*)^k} w_j f_{ij} \left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1 \right)}{\left(\frac{w_i \tau_{ij}}{w_j} \right)^{\sigma-1} - 1} \right]^{\frac{-k+\sigma-1}{\sigma-1}} \left(\frac{k}{k-\sigma+1} \left(\frac{w_j}{w_i \tau_{ij}} \right)^{1-\sigma} - \frac{c f_{jj}^M}{f_{ij}} \right) \right\}$$

$$\frac{w_i f_{Ei}}{\left(\varphi_i^{min} / \varphi_{ii}^* \right)^k} = \frac{k}{k-\sigma+1} w_i f_{ii} (\varphi_{ii}^*)^{+\sigma-1} - w_i f_{ii} + \sum_j \left\{ \frac{(\varphi_{ii}^*)^k}{(\varphi_{ij}^*)^k} w_j f_{ij} \frac{\sigma-1}{k-\sigma+1} \left(1 - \left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1 \right)}{\left(\frac{w_i \tau_{ij}}{w_j} \right)^{\sigma-1} - 1} \right]^{\frac{-k+\sigma-1}{\sigma-1}} \right) + \frac{(\varphi_{ii}^*)^k}{(\varphi_{ij}^*)^k} w_j f_{ij} \left[\frac{\left(\frac{c_j f_{jj}^M}{f_{ij}} - 1 \right)}{\left(\frac{w_i \tau_{ij}}{w_j} \right)^{\sigma-1} - 1} \right]^{\frac{-k+\sigma-1}{\sigma-1}} \left(\frac{k}{k-\sigma+1} \left(\frac{w_j}{w_i \tau_{ij}} \right)^{1-\sigma} - \frac{c f_{jj}^M}{f_{ij}} \right) \right\}$$

D. Number of entrant firms

In a general equilibrium framework, firms enter the market until the expected profits are equal to 0. Having solved for the cut-off ($\varphi_{ii}^*, \varphi_{ij}^*, \varphi_{jj}^{*M,i}$) and market demand using the free entry condition, is possible to compute the number of entrant firms in every country *i* implying labour market clearing $\left(\sum_j X_{ij} = w_i L_i\right)$. The number of entrant firms is derived as the solution to the following system, where x_{ii}^D is the total production of domestic firm in country *i* while $x_{ji}^{X,FDI}$ are the goods imported by country *j* in country *i* plus the goods produced in country *i* by the multinational firms.

$$\begin{bmatrix} x_{ii}^D & \cdots & x_{ji}^{X,FDI} \\ \vdots & \ddots & \vdots \\ x_{ij}^{X,FDI} & \cdots & x_{jj}^D \end{bmatrix} \begin{bmatrix} n_i^e \\ \dots \\ n_j^e \end{bmatrix} = \begin{bmatrix} w_i L_i \\ \dots \\ w_j L_j \end{bmatrix}$$

For illustrative purpose, we can simplify the solution considering a two-countries' economy. In this framework we can solve the following system of equation:

$$\begin{bmatrix} v_{ii}^{D} & v_{ji}^{X,FDI} \\ v_{ij}^{X,FDI} & v_{jj}^{D} \end{bmatrix} \begin{bmatrix} n_i \\ n_j \end{bmatrix} = \frac{1}{B} \begin{bmatrix} w_i L_i \\ w_j L_j \end{bmatrix}$$

plugging:

$$\mathrm{v_{ii}^{D}} = (\mathrm{w_i})^{-\mathrm{k}} (\sigma \mathrm{w_i f_{ii}})^{1-\frac{\mathrm{k}}{\sigma-1}}$$

$$\mathrm{v_{ji}^{X,FDI}} = \left(\frac{\sigma \mathrm{w_i} \left(\mathrm{c_i f_{ii}^{M}} - \mathrm{f_{ji}} \right)}{\left[\mathrm{w_i^{1-\sigma}} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right]} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left[(\mathrm{w_i})^{1-\sigma} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right] + \left(\sigma \mathrm{w_i f_{ji}} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left(\mathrm{w_j \tau_{ji}} \right)^{-\mathrm{k}}$$

$$\mathrm{B} = \left(\frac{\sigma}{\sigma - 1} \right)^{-\mathrm{k}} \left(\frac{\mathrm{X_i}}{\mathrm{P_i^{1-\sigma}}} \right)^{\frac{\mathrm{k}}{\sigma-1}} \frac{\mathrm{k}}{\mathrm{k} - \sigma + 1} \ \varphi_{\mathrm{MIN}}^{\mathrm{k}}$$

