Intellectual Property Production During Market Shocks: Evidence from Hosting Sport Mega Events

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Literature

Mega-events tend not to affect a range of outcomes like personal income, jobs, and business’ taxable sales (Matheson, 2006). Some work focused specifically on service sectors (e.g., Solberg & Preuss, 2007; Kang & Perdue, 1994), documenting very short-term effects. This makes sense given mega-events are short-lived and dependent on tourists. Overall, work suggests that mega-events cannot induce economic development, despite booster groups’ speculations to the contrary.

An important component of economic development is innovative capacity (IC; Fu & Yang, 2009). IC is a nation’s ability to generate and leverage knowledge capital to earn Schumpeterian rents. Mega-events are regarded as significant demand-shifting events for national economies (Dollinger et al., 2010). They facilitate cross-border relationships and require significant technological and infrastructural investment. It stands to reason that hosting a mega-event could help nations develop new technical knowledge – the long-term benefits of which would be essential for economic development.

Purpose & Empirical Analysis

The purpose of this paper is to explore whether hosting a mega-event has an effect on technical knowledge and intellectual property. We leverage a panel dataset of 191 nations over 50 years (N = 9,550) tied to 63 mega-events to develop a cross-country production frontier model of intellectual property (IP). This framework models IP as a function of labor, capital, and inefficiency; and we proxy IP by the number of granted US patents (Furman et al., 2002).

We begin with the translog production function, a flexible form of the Cobb-Douglas. First, agents cannot maximize uncertain inputs (Zellner, Kmenta, & Dreze, 1966), so we expect one-year lags in the outcome. Next, Battese and Coelli (1992) propose a panel-adapted stochastic frontier production function. The estimation equation is:

\[
\ln I_{it} = \alpha_0_{it} + \tau_{it} + \lambda_1_{it} \ln K_{(i-1)} + \pi_2_{it} \ln L_{(i-1)} + \lambda_3_{it} \ln (K_{(i-1)}^2) + \tau_4_{it} \ln (L_{(i-1)}^2) + \phi_5_{it} \ln (K_{(i-1)} L_{(i-1)}) + (v_{it} - u_{it})
\]

i indexes nations; t indexes years

\( I = IP \)

\( K = \) capital

\( L = \) labor

\( \tau_{it} = \) the ‘time-to-event’ covariate

\( u_{it} = \) technical inefficiency; assumed to be iid & \( N(e'_it, \sigma_v^2) \)

\( e'_it = \) a matrix of environmental variables

Results & Contributions

This is a work in progress, so we hypothesize one of two classes of results. Nations may increase production efficiency of IP ahead of a mega-event due to increased demand (Dollinger et al., 2010; Preuss, 2006), generating a positive effect of \( \tau_{it} \) on \( \ln I_{(it+1)} \). In that scenario, we also expect an increase in the sum of \( \lambda_1 \) and \( \pi_2 \), denoting increasing marginal returns to labor and capital. Other work hypothesizes demand adjustment costs that hurt productivity (Bond & Soderbom, 2005), suggesting a negative effect of \( \tau_{it} \) and/or a decrease in the sum of \( \lambda_1 \) and \( \pi_2 \).
We expect to document negative or null findings, which would be in line with extant literature. This would extend current frameworks of mega-event impact to the context of technical knowledge and intellectual property. It would provide further evidence against the idea that mega-events are beneficial to host economies. Positive effects would constitute a substantial departure from the literature. IP is a valuable and lucrative knowledge resource, which can be genuinely leveraged for long-term development efforts. That produces a number of clear implications for practitioners.