The solution is equal to:

$$n_i = \frac{1}{B \det(V)} \left(v_{jj}^{D} w_i L_i - v_{ji}^{X,FDI} w_j L_j \right)$$

$$n_j = \frac{1}{B \det(V)} \left(v_{ii}^{D} w_j L_j - v_{ij}^{X,FDI} w_i L_i \right)$$

or in an extensive way:

$$\mathrm{n_i} = \frac{1}{\mathrm{B}} \frac{\mathrm{v_{jj}^{D} w_i L_i} - \mathrm{w_j L_j} \left(\frac{\sigma \mathrm{w_i} \left(c_i \mathrm{f_{ii}^{M}} - \mathrm{f_{ji}} \right)}{\left[\mathrm{w_i^{1-\sigma}} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right]} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left[(\mathrm{w_i})^{1-\sigma} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right] + \mathrm{w_j L_j} \left(\sigma \mathrm{w_i f_{ji}} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left(\mathrm{w_j \tau_{ji}} \right)^{-\mathrm{k}}}{\mathrm{v_{ii}^{D} v_{jj}^{D}} - \mathrm{v_{ij}^{X,FDI}} \left\{ \left(\frac{\sigma \mathrm{w_i} \left(c_i \mathrm{f_{ii}^{M}} - \mathrm{f_{ji}} \right)}{\left[\mathrm{w_i^{1-\sigma}} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right]} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left[(\mathrm{w_i})^{1-\sigma} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right] + \left(\sigma \mathrm{w_i f_{ji}} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left(\mathrm{w_j \tau_{ji}} \right)^{-\mathrm{k}} \right\}}$$

$$\mathrm{n_j} = \frac{1}{\mathrm{B}} \frac{\left(\mathrm{v_{ii}^{D} w_j L_j} - \mathrm{v_{ij}^{X,FDI} w_i L_i} \right)}{\mathrm{v_{ii}^{D} v_{jj}^{D}} - \mathrm{v_{ij}^{X,FDI}} \left\{ \left(\frac{\sigma \mathrm{w_i} \left(c_i \mathrm{f_{ii}^{M}} - \mathrm{f_{ji}} \right)}{\left[\mathrm{w_i^{1-\sigma}} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right]} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left[(\mathrm{w_i})^{1-\sigma} - \left(\mathrm{w_j \tau_{ji}} \right)^{1-\sigma} \right] + \left(\sigma \mathrm{w_i f_{ji}} \right)^{1-\frac{\mathrm{k}}{\sigma-1}} \left(\mathrm{w_j \tau_{ji}} \right)^{-\mathrm{k}} \right\}}$$

It follows that, when capital control are eased (lower c_i), the number of entrant firms in country j (n_j) increases while the number of entrant firms in country i (n_i) decreases (this is true only if we assume that capital controls do not affect the cost of production of the domestic firms too; if we remove this

assumption – as in the case that lower *c* decreases the cost of capital – lowering capital controls increases even the profits of domestic firms by augmenting the number).

For the two-country world, the effect on export of an increase of capital control is:

$$X_{ji}^{EXP} = n_j\left(\tau_{ji}w_j\right)^{1-\sigma}\sigma^{1-\frac{k}{\sigma-1}}\left(\frac{\sigma}{\sigma-1}\right)^{-k}\left(\frac{X_i}{P_i^{1-\sigma}}\right)^{\frac{k}{\sigma-1}}\frac{k}{k-\sigma+1}\,\varphi_{MIN}^{k}\left\{\left\{\frac{\left(w_j\tau_{ji}\right)^{1-\sigma}}{w_i f_{ji}}\right\}^{\frac{k}{\sigma-1}-1}\right.$$

$$\left.-\left\{\frac{\left[w_i^{1-\sigma}-\left(w_j\tau_{ji}\right)^{1-\sigma}\right]}{w_i\left(c_i f_{ii}^{M}-f_{ji}\right)}\right\}^{\frac{k}{\sigma-1}-1}\right\}$$

Plugging n_j computed from the previous equation on the gravity model for X_{ji}^{EXP}, and rearranging some terms, we derive

$$X_{ji}^{EXP} = \frac{A\left(v_{ii}^{D}w_jL_j - v_{ij}^{X,FDI}w_iL_i\right)\left\{\left\{\frac{\left(w_j\tau_{ji}\right)^{1-\sigma}}{w_i f_{ji}}\right\}^{\frac{k}{\sigma-1}-1} - \left\{\frac{B}{w_i\left(c_i f_{ii}^{M}-f_{ji}\right)}\right\}^{\frac{k}{\sigma-1}-1}\right\}}{v_{ii}^{D}v_{jj}^{D} - v_{ij}^{X,FDI}\left\{\left(\frac{B}{\sigma w_i\left(c_i f_{ii}^{M}-f_{ji}\right)}\right)^{\frac{k}{\sigma-1}-1}B + C\right\}}$$

$$\left(\tau_{ji}w_j\right)^{1-\sigma}\sigma^{1-\frac{k}{\sigma-1}}\left(\frac{\sigma}{\sigma-1}\right)^{-k}\left(\frac{X_i}{P_i^{1-\sigma}}\right)^{\frac{k}{\sigma-1}}\frac{k}{k-\sigma+1}\,\varphi_{MIN}^{k} = A$$

$$\left[\left(w_i\right)^{1-\sigma}-\left(w_j\tau_{ji}\right)^{1-\sigma}\right] = B$$

$$\left(\sigma w_i f_{ji}\right)^{1-\frac{k}{\sigma-1}}\left(w_j\tau_{ji}\right)^{-k} = C$$

where

$$\frac{d(EXP_{ji})}{dc_i} = +sign$$

whenever $\left(v_{ii}^{D}w_jL_j - v_{ij}^{X,FDI}w_iL_i\right) > 0$

E. Gravity equation for domestic, multinational and exporting firms

Domestic firms

$$X_{ii}^{D} = M_i \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} (w_i)^{1-\sigma} \frac{X_i}{P_i^{1-\sigma}} \frac{k}{k-\sigma+1} \varphi_{MIN}^{k} (\varphi_{ii}^{*})^{-k+\sigma-1}$$

$$X_{ii}^{D} = M_i \left(\frac{\sigma}{\sigma-1}\right)^{-k} (w_i)^{-k} \left(\frac{X_i}{P_i^{1-\sigma}}\right)^{\frac{k}{\sigma-1}} \frac{k}{k-\sigma+1} \varphi_{MIN}^{k} (\sigma w_i f_{ii})^{1-\frac{k}{\sigma-1}}$$

Multinational (FDI) firms

$$X_{ii}^{M} = M_j \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} (w_i)^{1-\sigma} \frac{X_i}{P_i^{1-\sigma}} \frac{k}{k-\sigma+1} \varphi_{MIN}^{k} \left(\varphi_{ii}^{*M,j}\right)^{-k+\sigma-1}$$

$$X_{ii}^{M} = M_j \left(\frac{\sigma}{\sigma-1}\right)^{-k} (w_i)^{1-\sigma} \left(\frac{X_i}{P_i^{1-\sigma}}\right)^{\frac{k}{\sigma-1}} \frac{k}{k-\sigma+1} \varphi_{MIN}^{k} \left(\frac{\sigma w_i \left(c_i f_{ii}^{M} - f_{ji}\right)}{\left[w_i^{1-\sigma} - \left(w_j \tau_{ji}\right)^{1-\sigma}\right]}\right)^{1-\frac{k}{\sigma-1}}$$

Exporting firms

$$X_{ji}^{EXP} = M_j \left(\frac{\sigma}{\sigma-1} \tau_{ji} w_j\right)^{-k} \left(\frac{X_i}{P_i^{1-\sigma}}\right)^{\frac{k}{\sigma-1}} \frac{k}{k-\sigma+1} \varphi_{MIN}^{k} \left(\sigma w_j f_{ji}\right)^{1-\frac{k}{\sigma-1}} \left[1 - \left[\frac{\left(\frac{w_j \tau_{ji}}{w_i}\right)^{\sigma-1} - 1}{c_i \left(\frac{f_{ii}^{M}}{f_{ji}} - 1\right)}\right]^{\frac{k}{\sigma-1}-1}\right]$$